Mark Lett (2013) 24:13–27
DOI 10.1007/s11002-012-9219-9

Customer satisfaction as a buffer against sentimental stock-price corrections

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Published online: 23 November 2012

Abstract Previous research has shown that customer satisfaction is a market-based asset that can contribute to a firm's value by increasing its stock-market returns, while simultaneously reducing the riskiness of these returns. This study contributes to the growing literature on the marketing–finance interface by examining the relationship between customer satisfaction and a type of risk that has not been previously studied in the marketing literature: the vulnerability of a firm's stock price to the stock-market corrections that typically follow periods of high investor sentiment. The results show that customer satisfaction can function as a buffer against the risk of such sentimental stock-price movements and reduces their negative impact on a firm's market value. In particular, we find that firms with higher (lower) levels of customer satisfaction exhibit smaller (greater) price corrections and higher returns after periods of high investor sentiment.

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Keywords Customer satisfaction · Investor sentiment · Market-based assets · Marketing–finance interface

1 Introduction

The financial crisis of 2008–2009 and the subsequent European debt crisis vividly illustrate that besides fundamental factors, such as earnings growth or cash flows, non-fundamental factors, such as investor sentiment, can be important drivers of fluctuations in a firm's stock price. In particular, these recent stock-market episodes demonstrate how a firm's stock price can change substantially without any new fundamental information reaching financial markets. The current study documents that high levels of customer satisfaction can function as a buffer against the risk of such sentimental stock-price movements and reduce the negative impact on a firm's market value of the stock-market corrections that typically follow periods of high investor sentiment.

Customer satisfaction is a well-documented market-based asset. In general, market-based assets arise from the firm's interactions with entities in its external environment and contribute to shareholder value by accelerating and enhancing cash flows, lowering the volatility and vulnerability of cash flows, and increasing the residual value of cash flows (Srivastava et al. 1998). Empirical findings in the marketing literature document a positive relationship between customer satisfaction and good economic performance (Anderson 1996; Anderson et al. 1994, 2004; Ittner and Larcker 1998; Rust et al. 2004). Fornell et al. (2006) even show that firms with satisfied customers have higher stock-market returns, yet do not exhibit higher risks than firms that lack customer satisfaction. These authors conclude that it is possible for investors to beat the market consistently by investing in firms that score well on the American Customer Satisfaction Index (ACSI). Grewal et al. (2010) add to this literature by showing that not only the *level* of customer satisfaction, but also the *heterogeneity* of such satisfaction is important for shareholder value. In particular, satisfaction heterogeneity influences shareholder value in two ways: (1) it reduces the translation of satisfaction into shareholder value, and (2) it reduces the contemporaneous volatility in shareholder value. Focusing on the relationship between customer satisfaction and firm risk, Tuli and Bharadwaj (2009) provide evidence that customer satisfaction is negatively correlated with a firm's overall and downside systematic and idiosyncratic risk. Systematic risk indicates the degree to which a firm's stock returns are a function of market returns, while idiosyncratic risk represents the volatility in a firm's stock returns that cannot be explained by market movements (see, e.g., Markowitz 1952, 1959). Downside systematic risk represents the degree to which stock returns are sensitive to downturns in the stock market (Ang et al. 2006). Downside idiosyncratic risk represents the volatility in stock returns that occurs when a firm's stock returns are negative (see Tuli and Bharadwaj 2009).

The current study contributes to this growing literature on the marketing–finance interface by examining the relationship between a firm's level of customer satisfaction and a type of risk that has not yet received widespread academic attention to date: the vulnerability of a firm's stock price to the stock-market corrections that occur after periods of high investor sentiment. Although the finance literature increasingly

studies investor sentiment as an important type of non-fundamental risk (see, e.g., Baker and Wurgler 2006, 2007), it has so far been overlooked by the marketing literature examining the relationship between customer satisfaction and firm risk.

The remainder of this paper is organized as follows. Section 2 reviews related literature. Section 3 presents descriptive statistics. Section 4 explains the methodology and presents the results. Section 5 concludes the paper.

