DO ANALYSTS PAY ATTENTION TO MARKETING? ADVERTISING, R&D AND DISPERSION IN ANALYSTS' FORECASTS

Raji Srinivasan
Assistant Professor of Marketing
Red McCombs School of Business
University of Texas at Austin
CBA 7.248, Austin, TX 78712-1176
Tel: 512-471-5441; fax: 512-471-1034
Email: raji.srinivasan@mccombs.utexas.edu

April 13, 2007

We gratefully acknowledge the contribution of I/B/E/S International Inc. for providing earnings per share forecast data, available through the Institutional Brokers' Estimate System. These data have been provided as part of a broad academic program to encourage earnings expectation research.

DO ANALYSTS PAY ATTENTION TO MARKETING? ADVERTISING, R&D AND DISPERSION IN ANALYSTS' FORECASTS

Abstract

There is growing evidence that marketing activities affect both the level and the variability of financial performance metrics. With respect to variability of performance, past research has related firms' marketing to the ex-post or "after the fact" variability of their performance. There are few insights relating marketing to the ex-ante or "before hand" variability of firm performance and the empirical evidence, which is in the accounting literature, is both limited and mixed. In this paper, we examine the effects of firms' advertising and R&D expenditures on the dispersion in financial analysts' expectation of earnings per share. Dispersion in analysts' forecast is an important ex-ante performance metric in the firm valuation process lowering the firm's future stock returns.

We propose that a firm's advertising and research and development expenditures, both independently and in conjunction with other firm characteristics, will affect the dispersion in analysts' forecasts of earnings. Specifically, we propose interaction effects of the firm's advertising and R&D expenditures with its size and with two performance characteristics: the firm's past performance and the variability of its past performance. We use a panel dataset of 96 Fortune 300 firms for the period 1995-2004 to test the proposed model.

The findings, which support a contingent effect of the firm's advertising and R&D expenditures on the dispersion in analysts' forecasts of earnings, suggest that analysts are, indeed, paying attention to the firm's marketing activities. Independently, advertising and R&D expenditures decrease dispersion in analysts' forecasts, and these effects are stronger for firms with superior past performance. For large firms, advertising decreases dispersion and R&D increases dispersion. For firms with variable past performance, advertising and R&D increase the dispersion in analysts' forecasts. The paper's findings have implications for marketing theory and managerial practice, which we discuss.

Keywords: dispersion in analysts' forecasts, advertising, research and development, marketing metrics

INTRODUCTION

A seminal development in the marketing literature is the market-based assets theory (Srivastava et al. 1998, 1999), which posits that firms' marketing expenditures create intangible market-based assets that both increase and stabilize firm performance, thereby increasing shareholder value. Empirical studies report the effects of marketing actions on the levels of various performance metrics, including cash flow (Gruca and Rego 2005; Merino, Srinivasan and Srivastava 2007), stock returns (Joshi and Hanssens, 2005; Mizik and Jacobson 2003; Pauwels et al. 2004) and shareholder value (Gruca and Rego 2005; Srinivasan 2006). In addition, marketing actions have also been shown to lower variability of performance including that of cash flow (Gruca and Rego 2005; Singh, Faircloth and Nejadmalayeri 2005), stock returns (McAlister, Srinivasan and Kim 2007; Merino et al. 2007) and intangible value (Merino et al. 2007). In this paper, we examine the effects of a firm's advertising and research and development (R&D) on dispersion in financial analysts' forecasts of earnings per share, an important metric for capital markets. We first provide the motivation for this paper.

From a marketing theory perspective, past research, cited above, has focused on the ex post, or "after the fact," or "actual," variability of firm performance. There are few insights on the ex-ante or "before hand," variability of firm performance. In this paper, we focus on dispersion, the variability in the expectations of financial analysts about the firm's earnings per share, which, as we discuss below, crucially affects shareholder value.

Expectations are central to the day-to-day practice of the investment community. Most models of stock valuation require financial analysts' estimates of earnings (e.g., Brown and Rozeff 1978; Schipper 1991). The important role of analysts' forecasts in the firm valuation process is evident from the fact that analysts at major financial institutions routinely produce

estimates of future performance that other stock market participants (i.e. investors, banks, mutual funds) pay close attention to (Schipper 1991). Analysts' expectations of performance reliably predict stock prices (Elton, Gruber and Gultekin 1981) and stock returns (Diether, Malloy and Scherbina 2002; Johnson 2004). While the mix of variables forecasted by analysts varies across firms and industries, analysts always produce forecasts of the firm's earnings per share (EPS),[1] which is a primary input in its future stock prices.

