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The marketing profession is being challenged to assess and communicate the value created by its actions on shareholder value. These demands create a need to translate marketing resource allocations and their performance consequences into financial and firm value effects. The objective of this article is to integrate the existing knowledge on the impact of marketing on firm value. The authors first frame the important research questions on marketing and firm value and review the important investor response metrics and relevant analytical models as they relate to marketing. Next, they summarize the empirical findings to date on how marketing creates shareholder value, including the impact of brand equity, customer equity, customer satisfaction, research and development and product quality, and specific marketing-mix actions. Then, the authors review emerging findings on biases in investor response to marketing actions. They conclude by formulating an agenda for future research challenges in this emerging area.

*Keywords:* marketing and firm valuation, financial performance, market valuation modeling, return on marketing investment, empirical findings

## Marketing and Firm Value: Metrics, Methods, Findings, and Future Directions

Investors trade companies' shares because their expectations of these companies' future earnings differ. This trading activity results in a share price that represents the valuation, or consensus forecast of the financial health, of these companies. To aid in this process, industry experts ("analysts") publish their own earnings expectations, which are based in part on meetings with senior company executives that focus on strategies and business plans for the foreseeable future. The importance of this expectation setting is evident every quarter when companies' earnings announcements are followed by sometimes drastic stock price adjustments when the actual earnings deviate from expectations (i.e., when there is an earnings surprise).

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This continuous firm value adjustment process is of major importance to senior executives and, in particular, to the stewards of demand generation for the firm (i.e., the marketing and sales managers). Individual executive compensation packages are often tied to stock price, and more important, when stock prices do not trend upward, this is perceived as a failure of management strategy. Consequently, managerial actions may be influenced by past movements in share price; in other words, there is a feedback loop of investor sentiment into managerial resource allocation. Thus, it is of the utmost importance to understand how managerial actions translate into the consensus forecast of financial health (i.e., stock price) and, in particular, what influences the consensus formation.

In recent years, researchers in marketing have begun to examine the demand creation aspect of firm valuation. Although demand creation is but one aspect of management strategy, it is arguably the most important and the most challenging. Its critical importance stems from the notion that customers have become the ultimate scarce resource (e.g., Peppers and Rogers 2005). To demonstrate this challenge, consider that the tenure of chief marketing officers is comparatively short (Nath and Mahajan 2008), which is another way of saying that chief executives and boards of directors are more often disappointed in the performance of

their chief marketing officers than in that of the other senior executives in the firm.

If marketing's contributions were readily visible in quarterly changes in sales and earnings, the task would be simple because investors are known to react quickly and fully to earnings surprises. However, much of good marketing is building the intangible assets of the firm—in particular, brand equity, customer loyalty, and market-sensing capability. Progress in these areas is not readily visible from quarterly earnings, not only because different nonfinancial “intermediate” performance metrics are used (e.g., customer satisfaction measures) but also because the financial outcomes can be substantially delayed. As with research and development (R&D), marketing is requesting that the investor community adopt an investment perspective on its spending.

The following recent examples from the business press serve as illustrative examples of investor response to specific marketing actions and nonfinancial performance movements in different areas:

- *Pricing.* In September 2007, when Apple announced a \$200 price cut on its cell phone, iPhone, investor reaction to this presumed “bad news” led to a stock price drop of Apple by 5% to \$136.36 (*Information Week* 2007).
- *Channels of distribution.* In July 2006, when Wal-Mart closed its operations in Germany, its share price increased by 1% to \$43.91 (Reuters 2006).
- *New product introductions.* In April 2006, the introduction of Boot Camp software by Apple, which allows users to operate Windows XP on Mac computers, led to an increase of \$6.04 in Apple's share price (Wingfield 2006).
- *Perceived quality.* In September 2006, General Motors announced that it would extend warranties to 100,000 miles on 2007 cars and trucks as part of a plan to tout quality and win back buyers lost to Toyota and other rivals. Investor reaction led to a 2.4% increase in General Motors stock price (Chon 2006).
- *Customer satisfaction.* In August 2005, when Dell's customer satisfaction rating dropped a steep 6.3% to 74 of a possible 100, the biggest drop among major PC makers, its shares closed down from \$41.79 to \$36.58 (DiCarlo 2005).

These examples suggest that investors react quickly, rewarding firms with a higher stock price as information perceived as “good news” becomes available, and vice versa. Are these financial-market reactions in sync with product-market reactions, which, de facto, are the revenue sources for the firm? According to the well-known efficient markets hypothesis (EMH) in finance, these investor reactions fully and accurately incorporate any new information that has value relevance.<sup>1</sup> Thus, insofar as marketing drives product-market performance, new marketing developments could be value relevant.

Finance theory supports the value relevance of marketing through its effect on the firm's cash needs (Rao and Bharadwaj 2008). Given that marketing affects the shape of the probability distribution of future sales revenues, it helps determine the firm's working capital requirements (see Rao

and Bharadwaj 2008). Thus, the study of marketing's impact on valuation proceeds by way of its impact on cash flows—in particular, their magnitude, speed, and volatility (Srivastava, Shervani, and Fahey 1998). Both tangible and intangible impact routes need to be considered. However, it is not clear a priori that the investor reaction mechanism will always be complete and accurate, as the EMH predicts. In the iPhone example, did the investors accurately infer the price elasticity for this new cell phone? Indeed, there are two reasons accurate investor response to marketing developments is inherently difficult to assess. First, because investors are not necessarily marketing experts, they may wrongly evaluate the impact of a marketing driver on future cash flows. For example, it has been reported that the shares of “intangible-intensive” firms are systematically undervalued (Lev 2004). This results in adverse consequences, including excessively high costs of capital for such firms, leading them to underinvest in intangibles, such as brand building, which could limit the future earnings growth that investors seek. Second, investors may be influenced by persuasive communication by company executives or stock analysts (e.g., Gallaher, Kaniel, and Starks 2005; Sirri and Tufano 1998) and by a host of other mediating factors.

This article examines the methods for determining the impact of marketing on investor valuation and summarizes the existing findings in this area. We first frame the important research questions on marketing and firm value and review the key investor response metrics and relevant analytical models as they relate to marketing. We then summarize the empirical findings to date on how marketing creates shareholder value, including the impact of brand equity, customer equity, customer satisfaction, R&D and product quality, and specific marketing-mix actions on firm value. Finally, we conclude with several directions for further research.

#### *MARKETING AND FIRM VALUE: METHODS AND METRICS*

##### *Summary Steps in Market Valuation Modeling*

The starting point for tackling the marketing valuation question is the Fama–French factor model developed in the finance literature (e.g., Fama and French 1992, 1996) (see Table 1, Row 1). This model recognizes the random-walk nature of stock prices and therefore is expressed as stock returns, which are stationary.

The Fama–French model also recognizes three systematic factors that explain cross-sectional differences among stock returns. It states that the additional returns investors can expect to receive by investing in stocks of companies are explained by three factors: the excess return on a broad market portfolio (market risk factor), the difference in return between a large-cap and a small-cap portfolio (size risk factor), and the difference in return between high and low book-to-market stocks (value risk factor). These three factors are augmented with a fourth factor, momentum, to obtain the Carhart (1997) four-factor financial model. Marketing valuation models then act on the unanticipated component of stock returns. From a finance perspective, such efforts complement the Carhart four-factor financial model because they demonstrate how firm-specific managerial actions can either add or subtract shareholder value. The

<sup>1</sup>The finance literature distinguishes among weak, semistrong, and strong efficiency (Fama 1991). In a marketing context, the semistrong definition is the most appropriate because, by definition, marketing actions are publicly observable.