2 Literature review

2.1 Market-based assets and firm value

Market-based assets are assets whose value arises from the firm's interactions with external parties, such as customers, suppliers, or investors (Srivastava et al. 1998). Marketing activities that manage and leverage market-based assets relate to firm value in two main ways (Aksoy et al. 2008; Gruca and Rego 2005). First, such marketing activities can influence traditional accounting (e.g., profit margins) and finance (e.g., book-to-market ratios) metrics of firm value. Second, such marketing activities can change investors' expectations in terms of the firm's future cash flows. The former link is intuitive, because managing and leveraging customers, brands, channels, and innovations likely adds firm value. The latter link suggests that marketing activities can also create value by influencing investors' perceptions of the firm (Hanssens et al. 2009). Indeed, the rapid growth of investor relations departments demonstrates the importance of creating and maintaining relationships with investors, as well as managing their perceptions of the firm (Rao and Sivakumar 1999). The risk that such perceptions might change for any reason other than fundamental information is referred to by finance scholars as non-fundamental risk (Shefrin 2008). Market-based assets thus relate to sentimental stock prices because of their ability to influence investors' beliefs and expectations.

2.2 Investor sentiment and market-based assets

Investor sentiment is generally defined to encompass both market over- and under-reactions to information, causing stock prices to behave in ways that are not supported by fundamental information. Underlying reasons for investor sentiment relate to behavioral biases and heuristics, as well as to uninformed, overly excited, and trend-following investors (Shefrin 2008). Overall, investor sentiment represents the forces that push stock prices away from their efficient fundamental values. Standard theoretical treatments of investor sentiment consider it exogenous to price formation, and thus many regard it as an external influence on an otherwise independent pricing process. Investor sentiment constitutes an important foundation of behavioral finance, and recent empirical work shows that periods of abnormally high investor sentiment are typically followed by stock-market price corrections (see Baker and Wurgler 2006, 2007).

For managers, a key question is how to protect firms against such sentimental stock-price corrections. Although the investor sentiment literature discusses how investors and investment firms try to profit from stock-price bubbles related to

investor sentiment (Brunnermeier and Nagel 2004), few studies examine the behavior of managers at firms whose stock prices are subject to sentimental stock-price movements. Shleifer and Vishny (2003) relate periods of high sentiment to acquisition waves, showing that managers are more likely to acquire other firms during high-sentiment periods. Ali and Gurun (2009) suggest that managers of small firms increase accruals during periods of high sentiment. These two studies illustrate that management's behavior is, for better or worse, affected by stock-market sentiment, but they do not show whether and how managing market-based assets, such as customer satisfaction, provides a buffer against such sentimental stock-price movements.

2.3 Customer satisfaction, stock prices, and investor sentiment

Customer satisfaction's relationship with stock prices is extensively documented thanks to the public availability of the American Customer Satisfaction Index (ACSI) developed by Fornell et al. (1996). The drivers of ACSI include customer expectations, perceived quality, and perceived value. Customer expectations designate customers' repurchase likelihood. Perceived quality is a post-purchase measure quantifying reliability and customization achieved by the company's product. Perceived value gauges customers' quality assessments relative to the product's price. Fornell et al. (1996) show that the ACSI is positively related to customer repurchase intentions and loyalty. Since their seminal work, many studies using the ACSI indicate the importance of customer satisfaction in terms of a firm's customers (Luo and Bhattarchaya 2006; Gustafsson et al. 2005), employees (Nishii et al. 2008; Evanschitzky et al. 2011; Luo and Homburg 2007), and investors (Gruca and Rego 2005; Grewal et al. 2010; Ali and Gurun 2009; Fornell et al. 2006; Anderson and Mansi 2009; Aksoy et al. 2008; Tuli and Bharadwaj 2009).

Most recent research on customer satisfaction examines the direct financial payoffs of investments in customer satisfaction. Fornell et al. (2006), for example, show that investments in stocks of companies with high customer satisfaction earn high returns with low risk, contradicting the standard finance notion that higher risks must be compensated by higher returns. Their findings indicate that an increase of 1 % in the ACSI rating translates into a 4.6 % increase in the firm's market value and that investors react to reported changes of customer satisfaction. They also report that for the 2000 to 2004 period, portfolios scoring high on the ACSI measure gain 75 %, compared with a loss of 19 % for the S&P 500 as a whole. Meanwhile, they report that the beta on such portfolios is 0.78, which means the ACSI portfolio is less risky than the overall market.

The question that arises is whether investors misunderstand the value of customer satisfaction and are consequently undervaluing these firms, resulting in their subsequently high returns for the betas they exhibit. Using the capital asset pricing model, the Fama and French (1993, 1996) three-factor model and the Carhart (1997) four-factor model, Aksoy et al. (2008) confirm that trading based on ACSI information yields risk-adjusted abnormal returns. These authors confirm that high-satisfaction portfolios perform better than predicted for their levels of risk and support the notion that investors initially underestimate the value created by satisfying customers and that stock prices adjust over time. Evidence of investors having incorrect reactions to

intangible information, such as customer satisfaction, is also documented by finance scholars such as Daniel and Titman (2006), who argue that investors' reaction to tangible information is efficient, but that intangible information leads to abnormal returns.