Typically, several financial analysts cover a firm, so that for a given period, there will be multiple analysts' forecasts, possibly all different. Dispersion measures the cross-sectional variation in analysts' forecasts for a particular period, reflecting the diversity of analysts' forecasts. Investors perceive dispersion in analysts' forecasts as valuable information about the uncertainty and risk of the firm's future performance (e.g., Barron et al. 1998; Barry and Jennings 1992). Importantly, dispersion in analysts' forecasts affects firm value by decreasing the firm's future stock returns (e.g., Brown, Richardson and Schwaeger 1987; Daley, Senkow and Vigeland 1988; Diether et al. 2002).

From a managerial perspective, insights on whether and how the firm's advertising and R&D expenditures affect dispersion in analysts' forecasts are useful not only to stock market participants, including investors, analysts, but also to senior finance and marketing executives, entrusted with the responsibility for managing their firm's advertising and R&D expenditures. As Rust et al. (2004, p. 76) note, the financial accountability of marketing expenditures is shifting such that the "the spotlight is not on underlying products, pricing or customer relationships…but on marketing expenditures (e.g., marketing communications, promotions and other activities) and how these measures influence marketplace performance." Insights on the

[1] Henceforth in the paper, we use the term 'analysts' forecasts' to refer to financial analysts' forecasts of the firm's EPS.

effects of marketing expenditures on ex-ante performance will enable managers to understand how their marketing activities are perceived by stock market participants to affect their firm performance and empower them to act proactively to bolster their firm's future performance.

Given the importance of dispersion in analysts' forecasts in the firm valuation process, accounting scholars have examined various issues related to dispersion including firm characteristics that affect dispersion (e.g., Atiase 1985; Lang and Lundholm 1996), the information characteristics of dispersion (e.g., Barron et al. 2002; Barron and Stuerke 1998), and the effects of dispersion on the firm's future stock returns (e.g., Brown et al. 1987; Diether et al. 2002).

Indeed, recently, some accounting studies have examined the effects of firms' advertising and R&D expenditures on the properties of analysts' forecasts, including their dispersion (Kwon 2002). However, our review suggests that there is mixed evidence of the effects of advertising and R&D expenditures on dispersion in analysts' forecasts. Kwon (2002) found that firms with higher R&D expenditures, relative to firms with lower R&D expenditures, have lower dispersion in analysts' forecasts, while Barron et al. (2002) found that analysts of firms with higher advertising and R&D expenditures were more uncertain about their future performance. Combining Barron et al.'s (2002) finding with an earlier finding that analysts' uncertainty about the firm's future performance increases dispersion in their forecasts (Barron et al. 1998), a firm's increasing advertising and R&D expenditures should increase dispersion in its analysts' forecasts. What might account for this mixed evidence for the effects of advertising and R&D on dispersion in analysts' forecasts?

We offer two explanations. From a theoretical perspective, these accounting studies have modeled only the main effects of advertising and R&D on analysts' forecasts without

considering their potential interactions with other firm characteristics. Contingency theory (Zeithaml, Varadarajan and Zeithaml 1988), suggests that interactions among a firm's characteristics and its strategies influence its performance. Supporting the contingency theory, in the marketing metrics area, Srinivasan (2006) found that firms' dual distribution strategies interact with other characteristics (e.g., size, financial leverage, and financial liquidity) to affect their intangible values. From an empirical perspective, accounting studies have estimated cross-sectional pooled regression models using data from firms over time without consideration of either firm heterogeneity or the data's time series structure, resulting in a potentially incorrect model specification. We address both the theoretical and empirical issues in this paper.

We propose a conceptual framework that includes interaction effects among a firm's advertising and R&D expenditures and the firm's characteristics on the dispersion in analysts' forecasts. What firm characteristics are likely to interact with advertising and R&D expenditures to affect dispersion in analysts' forecasts? The firm's size and aspects of its past performance, specifically, the level and variability of past performance have been found to influence properties of analysts' forecasts (e.g., Atiase 1985; Bhushan 1989; Lang and Lundholm 1996). Thus, in addition to the main effects of advertising and R&D on dispersion of analysts' forecasts, we also consider the effects of their interactions with the firm's size, its past performance, and the variability of its past performance.