Table 1  
OVERVIEW OF RESEARCH APPROACHES

<i>Approach</i>	<i>Characteristics of Approach</i>	<i>Limitations of Approach</i>	<i>Representative Studies/ Sample from Approach</i>	<i>Dependent/Predictor Variable Used in Study</i>
1. Four-factor model	<p>Recognizes systematic sources of cross-sectional differences among firms: the size factor, the market-to-book value factor, the market risk factor, and the momentum factor.</p> <p>Relies on EMH.</p> <p>Straightforward to estimate.</p> <p>Can assess cross-sectional variation in investor response.</p>	<p>Inferences from the portfolio approach are sensitive to the choice of the benchmark portfolio.</p> <p>Is correlational in nature.</p> <p>Is subject to omitted-variable bias.</p> <p>For application outside the United States, three of the four factors are not readily available.</p>	<p>Rao, Agarwal, and Dahlhoff (2004) (across industries)</p> <p>Barth et al. (1998) (across industries)</p> <p>Madden, Fehle, and Fournier (2006)</p>	<p>Tobin's q/branding strategy</p> <p>Firm valuation/brand value estimates</p> <p>Stock returns/brand valuation</p>
2. Event study	<p>Assesses the abnormal return for a stock as the <i>ex post</i> return of the stock during the course of the event window less the normal expected return, assuming that the event had not taken place.</p> <p>Relies on EMH.</p> <p>Easy to implement because key data are event dates and stock prices around the events.</p> <p>Analysis is causal in nature.</p>	<p>Inappropriate for measuring long-term abnormal returns to events that are clustered in time.</p>	<p>Horsky and Swyngedouw (1987) (across industries)</p> <p>Chaney, Devinney, and Winer (1991) (across industries)</p> <p>Lane and Jacobson (1995) (within industry)</p> <p>Geyskens, Gielens, and Dekimpe (2002) (within industry)</p>	<p>Stock returns/name change events</p> <p>Stock returns/ new product announcements</p> <p>Stock returns/brand extension announcements</p> <p>Stock returns/Internet channel investments</p>
3. Calendar portfolio	<p>Constructs a single portfolio including stocks of firms with the event to measure the long-term abnormal returns to that portfolio.</p> <p>Accounts for cross-sectional correlation of returns.</p> <p>Statistical inferences are likely more accurate than those obtained with event studies.</p>	<p>Does not produce separate measures of abnormal returns for each event.</p> <p>Inferences from the portfolio approach are sensitive to the choice of the benchmark portfolio.</p>	<p>Sorescu, Shankar, and Kushwaha (2007) (within industry)</p>	<p>Stock returns/new product announcements</p>
4. Stock return response model	<p>Establishes whether investors perceive information on marketing activity, such as advertising spending, as contributing to the projection of future cash flows.</p> <p>Based on the Carhart (1997) four-factor model.</p> <p>Relies on the EMH.</p> <p>Provides insights into the market's expectations of the long-term value prospects associated with changes in marketing strategy.</p> <p>Takes into account the dynamic properties of stock returns.</p>	<p>Requires detailed marketing data at the brand or strategic business unit level.</p> <p>Marketing measures must reflect information that is available to market participants because the stock market reacts to public information.</p> <p>Single-equation models and, thus, no temporal chain leading to stock returns.</p>	<p>Aaker and Jacobson (1994) (across industries)</p> <p>Aaker and Jacobson (2001) (within industry)</p> <p>Mizik and Jacobson (2003) (across industries)</p> <p>Srinivasan et al. (2009) (within industry)</p>	<p>Stock returns/ perceived quality</p> <p>Stock returns/brand attitude</p> <p>Stock returns/shifts in strategic emphasis</p> <p>Stock returns/marketing actions</p>
5. Persistence modeling	<p>These models use a system's representation in which each equation tracks the behavior of an important agent: the consumer (demand equation), the manager (decision rule equation), competition (competitive reaction equation), and the investor (stock price equation).</p> <p>A vector autoregressive model provides a flexible treatment of both short-term and long-term effects.</p> <p>Robust to deviations from stationarity.</p> <p>Provides a forecasted, expected baseline for each performance variable.</p> <p>Allows for various dynamic feedback loops among marketing and stock performance variables.</p>	<p>Requires detailed marketing data at the brand or strategic business unit level.</p> <p>Requires time-series over a long horizon.</p> <p>Inherently reduced-form models.</p>	<p>Pauwels et al. (2004) (within industry)</p> <p>Joshi and Hanssens (2008) (within two industries)</p>	<p>Firm valuation/new product introductions, sales promotions</p> <p>Stock returns/advertising</p>

impact of these exogenous variables provides the ultimate evidence of marketing's contribution to shareholder value.

*Metrics.* Stock returns have unexpected components due to financial and nonfinancial results and actions/signals. On the results side, the most straightforward are top-line (revenue) and bottom-line (earnings) surprises. These are typically modeled with time-series extrapolations.<sup>2</sup> In addition, earnings surprises can be modeled as the difference between analysts' consensus forecasts and the realized value of earnings. Unexpected stock return components that are the result of actions or signals include changes in marketing strategy (e.g., price hikes, price cuts), partnership announcements, top-management changes, advertising campaigns, new product introductions, and the like. In this way, virtually all aspects of marketing strategy can be examined in terms of the extent to which investors recognize them. In addition, it is possible to incorporate surprises in nonfinancial metrics that are generally believed to have a long-term impact on business performance, including customer satisfaction, customer attrition, brand equity, and customer equity. If desired, competitive results and competitive signals can be modeled in the same way as own results and signals.

*Methods.* The Carhart four-factor financial model is based on cross-sectional inferences. The model is simple to estimate, and under the null of the factor model, firm-specific attributes should not matter. In practice, however, the model may be subject to omitted variables as well as the temporal chain leading to stock returns. Depending on the research hypotheses and the data at hand, different methods are used to complement the four-factor financial model. For example, when firm actions take on the form of discrete interventions with information release at known time stamps, an event study (Table 1, Row 2) is necessary (e.g., Ball and Brown 1968; Chaney, Devinney, and Winer 1991). Such events may be recurring throughout the year (e.g., earnings announcements) or may be intermittent (e.g., new product introductions). When the actions are continuous rather than discrete, stock return models (Table 1, Row 4) can be used (e.g., Aaker and Jacobson 1994; Lev 1989). Such stock return models are single-equation models, and as such, they are limited in their ability to represent the temporal chain leading to stock returns. Persistence modeling (e.g., vector autoregressive models), which involves a system of equations (Table 1, Row 5), can be used for this purpose (e.g., Eun and Shim 1989; Pauwels et al. 2004). Such models generate impulse-response functions that can be used to assess the speed with which stock returns react to new information.

Capturing the long-term impact of marketing on valuation is more difficult because investors react to "news" quickly, and thus any extended horizon is subject to several

intermediate events that cloud the relationship the researcher is seeking. The abnormal returns can be summed across the horizon to obtain models of cumulative abnormal return (CAR) or buy-and-hold returns (BHAR). Cumulative abnormal return measures abnormal returns relative to a model such as the capital asset pricing model (CAPM) (Fama 1998) or the Carhart four-factor financial model and is preferred for short horizons (e.g., several days). Buy-and-hold return reflects the abnormal return an investor would earn from holding the stock for an extended period, using compounded interest, and therefore is preferred for longer horizons (e.g., several months or more) (e.g., Barber and Lyon 1997). Using either metric, the preferred solution is to build a test versus control portfolio—"test" refers to a marketing condition that did not exist in "control"—and track its performance over extended periods. Two such approaches are the calendar portfolio method (e.g., Fama 1998; Sorescu, Shankar, and Kushwaha 2007) and the matched-pair return model (Barber and Lyon 1997). A calendar-time portfolio includes all stocks of firms with the event as the unit of analysis (e.g., a new product announcement) and then measures the long-term abnormal returns of that portfolio (see Table 1, Row 3). In contrast, a matched-pair return model includes only the stocks of the focal firm and a matched firm.

Figure 1 is a schematic representation of these metrics, modeling steps, and choices. Table 1 summarizes the characteristics and limitations of each method, as well as the nature of the samples used in the study (i.e., a firm over time only, firms within an industry, and firms across industries). We now discuss the metrics and the modeling approaches in more detail.

#### *Metrics on Marketing and Firm Value*

*Market capitalization and stock returns.* The ultimate metric of shareholder value is firm value or market capitalization, the share price multiplied by the number of outstanding shares. To operationalize firm value for empirical work, we need to take two factors into account.

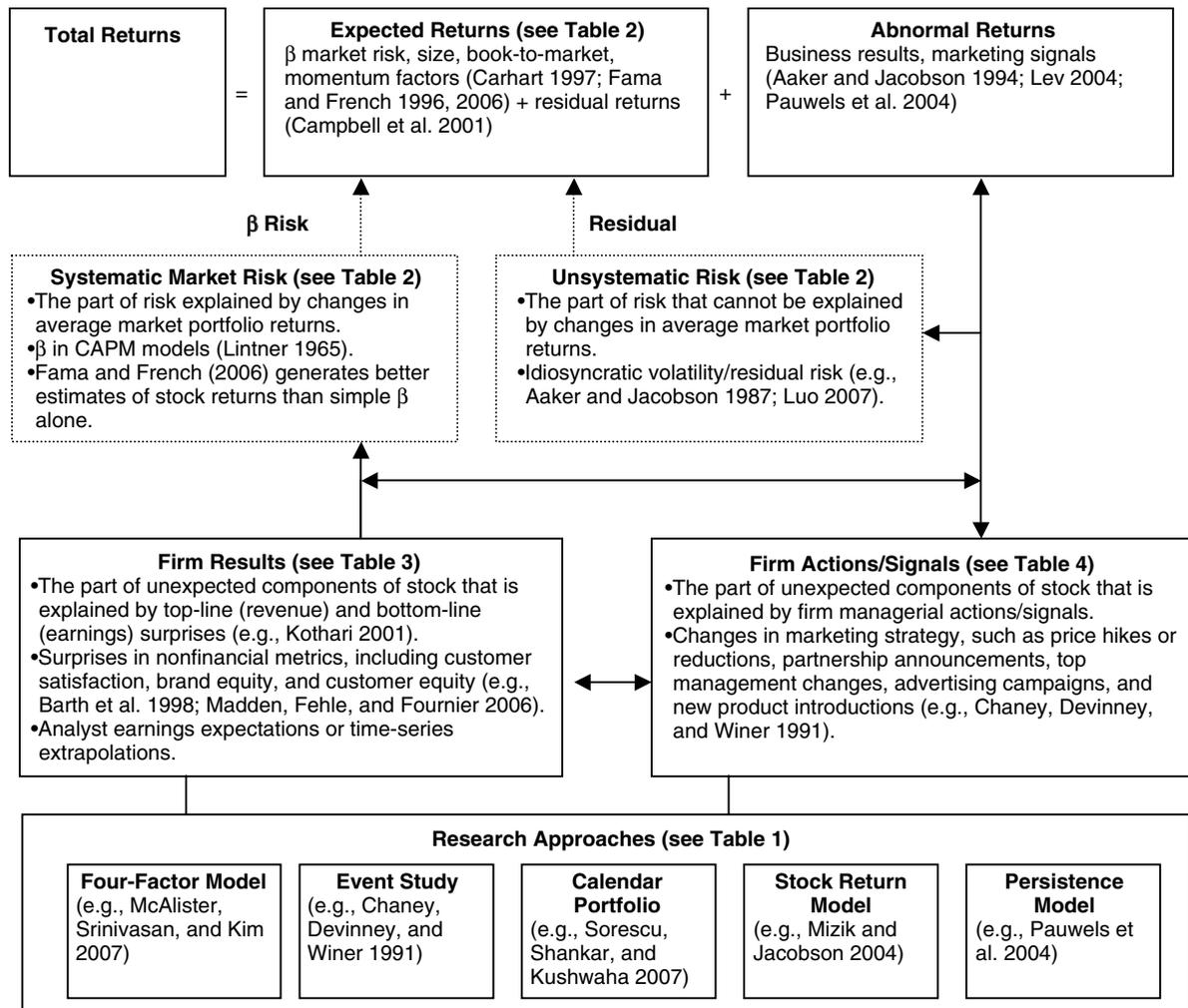
First, we need to isolate the book value of the firm, which is typically not related to marketing activity.<sup>3</sup> This is achieved by either Tobin's  $q$ , the ratio of market value to the replacement cost of the firm's assets, or the market-to-book ratio. Of these, Tobin's  $q$  is a preferred metric because the use of replacement costs of assets avoids accounting complications associated with book value, which rarely reflects the actual value of assets (McFarland 1988). However, replacement costs of intangible assets are not easy to discern in most cases (ibid). Furthermore, Tobin's  $q$  data are typically available only on a quarterly or annual basis.