Not all literature agrees, however, that firms with high customer satisfaction provide abnormal returns. O'Sullivan et al. (2009), Jacobson and Mizik (2009), as well as Derwall et al. (2010), for example, provide evidence that customer-satisfaction information is efficiently priced into equities. In particular, Derwall et al. (2010) use the errors-in-expectations hypothesis to show that investors correctly price customer satisfaction and that customer-satisfaction information is accordingly incorporated into equity prices, suggesting that investors cannot beat the market by strategies to invest in companies with superior customer satisfaction. Ittner et al. (2009) show that mispricing based on customer satisfaction is limited, and that no long-term abnormal returns can be expected from trading based on satisfaction information.

This study proposes that if mispricing arises during a stock-price bubble, high levels of customer satisfaction can minimize the adverse effects of the subsequent correction and result in a net increase in firm value. Empirically, this is equivalent to testing whether stock-price corrections after periods of high investor sentiment differ between firms with high and low customer satisfaction. To perform this analysis, we use three sources of data: publicly available ACSI information, stock-return data from Datastream of the firms incorporated in the ACSI, and a set of investor-sentiment measures obtained from the studies of Baker and Wurgler (2006, 2007).

3 Descriptive statistics

The sample period of our analysis covers 1994 to 2011 and concerns 209 New York Stock Exchange (NYSE)-listed firms for which data are available. The firms belong to several industries and represent such large established firms as General Electric, Google, Microsoft, Prudential, and Whirlpool. Table 1 and Fig. 1 show summary statistics.

3.1 Customer satisfaction

We use the ACSI to operationalize customer satisfaction. The ACSI is an economic indicator based on a model of customer experience developed by Fornell et al. (1996). Every year, the ACSI produces customer satisfaction scores for over 225 firms in 45 different industries and 10 economic sectors.[1] The ACSI contracts a market research firm to collect customer data using surveys, employing a sample that is representative of the U.S. customer population. Standardized satisfaction scores are published monthly, on a scale from 0 to 100, on the ACSI website. Scores represent whether customers feel that the firm's product or service satisfies (or does not satisfy)

[1] Some ACSI scores concern brands that belong to a parent company. In this case, we take the weighted average of the ACSI for all brands belonging to a same parent company.

Table 1 Descriptive statistics: returns, ACSI, and investor sentiment, January 1994 to December 2010

	Number of observation	Mean	Standard deviation	Min.	Max.
Monthly sentiment	204	0.20***	0.57	−0.81	2.32
ACSI (for 209 firms)	1,809	75.95***	6.53	49	95
Returns (%):					
Entire sample	21,332	0.00	0.14	−0.89	1.42
Portfolio deciles					
1 (low ACSI)	2,362	−0.002	0.14	−0.89	1.16
2	2,301	0.002	0.10	−0.65	1.05
3	2,244	0.002	0.10	−0.78	1.19
4	2,235	−0.000	0.11	−0.88	1.20
5	2,129	0.006***	0.11	−0.86	1.18
6	1,859	−0.000	0.10	−0.53	1.10
7	2,100	0.002*	0.11	−0.88	1.15
8	1,919	0.00	0.11	−0.86	1.25
9	2,192	0.00**	0.10	−0.78	1.38
10 (high ACSI)	1,548	0.01***	0.09	−0.63	1.42

This table shows descriptive statistics of the data used in this study. Investor sentiment is measured monthly and is given by the principal component of 6 investor sentiment proxies (Baker and Wurgler 2006). The ACSI is a measure of customer satisfaction. The returns in the sample are monthly returns for each of the 209 NYSE-listed firms included in the sample. Monthly returns are sorted into 10 portfolios according to firms' ACSI level

Significantly different from zero at $*p<0.1$, $**p<.05$, $***p<0.01$

them, exceeds (or falls short of) their expectations, and approaches (or fails to compare) to an ideal.

3.2 Investor sentiment

We use the investor-sentiment data of Baker and Wurgler (2006). [2, 3] Figure 1 shows investor sentiment plotted with the S&P 500 index and the ACSI. The ACSI displays a negative correlation with investor sentiment and the S&P 500. One possible explanation is that during periods of growth or high investor sentiment, firms might not focus on customer-service efforts. Investor sentiment shows a positive correlation with the S&P 500.