We test the proposed model using an unbalanced panel dataset from 96 Fortune 300 firms covering 23 industries between 1995 and 2004, resulting in 549 firm-years. We obtained data on dispersion in analysts' forecasts from I/B/E/S International Inc. and data on the firms' advertising and R&D expenditures and other firm characteristics from Compustat and CRSP (Center for Research in Security Prices). We also include in the model, control variables, shown

by past accounting research to affect analysts' forecasts. We estimate the model using a fixed effects regression that accounts for unobserved firm heterogeneity and incorporates the data's time series structure. The estimation results strongly support the model and hypotheses.

The findings indicate a contingent effect of the firm's advertising and R&D expenditures on the dispersion in analysts' forecasts of its earnings. Independently, both advertising and R&D expenditures decrease dispersion in analysts' forecasts, and these effects are stronger for firms with superior past performance. For large firms, advertising decreases dispersion while R&D increases dispersion. For firms with variable past performance, advertising and R&D expenditures increase dispersion in analysts' forecasts. The findings have implications for marketing theory and managerial practice, which we discuss.

We organize the paper as follows. In the next section, we develop the framework and hypotheses that relate advertising, R&D and their interactions with firm characteristics to dispersion in analysts' forecasts. We then discuss the data, measures, and method we use to test the model. Following that, we present the results and additional analyses that examine the robustness of our results. We conclude with a discussion of the findings' implications for marketing theory, managerial practice, and emergent opportunities for further research.

THEORY

Dispersion in Analysts' Forecasts

Over the past few decades, a large, extensive body of research in the accounting and finance literatures has examined various aspects of the dispersion in analysts' forecasts. We provide a brief overview of dispersion in analysts' forecasts, its characteristics and its effect on the firm's stock returns.

Since 1983, I/B/E/S International Inc. has been recording financial analysts' forecasts of earnings forecasts for a large cross section of U.S. firms. Each observation in this data set is the issuance of a point estimate forecast by an individual analyst for a firm's operating earnings for a particular reporting period (e.g., the next fiscal year, next quarter). Dispersion in analysts' forecasts is the standard deviation of all outstanding forecasts pertaining to a single firm's stock across various analysts for a given time period.

Forecast dispersion reflects both uncertainty (Barron and Stuerke 1998) and lack of consensus among market participants about the firm's future earnings (Barron et al. 1998; Barry and Jennings 1992). Uncertainty refers to the expected error in individual forecasts aggregated across analysts, while consensus refers to the degree to which analysts share a common belief. Investors face two components of uncertainty about a firm (Johnson 2004). The first component is the fundamental risk, which reflects the stochastic evolution of the underlying value, primitive to the economy and independent of the firm's information environment. The second component, the parameter risk or idiosyncratic risk, is determined by the firm's information setting. Forecast dispersion is considered to be a proxy for the manifestation of idiosyncratic risk related to the unobservability of the firm's underlying value (Han and Manry 2000).

Dispersion in analysts' forecasts is a relevant metric for the capital market as it affects various stock performance metrics. Dispersion is associated with higher trading volume of stocks (e.g., Ajinkya et al. 1991) and the volatility of stock returns (e.g., Abarbanell, Lanen and Verrecchia 1995; Ajinkya and Gift 1985) and decreases future stock returns (e.g., Diether et al. 2002; Han and Manry 2000). Various explanations have been proposed for the negative relationship between dispersion in analysts' forecasts and stock returns. These include: a) the uncertainty reflected in the dispersion in analysts' forecasts increases the option value of the

firm, lowering its future returns (e.g., Johnson 2004); b) dispersion is a proxy for idiosyncratic risk for the firm, whose asset values are unobservable, and expected returns always decrease with increasing idiosyncratic risk; and c) overpricing of the firm's stock resulting from investors' disagreement about the firm's future performance, and limits on short sales produce optimistic current stock prices lowering future stock returns (e.g., Diether et al. 2002).

In sum, dispersion in analysts' forecasts, which reflects the ex-ante variability of the firm's performance, is a metric of great interest to both stock market participants and therefore, to the senior management of publicly listed firms.

Conceptual Framework

The contingency-based approach (Zeithaml, Varadarajan and Zeithaml 1988) argues that complementarities between a firm's resources and strategy significantly influence its performance. Extending contingency theory, we propose a conceptual framework that includes the main effects of a firm's advertising and R&D expenditures on the dispersion in analysts' forecasts and their interaction effects with other firm characteristics.