Second, we need to incorporate the random-walk behavior in stock prices (Fama 1965). Unlike the typical time-

<sup>2</sup>Typically, this involves estimating an autoregressive model of the variable (e.g., earnings) on its past lags and using the residuals as the unanticipated component of the variable.

<sup>3</sup>Exceptions include investments in retail warehouses, retail outlets, and so on, that are marketing investments accounted for (in part) in the book value of the firm.

Figure 1  
FLOW CHART OF RETURN AND RISK



series behavior of consumer sales or product prices, the permanent component in stock price fluctuations dominates (i.e., the series are in a constant state of evolution). Taking logarithms of stock prices, followed by first differences to account for the random-walk behavior, results in stationary (mean-reverting) time series of stock returns as a dependent variable.

As Figure 1 (first row) shows, the total stock returns of a firm have two parts: expected returns and abnormal returns. Fama and French (1992, 1996) propose a three-factor explanatory model for expected stock returns, including the size risk factor, the value risk factor, and the market risk factor (i.e.,  $\beta$ ). In particular, investors can be expected to receive additional returns by investing in stocks of companies with smaller market capitalization and with lower market-to-book ratios. Both of these effects imply that riskier stocks are characterized by higher returns. Carhart (1997) extends this model to a four-factor model by including a momentum factor. Specifically, the extended Carhart four-factor explanatory financial model for stock returns is estimated as follows:

$$(1) \quad R_{it} - R_{rf,t} = \alpha_i + \beta_i (R_{mt} - R_{rf,t}) + s_i \text{SMB}_t + h_i \text{HML}_t + u_i \text{UMD}_t + \varepsilon_{it}$$

where  $R_{it}$  is the stock return for firm  $i$  at time  $t$ ,  $R_{rf,t}$  is the risk-free rate of return in period  $t$ ,  $R_{mt}$  is the average market rate of return in period  $t$ ,  $\text{SMB}_t$  is the return on a value-weighted portfolio of small stocks less the return of big stocks,  $\text{HML}_t$  is the return on a value-weighted portfolio of high book-to-market stocks less the return on a value-weighted portfolio of low book-to-market stocks, and  $\text{UMD}_t$  is the average return on two high prior-return portfolios less the average return on two low prior-return portfolios.<sup>4</sup> These are referred to as the market factor, size factor,

<sup>4</sup>To construct momentum, we used six value-weighted portfolios, including NYSE, AMEX, and NASDAQ stocks, formed on size and monthly prior (2–12) returns. The monthly portfolios are the intersections of two portfolios formed on size and three portfolios formed on prior (2–12) return. The monthly size breakpoint is the median NYSE market equity, and the monthly prior (2–12) return breakpoints are the 30th and

value factor, and momentum factor, respectively. The data source for the four-factor financial model is Kenneth French's Web site at Dartmouth, which provides details on all factors at the daily and weekly levels (see [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)). In addition,  $\epsilon_{it}$  is the error term;  $\alpha_i$  is the model intercept; and  $\beta_i$ ,  $s_i$ ,  $h_i$ , and  $u_i$  are parameter estimates of the factors used in the model. If the stock's performance is "normal," the four-factor model captures the variation in  $R_{it}$ , and  $\alpha_i$  is zero.<sup>5</sup> Therefore,  $\alpha_i$  is the abnormal return associated with firm  $i$ , and  $\epsilon_{it}$  captures additional abnormal (excess) returns associated with period  $t$ .

The empirical evidence around the three Fama–French factors is typically positive, while the evidence on the Carhart fourth factor (momentum) is ambiguous.<sup>6</sup> Momentum captures the notion that a stock that has performed well in the recent past continues to do so, and vice versa (Jegadeesh and Titman 1993). Among others, Fama and French (1996) question whether the momentum effect is real and call for further empirical verification. As such, we recommend that marketing researchers tackling the investor valuation question use the Carhart four-factor model as the starting point but be prepared for ambiguous results on the momentum factor.

*Systematic risk and idiosyncratic risk.* A second fundamental metric in finance is firm stock risk (Hamilton 1994). Greater risk, as reflected in higher stock price volatility, may suggest vulnerable and uncertain cash flows in the future, which induces higher costs of capital financing, thus damaging firm valuation in the long run. Total risk has two components: systematic risk (related to variability through the four factors) and idiosyncratic (firm-specific) risk (see Figure 1, second row). Risk stems from several factors, including market volatility (through  $\beta$  in Equation 1) at macroeconomic levels (e.g., exchange rate, interest risk) or at the sector level (some industries by their very nature are more or less stable), product-market competition (competition may be stronger or weaker than anticipated), and project-level outcomes (projects such as new product launches may fare better or worse than expected).

Systematic market risk is the part of the total risk that is explained by changes in overall market portfolio returns

due to inflation, interest rate changes, and so on, that are common to all stocks; it is measured by the  $\beta_i$  in Equation 1. By construction, the stock market as a whole has a  $\beta$  of 1.0. A stock whose return falls more than a drop in market return has a  $\beta$  greater than 1.0, and vice versa. Thus,  $\beta$ , a measure of the stock's sensitivity to market changes, is an important metric for publicly listed firms.

Unsystematic or idiosyncratic risk is the part of the risk that cannot be explained by changes in average market portfolio returns; this is measured by the variance of the residuals in Equation 1. Idiosyncratic risk constitutes approximately 80% of total risk on average (Goyal and Santa-Clara 2003). Recent finance literature has shown its relevance in firm value determination for several reasons (Brown and Kapadia 2007). First, all else being equal, investors favor stable earnings over volatile earnings (e.g., Ang, Chen, and Xing 2006; Goyal and Santa-Clara 2003; Graham, Harvey, and Rajgopal 2005). Insofar as marketing contributes to the stability or volatility of earnings, this becomes an important area for marketing researchers to address—in particular, the impact of marketing on the firm's required level of working capital (Rao and Bhargava 2008). Indeed, the higher the volatility, the more working capital is required to prevent insolvency. Second, high levels of idiosyncratic risk increase the number of securities required to generate a well-diversified portfolio (see Campbell et al. 2001). Similarly, some investors cannot diversify (e.g., participants in employee stock option plans) and must bear idiosyncratic risk. Third, stock option prices depend on the total volatility of the underlying stock, of which idiosyncratic volatility is the largest component. In summary, an emerging body of literature is incorporating market realities that firm value depends on both systematic and idiosyncratic risk, with each component affecting value negatively. Table 2 provides an overview of different investor response metrics, each with its own characteristics and limitations.<sup>7</sup>

*Marketing asset and marketing action metrics.* On the independent variable side, marketing is represented by one or more asset metrics or by direct marketing actions (investments) (see Figure 1, third row). The asset metrics include intermediate performance metrics, such as brand equity, and customer metrics, such as customer satisfaction, customer equity, and perceived product quality. Marketing action metrics include new products, advertising, promotions, channels of distribution, and so on. Several empirical generalizations about the customer response effects of these actions have been derived (see, e.g., Hanssens, Parsons, and Schultz 2001).

Of recent interest to marketing researchers is the question whether investors react differently to movements in asset metrics (e.g., movements in customer satisfaction) versus directly observable marketing investments (e.g., marketing spending movements). In answering this question, several empirical issues arise.

70th NYSE percentiles. For further details, we refer readers to [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data\\_Library/det\\_mom\\_factor.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor.html).

<sup>5</sup>Related finance literature (e.g., Daniel and Titman 1997) has proposed characteristics-based models, which argue that firm characteristics rather than the sensitivity to the four risk factors drive stock returns. As an example, it is firm size and not the sensitivity to the size factor (SMB) that drives stock returns. However, Davis, Fama, and French (2000) subsequently argue that such characteristics-based effects are confined to the shorter sample used in the former study.

<sup>6</sup>Empirical evidence suggests that under certain sampling conditions, such as using samples with only large firms versus small caps (Loughran 1997) or samples trimmed for extreme observations (Knez and Ready 1997), the size factor and the value factor become insignificant. Bollerslev and Zhang (2003) use high-frequency data (e.g., five-minute intervals) to find a sign reversal in these two factors. As for momentum, its effect sign depends on the period considered as follows (see, e.g., Subrahmanyam 2005): It is negative for 1 week up to 1 month, positive for 3- to 12-month periods (Jegadeesh and Titman 1993), and negative for long horizons, such as 3 to 5 years (DeBondt and Thaler 1985). Robustness checks of these factor effects are an area of ongoing research in empirical finance.

<sup>7</sup>Although our focus here is on outcomes in the real stock market, the application of Internet-based virtual stock markets is an emerging empirical approach that can be used to predict market valuation. Its basic idea is to bring a group of participants together through the Internet to trade shares of virtual stocks. These stocks represent a bet on the outcome of future market situations, and their value depends on the realization of these market situations (e.g., Elberse 2007).

First, there is the issue of temporal aggregation of the data, which may be different for both the dependent variable (e.g., daily price changes) and the independent variables (e.g., monthly changes in marketing actions). Although marketing actions can theoretically be traced back to daily or even five-minute intervals (e.g., a firm's announcement of an innovation launch), they are typically examined at weekly or longer intervals (e.g., weekly in Pauwels et al. 2004; annually in McAlister, Srinivasan, and Kim 2007). New econometric methods are available to deal with such differences in temporal aggregation (e.g., Ghysels, Santa-Clara, and Valkanov 2006).