Baker and Wurgler's (2006) measure of investor sentiment is a composite index based on the common variation in six underlying proxies for sentiment: The number of Initial Public Offerings (IPOs) (Lowry 2003), IPO first-day returns (Ritter 1991), the share turnover at the NYSE (Baker and Stein 2004), the dividend premium (Baker

[2] Different industries in the ACSI are measured at different times of the year. To align the other variables that we use in our analyses (e.g., investor sentiment) with these quarterly measurements of the ACSI, we follow the work of Grewal et al. (2010) and calculate these variables using the most recent information available at the end of each quarter in which the ASCI for the firms in the respective industry is measured.
[3] Available on Jeffrey Wurgler's website: http://people.stern.nyu.edu/jwurgler/.

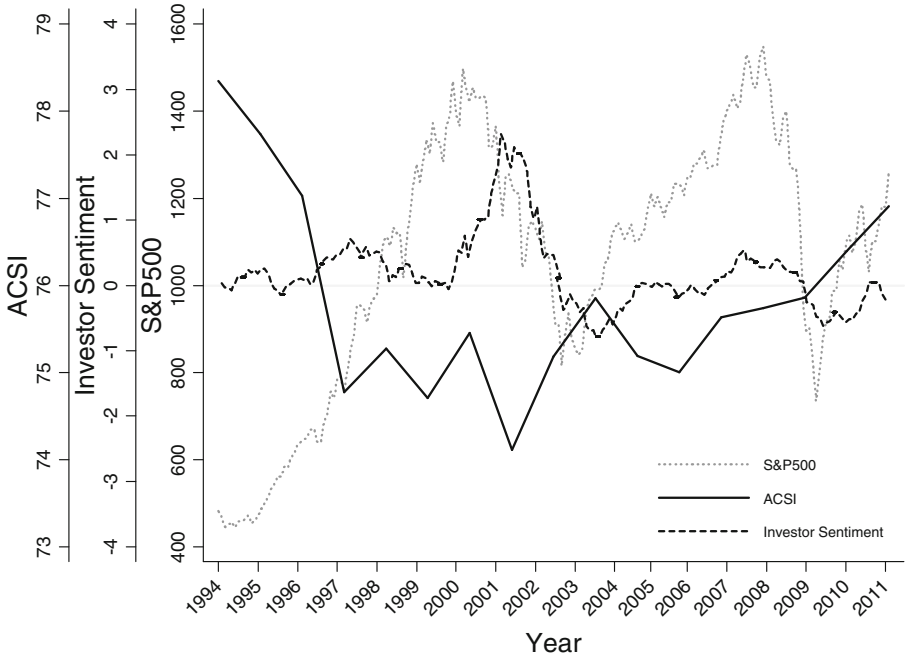

Fig. 1 S&P 500, ACSI, and investor sentiment from January 1994 to December 2010. This figure plots the S&P 500 index against the ACSI and Baker and Wurgler's (2006) investor sentiment index

and Wurgler 2004), the closed-end fund discount (Lee et al. 1991), and the equity share in new issues (Baker and Wurgler 2000). We explain each of these sentiment proxies in detail next.

The IPO market is sensitive to investor sentiment. High first-day returns on IPOs are cited as a measure of investor enthusiasm (Ritter 1991), and low idiosyncratic returns on IPOs are interpreted as a symptom of market timing: The number of IPOs is higher when investor sentiment is high (Lowry 2003). Baker and Stein (2004) suggest that NYSE share turnover, or more generally liquidity, can function as an index for investor sentiment: In a market with short-sale constraints, irrational investors driven by sentiment participate, and thus add liquidity only when they are (overly) optimistic. Baker and Wurgler (2004) explain how the dividend premium, or the log difference of the average market-to-book ratios of dividend payers and non-payers, relates to investor sentiment. That is, the dividend premium tends to be negative, and the propensity to pay dividends decreases, when investor sentiment for growth stocks (which characteristically are non-payers) is high, such as in the late-1960s and late-1990s. The closed-end fund discount is the average difference between the net asset values of closed-end stock fund shares and their market prices. Lee et al. (1991) provide evidence that investors' changing sentiment explains the fluctuations of prices and discounts on closed-end funds. In particular, discounts are high when investors are pessimistic about future returns and low when investors are optimistic. Baker and Wurgler (2000) show that as a measure of firms' financing activities, the share of equity issues in total equity and debt issues relates to investor sentiment. That is, when investor sentiment causes, for example, overvalued equity prices, managers

prefer to issue equity. Consistent with managers timing a market periodically driven by irrational sentiment, the equity share in new issues is related to various measures of investor optimism.

Baker and Wurgler define the investor sentiment index as the first principal component of the previously discussed variables, which are rescaled to ensure unit variance in the sentiment index. High investor sentiment is defined as "above the long-run average," while low sentiment is defined as "below the long-run average."