Developments in the analysts' forecasts literature (e.g., Atiase 1985; Bhushan 1989) indicate that the firm's size and aspects of its past performance, specifically, the level of its past performance and the variability of past performance (e.g., Lang and Lundholm 1996) are key factors that influence analysts' forecasts. Accordingly, we consider the effects of the interactions of a firm's advertising and R&D expenditures with its size, its past performance, and the variability of its past performance on the dispersion in analysts' forecasts. We propose that advertising and R&D expenditures, in conjunction with these characteristics, will decrease dispersion in analysts' forecasts under some conditions, and will increase it under other

conditions. We first discuss the hypothesized main effects of advertising and R&D expenditures followed by their interaction effects.

Advertising and R&D

We note two aspects of the development of the hypotheses of main effects. First, we anticipate that similar processes will underlie the effects of advertising and R&D expenditures on dispersion in analysts' forecasts. So, for ease of exposition, we develop the arguments for their effects simultaneously. Second, we expect opposing effects of advertising and R&D expenditures on dispersion in analysts' forecasts. Thus, we first discuss why advertising and R&D expenditures may increase dispersion and then discuss why they may decrease it.

Advertising and R&D may Increase Dispersion in Analysts' Forecasts. While all future economic benefits are, in general, uncertain, uncertainty is higher for the returns to investments in intangible assets than for returns to investments in tangible physical assets. Advertising and R&D programs create intangible assets that are associated with more complex information, have more uncertainty about their potential value (Kothari, Laguerre and Leone 2002) and are characterized by fuzzy property rights (Lev 2001). Indeed, current Generally Accepted Accounting Principles (GAAP) in the United States reflect this view of intangible assets by mandating that expenditures related to the creation of intangible assets (i.e. through advertising and R&D programs) must be fully expensed in the fiscal year in which they are incurred.

In addition, typically, advertising assets (i.e. brand equity) and R&D assets (i.e. new technologies, patents, products, and processes) are highly idiosyncratic investments that cannot be easily traded on active and transparent markets. Observable and reliable asset prices aid analysts in estimating a firm's future earnings (Diamond and Verrecchia 1991). Thus, the non-

tradability of a firm's intangible advertising and R&D assets may lead to a higher mismatch of a firm's revenues and expenses, increasing the complexity of the analysts' forecasting task.

Moreover, the benefits of advertising are related to the program's efficacy (Aaker and Carman 1982; Picconi 1977), implying further uncertainty about the firm's ability to secure rents from its advertising investments. Likewise, it is difficult to predict whether and when a given R&D program will translate into increased sales and profitability, as the returns to R&D investments are both uncertain and distal (Mansfield 1981). All of this, we suggest, will further increase the complexity of the analysts' forecasting task for firms with high advertising and R&D expenditures.

As the complexity of the forecasting task increases, the analysts' effort in following the firm's stock increases (Barron and Stuerke 1998). Also, the performance of firms with high advertising and R&D expenditures may be subject to greater scrutiny and interpretation by analysts, further increasing the dispersion in analysts' forecasts (Harris and Raviv 1993; Kandel and Pearson 1995). Moreover, under such conditions, analysts may employ decision making heuristics and use more private relative to public information, which will vary across firms and analysts, increasing the dispersion in forecasts (e.g., Barron et al. 2002; Brown et al. 1987; Lang and Lundholm 1996). The above arguments suggest that an increase in a firm's advertising and R&D expenditures will increase the dispersion in its analysts' forecasts.

However, other developments suggest that advertising and R&D expenditures may decrease the dispersion in analysts' forecasts, which we discuss next.

Advertising and R&D may Decrease Dispersion in Analysts' Forecasts. Information asymmetry characterizes the relationship between the firm and the analysts following it. Specifically, the firm's executives will have more accurate information about the firm's

prospects than its analysts resulting in a potential adverse selection problem (Akerlof 1969). Firms can reduce this adverse selection problem by undertaking costly signaling to reduce the information asymmetry (Spence 1973).

Consistent with this notion, signaling by firms—as denoted by changes in key fundamental metrics including their inventory, accounts receivables, and R&D—to stock market participants significantly affects stock returns (Lev and Thiagarajan 1993). Revealing public information to reduce information asymmetry can reduce a firm's cost of capital by attracting increased demand from large investors due to increased liquidity of its stocks (Diamond and Verrecchia 1991). Specifically, with respect to analysts' forecasts, increased corporate disclosure decreases dispersion in analysts' forecasts and volatility in their forecasts' revisions and increases the number of analysts following the firm (Lang and Lundholm 1996).