Second, cross-sectional studies have sometimes linked stock prices directly to levels of marketing (e.g., Rao, Agarwal, and Dahlhoff 2004). However, models based on the EMH must recognize that investors react only to new information, which is operationalized as the difference between the actual and the expected level of the independent variable. As such, models based solely on these levels

ignore the distinction between unexpected changes and expected levels of marketing actions and thus have limited value, from both a theoretical and a methodological perspective.

Finally, stock return is typically measured at the firm or corporate level, while marketing actions often take place at the brand or product level. As such, the level of aggregation differs between the dependent variable (firm stock returns) and the independent variables, such as brand metrics and brand extension announcements (e.g., Barth et al. 1998; Geyskens, Gielens, and Dekimpe 2002; Lane and Jacobson 1995; Pauwels et al. 2004). A modeling solution is to aggregate the brand-level marketing variables. However, such aggregation would involve a substantial loss of information and, thus, managerial insight. For one, managers would no longer be able to pinpoint which brands (e.g., those with more versus less advertising support, innovation level, and quality) and/or targeted categories contribute more or less to the firm's stock returns. For another, the

Table 2  
DEPENDENT FINANCIAL METRICS FOR ASSESSING INVESTOR RESPONSE

<i>Dependent Financial Metric</i>	<i>Characteristics</i>	<i>Limitations</i>	<i>Illustrative Studies (Data Interval Used)</i>
<i>A. Returns/Levels Metrics</i>			
1. Firm valuation (stock price $\times$ number of shares outstanding)	(a) Forward-looking measure, providing market-based views of investor expectations of the firm's future profit potential.	(a) Need to incorporate the random-walk behavior in stock prices. (b) Estimated model should be robust to deviations from stationarity—in particular, the presence of random walks in stock prices, which can lead to spurious regression problems (Granger and Newbold 1986).	Fornell et al. (2006) (annual)
2. Relative importance of tangibles to intangibles: (a) Tobin's q (ratio of market value of the firm to the replacement cost of the firm's assets)	Characteristic (a) applies here. (b) Values greater than unity signal a contribution of intangible assets on valuation. (c) Accepted paradigms of research (e.g., event study, vector autoregressive modeling, stock return response models) can be used to assess firm value effects. (d) Directly comparable across industries, whereas accounting measures may not be easily compared (Mittal et al. 2005). (e) Monte Carlo experiments show that Tobin's q estimates have smaller average errors and greater correlation with true measures (McFarland 1988) as compared with accounting rates of return.	Limitations (a) and (b) apply here. (c) Replacement cost of tangible assets is difficult to compute and that of intangible assets is usually ignored (Mittal et al. 2005).	Simon and Sullivan (1993) (annual)  Rao, Agarwal, and Dahlhoff (2004) (annual)
(b) Market-to-book ratio (ratio of market value to book value of common equity)	Characteristics (a), (b), (c), and (d) apply here.	Limitations (a) and (b) apply here.	Pauwels et al. (2004) (weekly)
3. Stock returns (change in the total value of an investment in a common stock over some period per dollar of initial investment and defined as $(Price_t + Dividend_t - Price_{t-1}) / (Price_{t-1})$ )	A stationary time series of stock returns is obtained as a dependent variable.	No obvious limitations.	Srinivasan et al. (2009) (weekly)

Table 2  
CONTINUED

<i>B. Risk/Volatility Metrics</i>			
<i>Dependent Financial Metric</i>	<i>Characteristics</i>	<i>Limitations</i>	<i>Illustrative Studies (Data Interval Used)</i>
1. Cash flow volatility (firm's cash flow coefficient of variation divided by the market's cash flow coefficient of variation)	Coefficient of variability equal to one indicates that the firm's cash flows are as volatile as those of the overall market.	It is not based on a financial model such as CAPM.	Gruca and Rego (2005) (annual)
	A coefficient of variability greater than one indicates higher volatility than the market, and vice versa.	Brand-level data are needed for all or most of the firm's divisions.	Fischer, Shin, and Hanssens (2009) (quarterly)
	Cash flow volatility can explain as much as 80% of the variation in systematic market risk.		
2. Systematic market volatility (the part of stock volatility that is explained by changes in average market portfolio returns)	It is the market risk common to all firms and is easily compared across industries.	Accounts for only approximately 20% of the total risk.	McAlister, Srinivasan, and Kim (2007) (monthly)
	Based on the CAPM and dependent on the market portfolio returns; a stock whose return falls (or rises) more than the fall (or rise) in market return has a $\beta > 1.0$ , and vice versa.	Can be measured but cannot be eliminated.	Fornell et al. (2006) (daily)
	Has received considerable attention in the literature.	Inferences are sensitive to the choice/definition of the market portfolio.	
	Can be extended with finer-grained analyses for upside and downside $\beta$ s (Ang, Chen, and Xing 2006).		
3. Idiosyncratic volatility (the variability that is not explained by changes in average market portfolio return but instead by firm-specific events)	It is independent of the economy but is firm idiosyncratic.	Theoretically, it is not related to a firm's long-term stock price, but there is increasing empirical support for the role of idiosyncratic volatility (e.g., Brown and Kapadia 2007).	Luo (2007) (daily aggregated to monthly)
	Assumption is that unsystematic risk could be eliminated in a well-diversified portfolio since unique risks could cancel each other out.		Osinga et al. (2009) (monthly)
	Accounts for 80% of the total risk.		

estimated aggregate effects may be fully driven by one or two brands.<sup>8</sup> Stock return impact assessment typically works well for major events associated with large brands (i.e., with a high signal-to-noise ratio). It also works well for smaller brands focused on one or a few lines of business or on tracking stocks created by large parent companies to value the financial results of specific subsidiaries. For example, Gupta, Lehmann, and Stuart (2004) study the relationship between customer equity and stock price for some Internet firms. Whether such assessment pertains to large or small brands, we believe that it is preferable to link stock returns to brand-level variables, even though that augments the size of the data matrix.

In summary, we offer three specific recommendations to marketing researchers tackling the investor valuation question: (1) Start with the Carhart four-factor model; (2) assess the impact of unanticipated changes, recognizing that

investors react only to new information; and (3) preferably use Tobin's  $q$  as the metric of firm valuation.

#### *Measuring Investor Response to Marketing Using Four-Factor Finance Models*

Several recent studies have examined the relationship between marketing and firm value starting with the four-factor financial or CAPM models (see Figure 1, first item in the last row). Such studies assume that financial markets are efficient and have focused either (1) on the level of financial performance (e.g., Barth et al. 1998; Madden, Fehle, and Fournier 2006) or (2) on the variability in financial performance (e.g., Gruca and Rego 2005; McAlister, Srinivasan, and Kim 2007).

One approach is to start with the four-factor model in Equation 1 to compare the performance of firms that have a proven emphasis on a particular marketing characteristic (e.g., branding) with a relevant benchmark set of firms. The null hypotheses are that, in Equation 1,  $\alpha_i = 0$  and the  $\beta_i$  coefficients of the two portfolios are equal; that is, there is neither a significant abnormal return for the portfolio of focal firms nor a significant difference in the variability ( $\beta$ ) for the portfolio of focal firms versus the benchmark portfolio of firms. The alternate hypotheses are that  $\alpha_i > 0$  and the  $\beta_i$  coefficients of the two portfolios are not equal. Positive  $\alpha_i$  relative to the benchmark indicates superior performance in returns, and  $\beta_i < 1$  suggests below-average market risk, and vice versa.

<sup>8</sup>It would be ideal to run the regression  $RET^{BRAND} = bX + \mu$ , where  $RET^{BRAND}$  is the return associated exclusively with the particular brand information  $X$ . However, given the corporate nature of stock returns, the estimated regression is  $RET = \beta X + \epsilon$ , where  $RET$  is the total corporate stock return, which is composed of  $RET^{BRAND}$  and  $RET^{NOT-BRAND}$  (i.e., the stock return that is not associated with the brand). Because  $RET = (RET^{BRAND} + RET^{NOT-BRAND})$ , it can be shown that the least squares estimate  $E[\beta] = E[(X'X)^{-1}X'(RET^{BRAND} + RET^{NOT-BRAND})] = b$  (see Geyskens, Gielens, and Dekimpe 2002; Lane and Jacobson 1995), leading to an unbiased estimate, under the reasonable assumption that  $RET^{NOT-BRAND}$  and  $X$  are uncorrelated.

Studies of marketing's impact on returns include Maden, Fahle, and Fournier (2006), who compare an *ex ante* portfolio of 111 company brands that appeared on the Interbrand list of World's Most Value Brands at least once between 1994 and 2001 with a benchmark.<sup>9</sup> Along comparable lines, Rao, Agarwal, and Dahlhoff (2004) estimate the relationship between brand strategy and firm value (as measured by Tobin's *q*) using a cross-sectional, time-series panel model that controls for firm-specific variables reflecting either previous operations or future growth opportunities.

Studies of marketing's impact on volatility include McAlister, Srinivasan, and Kim (2007), who examine the relationship between firms' advertising and R&D expenditures and their systematic market risk. First, they estimate a firm's systematic market risk,  $\beta$ , starting with the CAPM, using both the equal-weighted and value-weighted portfolios. In a second step, they assess the effect of advertising/sales and R&D/sales on systematic market risk, incorporating unobserved firm heterogeneity and serial correlation in the errors by estimating a model with the systematic market risk,  $\beta_{it}$ , as the dependent variable.