3.3 Stock returns

Returns are calculated using monthly stock-price information from Datastream. Table 1 shows the mean sample returns, which are not significantly different from zero. Table 1 also shows summary statistics of each of ten portfolios, where the returns of each firm are grouped according to their ACSI levels. Although most of the mean returns in each portfolio are not significantly different from zero, the highest non-zero returns come from the highest ACSI portfolio, supporting earlier findings that high-ACSI firms exhibit higher returns. Figure 2 also shows mean returns by ACSI-sorted portfolios: Again, returns in high-ACSI portfolios are higher than those in low-ACSI portfolios. This is consistent with the previously discussed findings about the ACSI and stock returns.

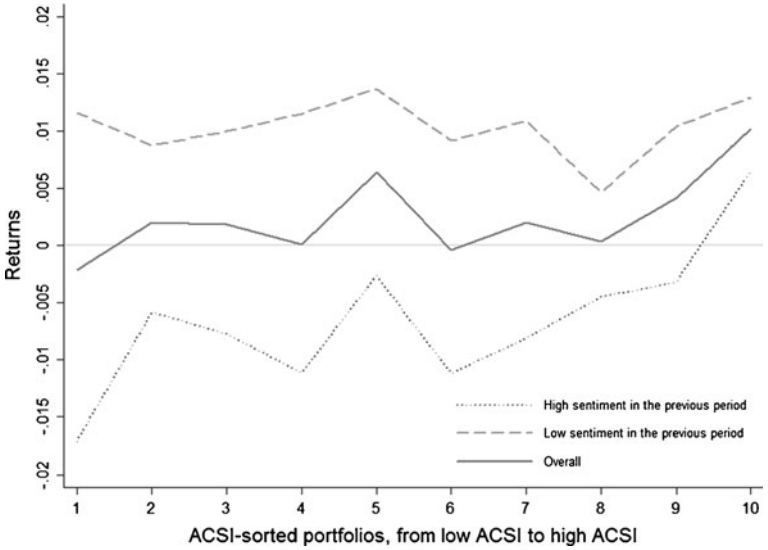

Fig. 2 Returns of ten portfolios sorted from low to high ACSI, in high and low sentiment periods. This figure shows the returns of portfolios sorted by ACSI. High-ACSI portfolios exhibit small corrections after periods of high and low investor sentiment. Low-ACSI portfolios exhibit large corrections after periods of high and low investor sentiment. After periods of *low* investor sentiment, returns are consistently positive for all portfolios, but after periods of *high* investor sentiment returns are generally negative, with the exception of portfolio 10 (high ACSI), which exhibits positive returns after *high* investor sentiment. This result suggests that high-ACSI firms are less sensitive than low-ACSI firms to sentimental stock-price corrections

4 Methodology and results

We use both non-parametric and parametric approaches to test whether customer satisfaction provides firms with a buffer against the stock-market corrections that typically occur after periods of high investor sentiment.

4.1 Non-parametric approach

Monthly returns are sorted into ten portfolios based on the firms' ACSI score that year. This results in the portfolio returns shown in Table 1. Returns are then further classified by separating returns that occurred during periods of high investor sentiment and those that occurred during periods of low investor sentiment. Prices of firms in each portfolio are expected to behave as in Baker and Wurgler (2006): If sentiment is "high" in a given period, we expect prices to be above their fundamental values; when sentiment is "low," we expect prices to be below fundamental values.

Figure 2 displays the returns of each portfolio, sorted from low ACSI on the left to high ACSI on the right. The figure shows two interesting results. First, the corrections of stock prices of firms with low ACSI (portfolio 1) are larger than those with high ACSI (portfolio 10). Figure 2 thus supports the proposition that firms with high customer satisfaction resist the price corrections occurring after waves of high investor sentiment. This is evident from the positive upward trend in the high sentiment curve of returns. Second, only firms in the highest ACSI portfolio (portfolio 10) exhibit positive returns after a period of high investor sentiment. This result is shown by the portion of the high sentiment curve above zero. High-ACSI firms thus may grow after a stock-market bubble.