Applying the idea of signaling to the present case concerning advertising and R&D expenditures, we suggest that when the firm has high advertising and R&D expenditures, which are discretionary, the firm is signaling to stock market participants that its advertising and R&D programs are anticipated to be effective, and that its future performance is likely to be superior.

In addition, because advertising and R&D expenditures are expensed within the same time period, they can be potentially manipulated by the firm to increase its earnings. This requirement makes advertising and R&D expenditures vulnerable to cutbacks by managers burdened to achieve short-term earnings targets. Supporting the earnings manipulation argument, Perry and Grinaker (1994) find a positive relationship between unexpected earnings and unexpected R&D spending. Accordingly, we suggest that a firm with high advertising and R&D expenditures is signaling to analysts its expectations of strong future performance, independent of the anticipated rewards from its current advertising and R&D programs. In

addition, with respect to advertising, ceteris paribus, firms with greater advertising have more individual and institutional investors and greater common stock liquidity (Grullon, Kanatas and Weston 2004) which lowers their cost of capital and improves their performance. The pertinent question is how will these factors affect the dispersion of analysts' forecasts?

The primary responsibility of analysts who work for financial investment and brokerage firms is to write research reports that recommend stocks to their firm's customers (Schipper 1991). In writing these reports, analysts are under pressure to make buy recommendations rather than sell recommendations. To justify these buy recommendations, analysts direct their information acquisition efforts toward firms anticipated to have good performance prospects. Dispersion in analysts' forecasts is decreasing in the amount of information used by analysts (Barry and Brown 1985). Thus, increasing firms' advertising and R&D expenditures, which increases expectation of their future performance, will increase the number of analysts following the firm (Barth et al. 2001) and their information acquisition efforts (Barron et al. 2002). This, in turn, will lower the dispersion in their forecasts.

Given these opposing effects of advertising and R&D expenditures on the dispersion of analysts' forecasts, which is likely to dominate? Because of the increasing attention to intangible assets in the accounting literature, the growing recognition of their role on corporate growth and profits (Lev 2001), and their consideration as assets for inclusion in financial statements in other countries, including the United Kingdom and Australia (Aboody, Barth and Kasznik 1999; Barth and Clinch 1998), we anticipate that the negative effect of advertising and R&D expenditures on the dispersion in analysts' forecasts will dominate their positive effect on dispersion. Thus,

> **H_1:** The higher the firm's advertising expenditure, the lower the dispersion in analysts' forecasts.

H_2: The higher the firm's R&D expenditure, the lower the dispersion in analysts' forecasts.

We next discuss the effects of the interaction between the firm's advertising and R&D expenditures on the dispersion in analysts' forecasts. Integrating the arguments for the main effects above, increased advertising and R&D expenditures, which will independently decrease the dispersion in analysts' forecasts may together decrease dispersion in analyst's forecasts. Moreover, investing in advertising and R&D programs builds complementary capabilities, with R&D fostering a value-creation capability and advertising fostering a value appropriation capability (Mizik and Jacobson 2003). Thus, taken together, they may enable a firm to leverage its new product developments through the enhanced brand equity that results from increased advertising. Further, a firm's increased R&D expenditure, which should produce more novel products, may result in more effective advertising, buffering the firm's performance from market uncertainty and competitive onslaughts and further decrease analysts' uncertainty about its future performance. Thus,

H_3: The interaction between the firm's advertising and R&D expenditures will decrease the dispersion in analysts' forecasts.

Interactions with Firm Characteristics

We next discuss the interaction effects of the firm's advertising and R&D expenditures with three firm characteristics—its size, past performance, and variability of past performance—on dispersion in analysts' forecasts.

Firm's Size

Advertising and Size. Larger firms have greater analysts' following (e.g., Atiase 1985; Bhushan 1989) and generate more information acquisition activities relative to small firms; thus,

the firm's size decreases dispersion in analysts' forecasts. The pertinent question here is: what is the effect of increased advertising by large firms on dispersion in analysts' forecasts?