The four-factor financial model is relatively straightforward to estimate and is useful in assessing cross-sectional variation in investor response. However, existing applications rarely control for all four factors. For example, the branding study of Rao, Agarwal, and Dahlhoff (2004) accounts for two factors (the size factor and the relative importance of intangibles), and the systematic-risk study of McAlister, Srinivasan, and Kim (2007) controls for three of the four factors (excluding the momentum factor). In addition, the inferences from the portfolio approach are sensitive to the choice of the benchmark portfolio (Barber and Lyon 1997). For example, a benchmark portfolio based on strong brands runs the risk of omitted-variable bias because brand strength may be associated with other characteristics that are not represented in the portfolio. As such, the selection of the benchmark is important, and it is advised to conduct robustness checks using samples matched on several characteristics (e.g., industry, market share). Finally, the four-factor model assumes that markets are efficient. The persistence model we discuss subsequently allows the researcher to test for deviations from market efficiency.

#### Measuring Investor Response Using Event Studies

When firm actions take on the form of interventions with known time stamps, an event study is necessary. Event studies eliminate the dependence on accounting information—again assuming that markets are efficient—and allow for an inference of cause and effect in a quasi-experimental setting (see Figure 1, second item in the last row). Indeed, all event studies are joint tests of the hypothesis under consideration as well as the efficiency of capital markets (Fama et al. 1969). The intuition behind the event study methodology is that given market efficiency, perfect information, and rationality of investors (Fama 1991), the effect of a relevant event should be immediately reflected in stock prices. Event studies require that the share-price reaction to the event of interest can be clearly isolated while controlling for other relevant information and that an appropriate

benchmark can be used to compute normal and abnormal returns. Event studies have been used to measure investor impact of new product announcements (Chaney, Devinney, and Winer 1991), corporate name changes (Horsky and Swyngedouw 1987), brand extensions (Lane and Jacobson 1995), celebrity endorsements (Agarwal and Kamakura 1995), joint ventures (Johnson and Houston 2000), Internet channel additions (Geyskens, Gielens, and Dekimpe 2002), new product quality reports (Tellis and Johnson 2007), market entry of a retailer (Gielens et al. 2008), and motion picture advertising (Joshi and Hanssens 2009).

The abnormal return for a stock is the *ex post* return of the stock during the course of the event window less the normal expected return, assuming that the event had not taken place (Srinivasan and Bharadwaj 2004). Starting with the Carhart four-factor financial model, the abnormal return for a stock is calculated as follows:

$$(2) \quad \epsilon_{it} = (R_{it} - R_{rf,t}) - \alpha_i - \beta_i(R_{mt} - R_{rf,t}) - s_i \text{SMB}_t - h_i \text{HML}_t - u_i \text{UMD}_t$$

In Equation 2,  $\epsilon_{it}$ , the measure of abnormal return (risk adjusted) for firm *i* in period *t*, provides an unbiased estimate of the future earnings generated by the event (Fama 1970). This abnormal return is then aggregated over the length of the window after the event of interest to arrive at the CAR.<sup>10</sup> The statistical significance of the abnormal return is calculated by dividing the CAR by its standard error. When the test period is short (e.g., a day, a week), the CAR measures are not too sensitive to the financial model used to adjust for risk. For longer test periods, event studies are sensitive to the return metrics used (Fama 1998). Consequently, it is advisable for researchers to use multiple measures of abnormal returns, such as continuously compounded abnormal return or BHAR, and to assess the sensitivity of findings to these alternative return metrics (Jacobson and Mizik 2009a, b; Lyon, Barber, and Tsai 1999). Note also that for applications outside the United States, data on some of the four factors are available at Kenneth French's Web site for a set of 20 major countries, including the United Kingdom, Germany, and Japan. For international applications beyond this set of countries, Equation 2 may not include SMB, HML, and UMD (e.g., Gielens et al. 2008). Gielens and colleagues (2008) find that their substantive results are insensitive to such omissions in their empirical setting. Overall, we recommend that investor valuation applications in markets with incomplete factor data conduct robustness checks for such omissions.

#### Measuring Investor Response Using Calendar Portfolio Theory

The event study methodology has a limitation that makes it inappropriate for measuring long-term abnormal returns to events that are clustered in time; namely, it cannot properly account for cross-sectional dependency (or overlap) among events, which could lead to misleading statistical inferences (Barber and Lyon 1997; Kothari and Warner 2006; Mitchell and Stafford 2000). One way to account for such cross-sectional dependency is to compute "one-to-one matched-pair returns" by matching firms that are closest in

<sup>9</sup>Table 4 summarizes the substantive findings of this and other marketing studies.

<sup>10</sup>Event leakage can be investigated by including preevent periods in the event window (e.g., Chaney, Devinney, and Winer 1991).

size and market-to-book ratio to the target firm (Barber and Lyon 1997; Joshi and Hanssens 2008).

Another approach is the calendar-time portfolio method (Fama 1998; Mitchell and Stafford 2000), which has recently been applied in marketing (Sorescu, Shankar, and Kushwaha 2007) (see Figure 1, third item in the last row). This method begins with the construction of a single portfolio (called a calendar-time portfolio) to include all stocks of firms with the event as the unit of analysis (e.g., a new product announcement) and then measures the long-term abnormal returns to that portfolio using the four-factor model in Equation 1. Unlike the matched-pair approach, the calendar portfolio method is based on a large comparison sample, so the potential omitted-variable bias resulting from industry characteristics variables is smaller (Barber and Lyon 1997).

The calendar-time method automatically accounts for cross-sectional correlation of returns (Lyon, Barber, and Tsai 1999; Mitchell and Stafford 2000). This is because the standard error of the abnormal return estimates of the portfolio,  $\alpha_p$ , is not computed from the cross-sectional variance (as is the case with the event study method) but rather from the intertemporal variation of portfolio returns. Given rational investors, monthly stock returns are serially uncorrelated (Kothari and Warner 2006), so the methodology is well specified, and statistical inferences are likely to be more accurate than those obtained with event studies in which the standard error is computed within the cross-section. However, the calendar-time portfolio approach has less power to detect abnormal performance because it averages over months of "hot" and "cold" event activity (Loughran and Ritter 2000). For example, the calendar-time portfolio approach may fail to identify significant abnormal returns if abnormal performance primarily exists in months of heavy event activity. Because stocks are grouped into a portfolio and a single measure of returns is obtained for the entire group, it is not possible to use a cross-section regression model to analyze the relationship between financial performance and marketing drivers (e.g., marketing actions). When the actions are continuous or repetitive rather than discrete, stock return models are better suited for that purpose.

#### *Measuring Investor Response Using Stock Return Response Models*

Stock return response models (e.g., Brennan 1991; Lev 1989) are similar to event studies, except the inputs are continuous rather than discrete in nature (see Figure 1, fourth item in the last row). Marketing examples include price movements, advertising spending, and distribution outlets. Both approaches build on the EMH, and both assess the stock return reaction to unanticipated events (i.e., the effect of new information on investors' expectations of discounted future cash flows). Stock return models may be specified on whatever data interval is appropriate for the marketing resources being deployed, such as weekly data for advertising or monthly data for major new product innovations.

Stock return response models establish whether investors perceive information on change in marketing activity, such as advertising spending, as contributing to a change in the projection of future cash flows (Mizik and Jacobson 2004). The causal inference in stock return models is not as

straightforward as in event studies. Indeed, event studies are designed as controlled quasi experiments, in which the postevent behavior of the stock price is tested relative to the expected preevent behavior, so the causal inference is direct. In contrast, stock return models may lead to signaling interpretations as well. For example, suppose an automobile manufacturer announces a significant increase in its promotional incentives, and its stock price goes down. One interpretation is that investors anticipate that these promotions will reduce the firm's future profit margins and, therefore, cash flows, indicative of a causal linkage from promotions to cash flows and, thus, to firm valuation. Another interpretation is that the market views the increase in promotional spending as a signal of weakening consumer demand for the firm's products and adjusts its valuation of the firm accordingly, indicative of a signaling linkage from promotional spending to firm valuation.

More broadly, both event studies and stock return response models may be subject to omitted-variable bias. For example, forecasts of downturns in demand or increases in commodity prices may lead to (1) more aggressive firm innovation spending and (2) decreased sales of existing products. If the latter is greater than the former, a study of innovation spending could show a negative rather than a positive effect on stock returns.

In a stock return response model, the four-factor financial model (Equation 1) is augmented with firm results and actions to test hypotheses on their impact on future cash flows. These are expressed in unanticipated changes (i.e., deviations from past behaviors that are already incorporated in investor expectations). The stock return response model is defined as follows:

$$(3) \quad R_{it} = ER_{it} + \beta_1 U\Delta REV_{it} + \beta_2 U\Delta INC_{it} + \beta_3 U\Delta CUST_{it} \\ + \beta_4 U\Delta OMKT_{it} + \beta_5 U\Delta COMP_{it} + \varepsilon_{i2t},$$

where  $R_{it}$  is the stock return for firm  $i$  at time  $t$  and  $ER_{it}$  is the expected return from the four-factor model in Equation 1. A test of "value relevance" of unexpected changes to firm and competitive results and actions is a test for significance of the  $\beta$  coefficients in Equation 3; significant values imply that these variables provide incremental information in explaining stock returns.

The components of stock returns that are, to some extent, under managerial control are of three kinds: financial results, customer asset metrics (nonfinancial results), and marketing actions. Financial results include unanticipated revenues ( $U\Delta REV$ ) and earnings ( $U\Delta INC$ ), and nonfinancial results include metrics such as customer satisfaction and brand equity ( $U\Delta CUST$ ). Specific marketing actions are the unanticipated changes to marketing variables or strategies ( $U\Delta OMKT$ ). In addition, competitive actions or signals in the model reflect the unanticipated changes to competitive results, marketing actions, strategy, and intermediate metrics ( $U\Delta COMP$ ), and  $\varepsilon_{i2t}$  is the error term. As an illustrative example, Srinivasan and colleagues (2009) investigate the impact of product innovations, advertising, promotions, customer quality perceptions, and competitive actions on stock returns for automobile manufacturers.