4.2 Parametric approach

The parametric approach is based on the conditional characteristics model of expected returns (Daniel and Titman 1997; Baker and Wurgler 2006) and estimates the effects of investor sentiment on the difference between returns of firms with high versus low levels of customer satisfaction. The model is specified as follows:

$$R_{\mathrm{ACSI}_t=\mathrm{High},t} - R_{\mathrm{ACSI}_t} = \mathrm{Low}, t = c + d\mathrm{SENTIMENT}_{t-1} + \beta\mathrm{RMRF}_t + s\mathrm{SMB}_t + h\mathrm{HML}_t + m\mathrm{UMD}_t + u_t \quad (1)$$

Where $R_{\mathrm{ACSI}_t=\mathrm{High},t}$ is the average monthly return of firms with high ACSI, and $R_{\mathrm{ACSI}_t=\mathrm{Low},t}$ is the average monthly return of firms with low ACSI. As in Baker and Wurgler (2006), high and low ACSI firms are defined as the firms in the top and bottom ACSI deciles, respectively. $\mathrm{SENTIMENT}_{t\text{-}1}$ is the level of investor sentiment in the previous period, measured as in Baker and Wurgler (2006). We include the Fama and French (1993) and momentum (Carhart 1997) factors. RMRF, SMB, HML, and UMD are control variables to ensure that the effects of investor sentiment are different from those captured by the Carhart four-factor model. As such, the change in the return difference between high- and low-ACSI firms is explained by investor sentiment, and not by the risk of the total market, firm-size

characteristics, book-to-market characteristics, or performance persistence (i.e., momentum).[4]

The coefficient of interest is *d*, which provides an estimate of the effect of investor sentiment on the return difference between high- and low-ACSI firms. A positive, non-zero *d* indicates that investor sentiment in the previous period causes high-ACSI firms' returns to increase and low-ACSI firms' returns to decrease in a given period. The consequence is greater cross-sectional differences between high- and low-ACSI firms, and this represents the size of the correction occurring after the sentimental effects pass. The hypothesis is thus:

H_0: $d=0$, *where markets are informationally efficient regarding variations in investor sentiment*: *Investor sentiment is unrelated to differences in returns between high- and low-ACSI firms*. *As such*, *customer satisfaction does not form an effective buffer against sentimental stock-price corrections*.

H_1: $d\neq 0$, *where non-zero effects represent cross-sectional patterns in sentimental mispricing*: *Investor sentiment is related to differences in returns between high- and low-ACSI firms*. *As such*, *customer satisfaction forms an effective buffer against sentimental stock-price corrections*.

Panel A of Table 2 shows the *d* coefficients for the univariate (column 1), three-factor (column 2), and four-factor (column 3) regressions of the return difference between high- versus low-ACSI firms. In all three cases, *d* is positive and significantly different from zero, thus rejecting the null hypothesis. This result is interpreted as follows: When investor sentiment in the previous period is high, the return difference between high- and low- ACSI firms is large in a given period. As the returns of high-ACSI firms correct less after periods of high sentiment than those of low-ACSI firms, customer satisfaction thus provides a buffer against sentimental stock-price corrections.

Apart from studying the impact of *levels* of customer satisfaction, it is also important to examine how *changes* in customer satisfaction impact a firm's susceptibility to stock-price corrections following periods of high investor sentiment. In particular, it can be expected that firms that *increase* their level of customer satisfaction are subsequently less susceptible to sentimental stock-price corrections, while firms that *decrease* their level of customer satisfaction are subsequently more susceptible to such corrections. To test this expectation, we again sort firms into deciles, now based on their *changes* in ACSI. The highest decile (10) contains firms with the greatest *increase* in ACSI, and the lowest decile (1) contains firms with the greatest *decrease* in ACSI. Next, we run the following model of expected returns:

[4] We use the well-established practice in the finance literature of using decile portfolios of firms instead of individual firms to make the results less susceptible to noise and to avoid problems of having only limited sample periods available for some individual firms (see Banz 1981; Fama and French 1992; Black and Scholes 1974). Furthermore, using portfolios of firms is consistent with the existing finance literature that examines the effects of investor sentiment on stock returns (Baker and Wurgler 2006, 2007). Fixed effects are captured in these models by having a separate coefficient ("fixed effect") for each decile portfolio (1 to 10). Time-varying effects are included in these models through the common factors from the Fama and French (1993) and Carhart (1997) models (i.e., RMRF, SMB, HML, UMD). The null hypothesis in these types of regression models is that apart from the common factors, there should not be any systematic effect of other factors, such as investor sentiment.