The unanticipated components can be modeled as the difference between analysts' consensus forecasts and the realized value (in the case of earnings) or with time-series

extrapolations using the residuals from a time-series model (e.g., Lev 1989). A few studies argue that analysts' forecasts could be more accurate predictors of earnings expectations than time-series models because analysts have access to broader and more current information sets (e.g., advance knowledge of firm actions), leading to improved quantitative models (Brown and Rozeff 1978; Brown et al. 1987).

Recent research in finance has relaxed the EMH assumption of investors' structural knowledge while maintaining the rationality assumption in decision making (e.g., Brav and Heaton 2002; Brennan and Xia 2001). This literature suggests that with rational learning, stock prices move not only when new information becomes available but also when investors improve their understanding of the various economic relationships that shape the market equilibrium. Thus, the short-term investor reaction to marketing "news" may be adjusted over time until it stabilizes in the long run and loses its ability to adjust stock prices further. Under the EMH, there would not be any time-adjusted effects because the impact of marketing actions would be fully contained in the next period's stock price. This perspective motivates the use of persistence models instead of event windows to study marketing's impact on firm value, which we turn to next.

#### Measuring Investor Response Using Persistence Modeling

Persistence models (see Figure 1, fifth item in the last row) use a system's representation (e.g., Dekimpe and Hanssens 1995; Pauwels et al. 2002), in which each equation tracks the behavior of an important agent—for example, the consumer (demand equation), the manager (decision rule equations), competition (competitive reaction equation), and, finally, the investor (stock price equation).<sup>11</sup> As an example, a persistence model estimated as a vector autoregressive model can be specified for each brand (two in the illustration) of firm *i* as follows:

$$(4) \quad \begin{bmatrix} \Delta MBR_{it} \\ \Delta INC_{it} \\ \Delta REV_{it} \\ MKT1_{it} \\ MKT2_{it} \end{bmatrix} = C + \sum_{n=1}^N B_n \times \begin{bmatrix} \Delta MBR_{it-n} \\ \Delta INC_{it-n} \\ \Delta REV_{it-n} \\ MKT1_{it-n} \\ MKT2_{it-n} \end{bmatrix} + \Gamma \times \begin{bmatrix} X_{1t} \\ X_{2t} \\ X_{3t} \end{bmatrix} + \begin{bmatrix} u_{MBRit} \\ u_{INCit} \\ u_{REVit} \\ u_{MKT1it} \\ u_{MKT2it} \end{bmatrix},$$

<sup>11</sup>The long-term behavior of each endogenous variable is obtained from a shock-initiated chain reaction across the equations. For example, a successful new product introduction will generate higher revenue, which may prompt the manufacturer to reduce sales promotions in subsequent periods. The combination of increased sales and higher margins may improve earnings and ultimately stock price. Because of such chains of events, the full performance implications of the initial product introduction may extend well beyond its immediate effects.

where  $B_n$  and  $\Gamma$  are vectors of coefficients,  $[u_{MBRit}, u_{INCit}, u_{REVit}, u_{MKT1it}, u_{MKT2it}]' \sim N(0, \Sigma_u)$ ,  $N$  is the order of the system based on Schwartz's Bayesian information criterion, and all variables are expressed in logarithms or their changes ( $\Delta$ ). In this system, the first equation is an expanded version of the stock return response model in Equation 3. The second and third equations explain the changes in, respectively, bottom-line (INC) and top-line (REV) financial performance of firm *i*. The fourth and fifth equations represent firm *i*'s marketing actions (e.g., for each brand)—that is,  $MKT1_t$  and  $MKT2_t$ . For example, Pauwels and colleagues (2004) consider a brand's new product introductions and sales promotions. The exogenous variables in this dynamic system ( $X_{1t}, X_{2t}, X_{3t}, \dots$ ) could include controls, such as the Carhart four factors and the impact of stock market analyst earnings expectations (Ittner and Larcker 1998). The impact of contemporaneous shocks is incorporated through the elements of  $\Sigma_u$ . Such models provide baseline forecasts of each endogenous variable, along with estimates of the shock or surprise component in each variable. If the EMH holds and all relevant new information is incorporated immediately into stock returns, the lagged terms in the investor equation of Equation 4 will be zero. In contrast, lagged effects indicate that information is incorporated gradually. For example, Pauwels and colleagues (2004) show that investors in the automotive industry need about six weeks to fully incorporate the impact of a new product introduction on stock returns.

Although the system's representation makes these models more comprehensive than the single-equation approaches (see Figure 1, first four items in the last row), vector autoregressive models have some limitations. First, persistence models are inherently reduced-form models, unless structural restrictions are imposed on the contemporaneous causal ordering. Second, the data requirements are substantial, and the data-generating process is assumed to be constant over time. To alleviate this concern, the stability of results over time needs to be tested, which may lead to moving-window estimation to capture response shifts (e.g., Pauwels and Hanssens 2007). Finally, vector autoregressive models can result in overparameterization, which may affect the quality of individual parameter estimates.

#### MARKETING AND FIRM VALUE: FINDINGS

The models reviewed have been used in several studies on the marketing–finance interface that enable us to formulate some empirical patterns. Table 3 summarizes the results for market asset metrics, and Table 4 focuses on marketing actions. We present these as propositions rather than empirical generalizations at this juncture because the studies are recent and, in many cases, still need replication across industries. In turn, we discuss propositions on brand equity, customer equity, customer satisfaction, R&D and product quality, and specific marketing-mix actions. We conclude with a discussion of the emerging evidence on biases in investor response.

#### Marketing Assets and Investor Response

**Brand equity effects.** Over the past decade, there has been significant interest among academics and practitioners in understanding the importance of brand equity (Keller and Lehmann 2006). Brands are viewed as assets that generate future cash flows (Aaker and Jacobson 1994; Rao,

Table 3  
MARKETING ASSETS (AS PREDICTORS) AND INVESTOR RESPONSE: METRICS AND FINDINGS

<i>Marketing Metric</i>	<i>Illustrative Metrics</i>	<i>Characteristics</i>	<i>Illustrative Studies</i>	<i>Empirical Findings</i>
1. Brand equity	<i>Financial World's</i> measure of brand equity  Young & Rubicam's Brand Asset Valuator	Brand's strength is determined by five components.  Based on consumer self-reports on five brand asset pillars—relevance, vitality, esteem, knowledge, and differentiation.  Available only for large firms.  Not always publicly available to investors (e.g., Young & Rubicam).	Barth et al. (1998)  Simon and Sullivan (1993)  Madden, Fehle, and Fournier (2006)  Rao, Agarwal, and Dahlhoff (2004); Joshi and Hanssens (2008)  Mizik and Jacobson (2007)	Stock returns are positively related to brand valuation.  A substantial fraction of the valuation of consumer goods companies and even some high-technology firms is based on brand equity.  Strong brands deliver greater stock returns and do so with lower risk.  Impact of branding on firm valuation is moderated by type of branding strategy: corporate branding, house of brands, or mixed branding.  Changes in a firm's brand assets are associated with changes in financial market valuation.
2. Customer satisfaction	American Customer Satisfaction Index (ACSI)	Publicly available ACSI data but not at the firm level.  ACSI scores are updated only annually.  Disaggregate firm/product data available for certain industries (e.g., auto from J.D. Power and Associates).	Ittner and Larcker (1998)  Anderson, Fornell, and Mazvancheryl (2004)  Gruca and Rego (2005)  Fornell et al. (2006); Mittal et al. (2005)  Gupta and Zeithaml (2006)  Luo and Bhattacharya (2006)	A 5-unit increase on a 0–100 scale (roughly one standard deviation from its mean) in the ACSI was associated with a 1% increase in CARs.  A 1% change in ACSI is associated with a 1.016% change in Tobin's q.  A 1-point increase in the ACSI generates an additional growth in cash flows and a decrease in cash flow variability.  Highly satisfied customers generate positive returns.  There is a strong link among customer satisfaction, firm profitability, and market value.  Customer satisfaction partially mediates the relationship between corporate social responsibility and firm market value.
3. Customer metrics	Customer lifetime value  Customer equity	Customer metrics data tend to be proprietary.	Gupta, Lehmann, and Stuart (2004)	Valuing customers makes it feasible to value firms because customer equity moves in parallel with market value for three of the five companies.  Retention is more important than margin or acquisition cost because a 1% improvement in retention can improve profitability by approximately 5%, while a similar improvement in margin and acquisition cost improves profits by 1.1% and .1%, respectively.
4. Product quality	Equitrend Perceived Quality  J.D. Power and Associates Perceived Appeal and Quality  Product Review (e.g., LexisNexis)	Customer-driven measures.  Amenable to event study analysis.  Time-intensive data collection (e.g., product review data).	Aaker and Jacobson (1994); Mizik and Jacobson (2003)  Srinivasan et al. (2009)  Tellis and Johnson (2007)	Perceived quality is associated with changes in stock returns, and thus investors view quality signals as providing useful information about future prospects of the firm.  New product introductions that enjoy more positive consumer perceptions of quality and product appeal lead to systematically higher returns.  Ratings of quality in published reviews influence investors' evaluation of the quality of the firm's products. Firms with good-quality reviews enjoy a gain of 10% in stock returns over the same period, while firms with poor-quality reviews suffer a drop of returns of approximately 5%.

Table 4  
MARKETING ACTIONS (AS PREDICTORS) AND INVESTOR RESPONSE: METRICS AND FINDINGS

<i>Marketing Metric</i>	<i>Illustrative Metrics</i>	<i>Characteristics</i>	<i>Illustrative Studies</i>	<i>Empirical Findings</i>
1. Advertising	Advertising dollars (e.g., COMPUSTAT)  Advertising dollars (e.g., TNS Media)	COMPUSTAT provides aggregate firm-level quarterly data, but it is widely available.  TNS Media provides disaggregate data at the brand/category level, and data interval is monthly.  Data are expensive.	Frieder and Subrahmanyam (2005); Grullon, Kanatas, and Weston (2004); Joshi and Hanssens (2008); Barth et al. (1998); Rao, Agarwal, and Dahlhoff (2004)	Advertising directly affects stock returns beyond the indirect effect of advertising through lifting sales revenues and profits.  Advertising has a direct effect on firm value through two mechanisms: spillover and signaling.  Investors cognizant of the benefits of increased advertising through enhanced brand equity may look beyond a firm's current cash flows and translate the long-term effects of advertising into firm valuation.
			Mathur and Mathur (2000); Mathur, Mathur, and Rangan (1997)	Advertising may act as a signal of the firm's financial well-being or competitive viability.
			Grullon, Kanatas, and Weston (2006)	Firms that raise significant amounts of equity capital increase their advertising significantly more than firms with higher financial leverage (i.e., higher levels of debt relative to equity capital).
			McAlister, Srinivasan, and Kim (2007)	Advertising lowers its systematic market risk.
			Srinivasan et al. (2009)	Communicating the differentiated added value created by product innovation yields higher firm value effects of these innovations, especially for pioneering innovations.
2. Price promotions	Promotional expenditures (e.g., J.D. Power and Associates)	Disaggregate, weekly, brand-/category-level data, but data tend to be proprietary.	Pauwels et al. (2004)	Price promotions diminish long-term firm value, even though they have positive effects on revenues and, in the short run, on profits.  A policy of aggressive new product introductions acts as an antidote for excessive reliance on consumer incentives.
3. Distribution channels	Channel additions (e.g., newspaper search of Internet channel additions)	Amenable to event study analysis.  Internet data collection is time intensive.	Geyskens, Gielens, and Dekimpe (2002)	Investors perceive the expected gains of the added channel as outweighing its costs. However, the negative stock returns are observed for established firms that may be hurt by Internet channel cannibalization.
			Gielens et al. (2008)	Entry of large retailers can have negative and positive effects on firm value of other retailers.
4. New products	Product preannouncements (e.g., LexisNexis)  New product introductions (e.g., J.D. Power and Associates)	Amenable to event study analysis.  Researcher needs to control for considerable delay in preannouncement date and introduction.	Chaney, Devinney, and Winer (1991)	New product announcements generate small excess stock market returns for a few days.
			Sorescu, Shankar, and Kushwaha (2007)	Financial returns from preannouncements are significantly positive in the long run.
			Kelm, Narayanan, and Pinches (1995)	Additional excess returns can be created when the new product is subsequently launched.
			Pauwels et al. (2004)	New product introductions increase long-term financial performance and firm value, but promotions do not. Moreover, investor reaction to new product introduction occurs over time, indicating that useful information unfolds in the first two months after product launch.
			Srinivasan et al. (2009)	Pioneering (new-to-the-world) innovations have a higher stock return impact than nonpioneering innovations.

Agarwal, and Dahlhoff 2004), and investors appear to consider brand value in their stock evaluation (Barth et al. 1998; Simon and Sullivan 1993). Marketing research on the link between brand-related intangible assets and firm value has assessed stock market reaction to the changing of a company's name (Horsky and Swyngedouw 1987), new product announcements (Chaney, Devinney, and Winer 1991), perceived quality (Aaker and Jacobson 1994), brand extensions (Lane and Jacobson 1995), brand attitude (Aaker and Jacobson 2001), and customer mind-set brand metrics (Mizik and Jacobson 2008).

Research using a commercial brand equity metric, Interbrand, has indicated that strong brands not only deliver greater stock returns than a relevant benchmark portfolio but also do so with lower risk (Madden, Fehle, and Fournier 2006). In addition, research has implied that the impact of marketing variables on Tobin's  $q$  may be moderated by the type of branding strategy a firm adopts (Rao, Agarwal, and Dahlhoff 2004; Joshi and Hanssens 2008). A corporate branding strategy was found to offer higher returns than either a house-of-brands strategy or a mixed-branding strategy. Although there is intense discussion about the admission of brands into financial accounts in the accounting community (Barth et al. 1998; Lev and Sougiannis 1996), there is little disagreement that brands are intangible assets of a firm. *In summary, improvements in brand equity have a significant, positive impact on firm valuation.*

*Customer satisfaction effects.* Several recent studies have shown a strong link among customer satisfaction, firm profitability, and market value (for a review, see Gupta and Zeithaml 2006). Changes in customer satisfaction are associated with increases in abnormal returns (Ittner and Larcker 1998), increases in Tobin's  $q$  (Anderson, Fornell, and Mazvancheryl 2004), increases in cash flows, and decreases in cash flow variability (Gruca and Rego 2005). Using comprehensive historical data, Luo and Bhattacharya (2006) show that customer satisfaction partially mediates the relationship between corporate social responsibility and firm market value. Furthermore, higher levels of customer dissatisfaction harm a firm's future idiosyncratic stock returns (Luo 2007). Because cash flow volatility affects the firm's cost of capital, this effect provides yet another source for stock price appreciation.

In cross-sectional analyses, Fornell and colleagues (2006) and Mittal and colleagues (2005) report that firms with highly satisfied customers usually generate positive returns. In addition, Fornell and colleagues report that changes in the American Customer Satisfaction Index are not immediately or fully incorporated into stock returns. This situation creates an arbitrage opportunity for alert investors, which the authors find to be sizable over a five-year horizon. Conversely, Anderson, Fornell, and Mazvancheryl (2004) report that satisfaction growth is positively related to Tobin's  $q$  growth. A possible explanation for these different findings may stem from the different periods used (1994–1997 versus 1994–2002). The difference may also stem from a failure to include an appropriate measure of unanticipated customer satisfaction in the stock return model (for a discussion, see Jacobson and Mizik 2009a, b). Yet another possible explanation is that some studies do not control for financial and accounting information that is likely to affect investor expectations (i.e., an

omitted variables problem). For example, Fornell and colleagues do not consider two of the four factors—namely, the size and the value risk factors. *In summary, levels of customer satisfaction are significantly related to firm value, while news about changes in customer satisfaction may not result in an immediate change in firm valuation.*

*Customer equity effects.* Customer equity and market valuation are intrinsically related because they are two versions of the principle of the present value of a stream of expected future cash flows. This connection helps make marketing more financially relevant and accountable. As an illustration, in a small-sample study of five companies, Gupta, Lehmann, and Stuart (2004) demonstrate how valuing customers makes it feasible to value firms because customer equity moves in parallel with market value for three of the five companies. Notably, they find that the remaining two companies are potentially mispriced. Their key findings are in Column 5 of Table 3. However, customer equity maximization can imply a narrowing of the customer base because the firm concentrates its efforts on the most profitable customers. This practice may increase the firm's risk in the long run, which is an area in need of further research. *In summary, improvements in customer equity are significantly related to firm value.*

*R&D and product quality effects.* Several studies have linked firm value to R&D expenditures (Doukas and Switzer 1992; Chan, Lakonishok, and Sougiannis 2001); discretionary expenditures, such as R&D and advertising (Erickson and Jacobson 1992; Griliches 1981; Jaffe 1986; Pakes 1985); and innovation (Bayus, Erickson, and Jacobson 2003; Pauwels et al. 2004). Most notably, value creation (e.g., through investments in R&D), in combination with value appropriation (e.g., through investments in advertising), has been found to enhance firm value (Mizik and Jacobson 2003). As for product quality, its relationship to market valuation is a relatively new research area. The research is sparse because there are varying definitions for quality, and there are significant differences between objective quality and perceived quality (Mitra and Golder 2006). Changes in perceived quality are associated with changes in stock returns, and thus investors view the quality signal as providing useful information about the future-term prospects of the firm (Aaker and Jacobson 1994; Mizik and Jacobson 2004). Moreover, two recent studies suggest that it takes innovation and quality assessment to improve stock performance. Srinivasan and colleagues (2009) assess the impact of unanticipated consumer quality scores in product innovations, and Tellis and Johnson (2007) focus on the impact of expert ratings of quality; we note their key findings in Table 3. *In summary, it takes more than merely introducing new products to improve stock performance. Improvements in consumer appraisal in terms of perceived quality, particularly for new products, are significantly related to firm value.*

Overall, research supports the proposition that brand equity, customer satisfaction, customer equity, and R&D and product quality are all linked to firm value. These are slow-moving performance metrics that are not immediately visible. In contrast, marketing initiatives are typically immediately observable, but because they are not outcome variables, their impact on firm value is more ambiguous.

*Marketing Mix and Investor Response*

*Advertising effects.* Several recent studies have suggested that a firm's advertising (Frieder and Subrahmanyam 2005; Grullon, Kanatas, and Weston 2004; Joshi and Hanssens 2008) directly affects stock returns, beyond the indirect effect of advertising through lifting sales revenues and profits. The intangible equity that advertising attempts to create, ostensibly for customer marketing purposes, can spill over onto investors and increase the firm's salience with individual investors, who typically prefer holding stocks that are well known or familiar to them (Frieder and Subrahmanyam 2005; Grullon, Kanatas, and Weston 2004). Luo and Donthu (2006) report a positive influence of marketing communication productivity on shareholder value. These findings help explain why several firms advertise at levels beyond those justified by sales response alone. Indeed, recent studies have confirmed that advertising expenditures create an intangible asset (Barth et al. 1998; Rao, Agarwal, and Dahlhoff 2004). After controlling for other factors, Grullon, Kanatas, and Kumar (2006) find that firms that decrease their leverage through increased equity financing advertise more aggressively than firms whose debt financing has increased. Their rationale for this increased advertising spending is that it creates more assets that are intangible and nontransferable. In addition, McAlister, Srinivasan, and Kim (2007) report that a firm's advertising lowers its systematic market risk. Srinivasan and colleagues (2009) find that communicating the added value created by product innovation to consumers yields higher firm value effects of these innovations, especially for pioneering innovations. Our conclusion is that advertising affects intangible firm value and lowers systematic market risk. Moreover, product innovation affects firm value more when it is accompanied by higher advertising support.