Table 2 Regression results for the univariate, three-factor, and four-factor conditional characteristics models using portfolios sorted into deciles by ACSI levels and changes in ACSI levels

	Univariate model		Three-factor model		Four-factor model	
	Coefficient	Standard deviation	Coefficient	Standard deviation	Coefficient	Standard deviation
Panel A: regression of sentiment on the difference between the returns of high and low ACSI firms						
$R_{\mathrm{ACSI}_t=\mathrm{High},t} - R_{\mathrm{ACSI}_t=\mathrm{Low},t} = c + d\mathrm{SENTIMENT}_{t-1} + \beta\mathrm{RMRF}_t + s\mathrm{SMB}_t + h\mathrm{HML}_t + m\mathrm{UMD}_t + u_t$						
SENTIMENT	0.010**	(0.004)	0.007*	(0.004)	0.007*	(0.004)
RMRF			−0.001**	(0.000)	−0.001**	(0.000)
SMB			0.000	(0.001)	−0.000	(0.001)
HML			0.000	(0.001)	0.000	(0.001)
UMD					0.000	(0.000)
Cons	0.03	(0.002)	0.003	(0.002)	0.003	(0.002)
R^2	0.03		0.07		0.07	
Wald-p	0.01		0.01		0.02	
Panel B: regression of sentiment on the difference between the returns of high and low ΔACSI firms:						
$R_{\Delta\mathrm{ACSI}_t=\mathrm{High},t} - R_{\Delta\mathrm{ACSI}_t=\mathrm{Low},t} = c + \mathrm{dSENTIMENT}_{t-1} + \beta\mathrm{RMRF}_t + s\mathrm{SMB}_t + h\mathrm{HML}_t + m\mathrm{UMD}_t + u_t$						
SENTIMENT	0.010*	(0.006)	0.007	(0.006)	0.007	(0.006)
RMRF			−0.001*	(0.001)	−0.002*	(0.001)
SMB			0.001	(0.001)	0.001	(0.001)
HML			0.001	(0.001)	0.001	(0.001)
UMD					−0.000	(0.001)
Cons	−0.01	(0.004)	0.000	(0.004)	0.000	(0.004)
R^2	0.01		0.04		0.04	
Wald-p	0.10		0.08		0.14	

Panel A of this table shows regression models estimating the relationship between investor sentiment and the difference between average equity returns of high- versus low-ACSI firms. The first column displays the univariate case (only *d*); the second column displays the regression that controls for excess market returns, size, and risk effects (three-factor model); and the third column shows the regression that additionally controls for momentum effects (four-factor model). The results show that the average returns of high-ACSI firms correct less than those of low-ACSI firms when SENTIMENT in the previous period increases by one unit. In the univariate case, for example, when SENTIMENT in the previous period increases by one unit, the difference between high- and low-ACSI firm returns increases by 0.01. The results suggest that high-ACSI firms are less sensitive than low-ACSI firms to stock-market corrections following periods of high investor sentiment. Panel B of this table shows regression models estimating the relationship between investor sentiment and the difference between the average equity returns of high- versus low- ΔACSI firms. The first column displays the univariate case (only *d*); the second column displays the regression that controls for excess market returns, size, and risk effects (three-factor model); and the third column additionally controls for momentum effects (four-factor model). The results show that the average returns of high-ΔACSI firms correct less than those of low-ΔACSI firms when SENTIMENT in the previous period increases by one unit. In the univariate case, for example, when SENTIMENT in the previous period increases by one unit, the difference between high- and low-ΔACSI returns increases by 0.01. The results suggest that high-ΔACSI firms are less sensitive than low-ΔACSI firms to stock-market corrections following periods of high investor sentiment

Significantly different from zero at *$p<0.1$, **$p<.05$, ***$p<0.01$.

$$R_{\Delta\mathrm{ACSI}_t=\mathrm{High},t} - R_{\Delta\mathrm{ACSI}_t=\mathrm{Low},t=} c + d\mathrm{SENTIMENT}_{t-1} + \beta\mathrm{RMRF}_t + s\mathrm{SMB}_t \quad (2)$$

$$+h\mathrm{HML}_t + m\mathrm{UMD}_t + u_t$$

Where $R_{\Delta\mathrm{ACSI}_t=\mathrm{High},t}$ is the average monthly return of firms with the greatest *increase* in ACSI and $R_{\Delta\mathrm{ACSI}_t=\mathrm{Low},t}$ is the average monthly return of firms with the greatest *decrease* in ACSI. High- and low-ΔACSI firms are again defined as firms in the top and bottom ΔACSI deciles, respectively. $\mathrm{SENTIMENT}_{t-1}$ is the level of investor sentiment in the previous period. RMRF, SMB, HML, and UMD are control variables from the Carhart four-factor model.

The coefficient of interest is *d*, which provides an estimate of the effect of investor sentiment on the difference between returns of firms that increase versus decrease their ACSI. A positive, non-zero *d* indicates that investor sentiment in the previous period causes the returns of firms that increase their customer satisfaction to increase and the returns of firms that decrease their customer satisfaction to decrease. The hypothesis is thus:

H_0: $d=0$, *where markets are informationally efficient regarding variations in investor sentiment*: *Investor sentiment is unrelated to differences in returns between firms that increase* versus *decrease their level of ACSI*. *As such*, *customer satisfaction does not form an effective buffer against sentimental stock-price corrections*.