*New product introduction effects.* It has been reported that new product announcements generate small excess stock market returns for a few days (Chaney, Devinney, and Winer 1991; Eddy and Saunders 1980; Kelm, Narayanan, and Pinches 1995). Although these studies have focused on the short-term effect, recent evidence indicates that the financial returns from preannouncements are significantly positive in the long run as well, with annual abnormal returns of approximately 13% (Sorescu, Shankar, and Kushwaha 2007). Similarly, Pauwels and colleagues (2004) find that new product introductions increase long-term financial performance and firm value, but promotions do not. Moreover, investor reaction to new product introduction occurs over time, indicating that financially useful information unfolds in the first two months after product launch. Finally, the stock performance impact shows a U-shaped relationship to innovation level, which is predominantly in the positive zone, but with a preference for new market entries over minor innovations (Pauwels et al. 2004). However, this positive impact of innovation is not without error; recent empirical evidence suggests that investor reaction is a poor predictor of the eventual commercial success of new product introductions (Markovitch and Steckel 2006). We conclude that firm innovativeness is predominantly positively related to firm value and potentially unfolds over time.

*Price promotion effects.* Although many studies have examined the impact of price promotions on revenues and

firms, their impact on firm valuation is relatively under-researched. An exception is Pauwels and colleagues (2004), who find that investor reaction mirrors consumer reaction to incentive programs, which is strong, immediate, and positive (Blattberg, Briesch, and Fox 1995; Srinivasan et al. 2004). However, these beneficial effects are short-lived for all but firm top-line performance because both long-term bottom-line and firm value elasticities are negative. Price promotions may also signal desperation, foretelling decreased earnings. Another plausible explanation for these sign switches is price inertia or habit formation in sales promotions: The short-term success of promotions makes it attractive for managers to continue using them (Nijs, Srinivasan, and Pauwels 2007). However, this practice eventually erodes profit margins, and bottom-line performance and firm value suffer in the long run. *In summary, price promotions are negatively related to firm value in the long run.*

*Channels of distribution effects.* The relationship between channel strategy and market valuation is also underresearched. In a study of the net impact of an additional Internet channel on a firm's stock return, Geyskens, Gielens, and Dekimpe (2002) show that, on average, investors perceive that the expected gains of the added channel will outweigh its costs. However, negative stock returns are observed for established firms that may be hurt by Internet channel cannibalization. More recently, Gielens and colleagues (2008) assessed the effect of Wal-Mart's entry in the United Kingdom on the stock prices of European retailers. They find that the shareholder value of incumbent retailers is negatively affected by the degree of overlap with Wal-Mart in assortment, positioning, and country of entry. Conversely, the shift in retail power can also lead to positive effects in the form of channelwide productivity increases for all retailers. Although these studies examine the market valuation impact of channel additions, research is needed on channel deletions as well. *We conclude that, on average, the opening of new distribution channels is positively related to firm value.*

*How Does Stock Price Influence Marketing Actions?*

The previously stated propositions establish that investors interpret many marketing initiatives, and therefore marketers may want to incorporate investor behavior in their actions. For example, Rappaport (1987, p. 62) notes that "sophisticated managers have found that they can learn a lot if they analyze what the stock price tells about the market's expectations about their company's performance;... managers who ignore important signals from stock price do so at their peril." The central premise in this research is that managers look to stock returns for information, actively respond to that information, and do so differently depending on whether the information is "good news" or "bad news." Specifically, managers of firms with underperforming stocks react more aggressively with changes to their product portfolio and distribution than managers of firms with high-performing stocks (Markovitch, Steckel, and Yeung 2005).

Recent evidence also suggests that in a myopic effort to inflate current-term earnings to give the appearance of improved long-term business prospects (and thus enhance stock price), managers tend to reduce marketing expendi-

tures at the time of seasoned equity offerings (Mizik and Jacobson 2007). Furthermore, an unexpected decline in a firm's stock price has been shown to lower managers' subsequent marketing and R&D spending (Shin, Sakakibara, and Hanssens 2008). *In summary, preliminary evidence supports reverse causality; that is, changes in firm value may drive some marketing actions.*

#### *Biases in Investor Response to Marketing Actions*

Given stock market reaction to marketing changes, there are several reasons investors may find it difficult to evaluate the impact of marketing actions, leading to deviations from the standard EMH model (e.g., Thaler 2005). First, investor overconfidence bias is well documented (e.g., Daniel and Titman 1999) and is hypothesized to stem from illusions of control and knowledge. Second, investor familiarity bias occurs because investors are cognitively unable to apply the same level of expertise across an entire universe of stocks (Freider and Subrahmanyam 2005; Shiller 2003). In this context, advertising can help attract a disproportionate number of investors who, at least in part, make their investments based on familiarity rather than fundamental information (Grullon, Kanatas, and Weston 2004). Third, investors are subject to loss-aversion bias (Benartzi and Thaler 1995). Even those with long-term investment horizons are tempted to change course at the prospect of short-term losses.

Finally, investors may be influenced by persuasive communication, either by companies themselves or by stock analysts. Companies spend substantial resources in dealing with capital markets through press releases, corporate advertising, chief executive officer appearances, and the like. Stock analysts specialize in certain sectors and compete with one another for influence over investors when they make stock recommendations. Recent work shows that investor portfolio choices for mutual funds are affected by fund advertising (Cronqvist 2006; Gallaher, Kaniel, and Starks 2005; Sirri and Tufano 1998), even though such advertising provides little direct informational content (e.g., Nelson 1974). In other words, investors are biased toward investing more in mutual funds with higher levels of advertising, even though these funds are not associated with higher postadvertising excess returns (Jain and Wu 2000; Mullainathan and Shleifer 2005). Similarly, analysts may have a biasing influence on investors as well. Specifically, analyst forecasts could be positively biased because of client relationships (e.g., Kothari 2001) or herding behavior (e.g., Trueman 1994). *In summary, preliminary evidence indicates that there are biases in investor response to marketing actions.*

#### *FUTURE RESEARCH DIRECTIONS*

Our review has emphasized the importance of the investor community in the design and execution of marketing plans. Investors react to changes in important marketing assets and actions that they perceive as changing the outlook of firms' cash flows. Several econometric models have been developed to parameterize these relationships, and several empirical propositions have been generated to date. These lead to the formulation of an important agenda for further research in the following areas:

1. Comparing the different measures of brand equity: We know that investors react to movements in brand value, but are these brand metrics reliable and consistent with each other? In general, what is the best approach to quantify the value of intangibles (e.g., brands, intellectual property) and to assess their impact on cash flows, growth, and risk?
2. Understanding the stock market impact of various metrics of return on marketing investment: Given that the benefits of sound marketing and branding strategy are typically materialized over multiple periods, are these measures of return on marketing investment shortsighted?
3. Understanding the stock market impact of known marketing phenomena such as diffusion of innovation, which can generate momentum in sales and stock returns. More generally, assessing how marketing may create the momentum factor in the Carhart four-factor financial model.
4. Understanding the stock market impact of corporate social responsibility initiatives, such as environmental sustainability. In particular, do higher levels of social responsibility investments hurt or benefit firms from a firm valuation perspective?
5. Assessing the influence of public relations efforts on the investor community.
6. Prescribing the critical marketing information elements that should be made available to investors: As an example, should firm revenue be broken down between existing and new customers? In addition, how should the value of market-based assets (e.g., customer lifetime value, brand equity, channel equity) and firms' marketing strategies be communicated? What is the role of intermediate performance metrics, such as customer satisfaction, and how do they affect valuation? Why are movements in customer satisfaction not immediately reflected in stock returns, even though a long-term relationship exists between customer satisfaction and investor valuation?
7. Understanding the volatility component of firm value: In particular, do higher levels of brand equity, customer equity, and product variety reduce the vulnerability of companies to competitive inroads, thus reducing risk and volatility of cash flows? Does this result in favorable risk profiles (lower  $\beta$ s)? Furthermore, what is the relationship between volatility in cash flows (or volatility in earnings) and the firm's systematic market risk (i.e.,  $\beta$ )?
8. Dealing with short-term revenue pressures: To date, the empirical evidence supports the notion that the stock market is not myopic. Thus, companies that engage in effective strategic marketing spending should feel justified in their actions. However, many corporate executives are concerned about their quarterly performance metrics, which motivates some of their actions. How can these two seemingly contradictory behaviors be reconciled?
9. Identifying the conditions under which investor reaction is accurate and how long it takes for such investor reaction to materialize: Given the mixed evidence on the quality of investor reaction, it is important to understand when biases occur and how they can be corrected.
10. Understanding the potential biases introduced by persuasive communication of analysts and company representatives: How do analysts' interpretations of marketing activities, such as product-price changes, affect stock returns? Can corporate lobbying efforts influence analyst reports? In turn, how do these reports influence subsequent movements in firm value? Is there a difference in the behavior of stock returns of firms that are tracked by analysts versus those that are not? How long does it take for investors to account for such biases?

Overall, given the increasing pressures on marketing executives to demonstrate the financial accountability of their firms' marketing initiatives, the studies we have reviewed clearly point to the link between marketing actions and investor response. Lev (2004) notes that marketing managers need to generate better information about their intangibles (e.g., investments in brand building, product and service innovations, R&D) and the benefits that flow from them and then disclose that information to the capital markets to give investors a sharper picture of the company's performance outlook. As a step in that direction, we hope that the collective findings in this article generate a much-needed discussion among senior management, finance and marketing executives, and academics on the important role of marketing actions in determining firm valuation.

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