H_1: $d\neq0$, *where non-zero effects represent cross-sectional patterns in sentimental mispricing*: *Investor sentiment is related to differences in returns between firms that increase* versus *decrease their level of ACSI*. *As such*, *customer satisfaction forms an effective buffer against sentimental stock-price corrections*.

Panel B of Table 2 shows the *d* coefficient for the univariate (column 1), three-factor (column 2), and four-factor (column 3) regressions of the return difference between firms with increasing versus decreasing levels of ACSI. In all three cases, *d* is positive. That is, in line with our expectation, when investor sentiment is *high* in the previous period, the difference between firms that increase versus decrease their level of ACSI is *large* in a given period. The returns of firms that increase their ACSI correct less after periods of high investor sentiment than the returns of firms that decrease their ACSI. Although the sign of *d* is consistent with our expectations in all three models discussed above, it is only significantly different from zero in case of the univariate model. This lack of significance might be because there is only a little time variation in most firms' level of ACSI during the sample period, while it may also take some time for the stock market to react to changes in firms' ACSI.

5 Discussion and conclusion

As one of behavioral finance's main assumptions, investor sentiment refers to investors' over- and under-reaction to information, causing temporary periods in which stocks are mispriced (Baker and Wurgler 2006). When mispricing persists, this leads to stock-price bubbles and high volatility. Overvalued share prices benefit the firm as long as prices continue to increase and there is no correction. When a correction occurs, stock prices drop and returns are low, although a firm's fundamental value has not necessarily changed. This study proposes that market-based assets, such as high levels of

customer satisfaction, can provide firms with a buffer against the stock-price corrections that occur after periods of investor overreaction (i.e., high investor sentiment).

The current study contributes to the emerging literature on the marketing–finance interface by assessing the relationship between customer satisfaction and a type of firm risk that has not yet received widespread attention: the vulnerability of a firm's stock price to stock-market corrections following periods of high investor sentiment. This study shows that firms with high customer satisfaction have positive returns regardless of whether they are made during periods of high sentiment (when investors are overreacting) or periods of low sentiment (when investors are underreacting). The findings show that as investor sentiment increases, so does the return difference between firms with high versus low customer satisfaction. In particular, firms with low levels of customer satisfaction exhibit larger price corrections as a result of investor over- and under-reaction than do firms with high levels of customer satisfaction. Customer satisfaction thus provides firms with a buffer against sentimental stock-price corrections.

There are several possible explanations for this study's findings. First, customer satisfaction contributes to firm value intrinsically (e.g., by increasing customer loyalty and hence cash flows), thus justifying positive non-zero returns. Second, indications of customer satisfaction help convince investors that the firm is a good investment because of the attention it pays to customer needs. Finally, when stock markets correct after periods of sentimental mispricing, investors may display a flight to quality earnings, transferring investments from firms with low customer satisfaction to firms with high customer satisfaction. The findings of this study are important because they show that market-based assets can protect firms' stock prices from the effects of non-fundamental stock-market risk, the risk that arises from changing levels of investor sentiment (Shefrin 2008). Non-fundamental risk is the risk that subjective perceptions of investors might change without a change in fundamental information (e.g., financial, macroeconomic information) and causes stock-price volatility. The results of this study suggest that firms with high customer satisfaction are able to convince their investors that corrections caused by investor sentiment are not warranted.

Although this study focuses on one market-based asset, many other types of market-based assets exist and may also interact with firm value. Employee satisfaction, for example, is another market-based asset that is likely to affect a firm's stock-price reaction to investor sentiment, because it seems reasonable to assume that investors have more trust in firms that treat all their stakeholders well, including internal stakeholders such as employees. The results presented here could thus to be interpreted as a lower bound of the aggregate effects that market-based assets may have on sentimental stock prices. Existing research calls for the leveraging of market-based assets and promotes the low-risk, high-return characteristics of such strategies. This study shows that firms concerned about the effects of investor sentiment on their stock prices could benefit from investments in customer satisfaction to alleviate these concerns. Future research holds many opportunities to examine a variety of strategies for managing market-based assets, in addition to the customer-related ones examined here.

Acknowledgments The authors thank the editor, Frank R. Kardes, and an anonymous reviewer for their insightful comments that helped us improve the manuscript. The authors thank Jeroen Derwall and Peter Schotman for their useful suggestions regarding the econometric analyses. Finally, the authors thank Donna Maurer for her editorial help.

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