To start with, a large firm's advertising expenditures will increase information acquisition activities by its analysts, which should decrease the dispersion in their forecasts. In addition, a large firm's increased advertising expenditure may create economies of scale in its advertising programs (Spence 1980) because of increased media buying clout and synergies across the various elements of its communications programs, creating an expectation of strong future performance. In addition, larger firms with greater advertising expenditures, ceteris paribus, will have higher visibility; have more investors, and higher liquidity of their stocks (Grullon et al. 2004). As noted earlier, analysts are likely to focus their information processing efforts on firms with favorable prospects, and dispersion in analysts' forecast is decreasing in the amount of information available to analysts. Thus, as large firms increase their advertising, analysts will increase their information acquisition efforts, which, in turn, will lower the dispersion in their forecasts. Thus,

> **H_{4a}:** The interaction between the firm's advertising expenditure and its size will decrease the dispersion in analysts' forecasts.

R&D and Size. As with increased advertising, we propose that increased R&D activities of large firms will result in greater information acquisition activities by its analysts, which should decrease the dispersion in their forecasts.

However, we also expect an opposing process to be in play for the interaction between R&D expenditure and the firm's size, which will increase dispersion. Innovation studies suggest that large firms, relative to small firms, tend to develop more innovative and radical technologies

(e.g., Teece 1986). By definition, such original, radical technologies and products are dramatically different from existing ones. As such, when compared to incremental technologies, the lack of useful benchmarks with respect to customer needs and the difficulty in applying conventional tools to evaluate radical technologies increases the complexity of projecting their time-to-market and subsequent market rewards. In addition, given the competitive threats from new technologies, firms, especially large firms, simultaneously enter multiple emerging product markets (e.g., Intel in digital cameras, Dell in multimedia players, and Microsoft in video-on-demand) to generate strategic options for future growth (Eisenhardt and Brown 1998) or to signal to competitors their intended presence in this emerging market (Heil and Robertson 1991). Frequently, only one of several technological trajectories will achieve market dominance and the firm must exit the market without any financial rewards from its investment in the new technology (Srinivasan, Lilien, and Rangaswamy 2006).

The pertinent question is: What will be the net result of the opposing effects of the interaction between the firm's size and its R&D expenditure on the dispersion in analysts' forecasts? Given the extreme uncertainty that characterizes the R&D activities of large firms, we anticipate that the positive effect of the interaction between R&D expenditure and the firm's size will dominate its negative effect, increasing the dispersion in analysts' forecasts. Thus,

> **H_{4b}:** The interaction between the firm's R&D expenditure and its size will increase the dispersion in analysts' forecasts.

Past Performance

Advertising and Past Performance. As noted earlier, the analysts' primary responsibility is to write research reports that recommend stocks to customers. In writing the reports, analysts are under pressure to make buy recommendations versus sell recommendations. In order to justify these buy recommendations, analysts direct their information acquisition efforts toward

firms anticipated to have good performance prospects relative to other firms. Dispersion in analysts' forecasts is decreasing in the amount of information available to analysts. Thus, superior past performance is associated with lower dispersion in analysts' forecasts (Lang and Lundholm 1996). How will the advertising expenditures of a well-performing firm affect dispersion in analysts' forecasts?

As noted, firms signal through their fundamental metrics to stock market participants (Lev and Thiagarajan 1993). So, when these well-performing firms advertise extensively, the signal value of their advertising programs will be stronger and their programs will be interpreted as being more effective, relative to firms with poor performance. Thus, analysts may perceive that such firms are well-positioned to obtain even more superior returns from their advertising expenditures. This should further increase analysts' coverage, increase their information acquisition activities, and decrease dispersion in analysts' forecasts. Thus,

> **H_{5a}:** The interaction between the firm's advertising expenditure and its past performance will decrease the dispersion in analysts' forecasts.

R&D and Past Performance. We anticipate analogous effects of the large firm's R&D expenditure on dispersion in analysts' forecasts, suggesting a decrease in the dispersion of analysts' forecasts.

An interesting question that arises is: Will analysts respond to the uncertainty associated with the well-performing firm's R&D expenditures, as discussed in the interaction effect between R&D and the firm's size? We hypothesize that the firm's superior performance will strongly signal the firm's ability to effectively manage the uncertainty of its R&D program, increasing analysts' expectations of its future performance, increasing their information acquisition efforts, and decreasing the dispersion in their forecasts. Thus,

H_{5b}: The interaction between the firm's R&D expenditure and its past performance will decrease the dispersion in analysts' forecasts.

Variability of Past Performance

The variability of firms' past performance is an important predictor of analysts' forecasts (e.g., Affleck-Graves, Callahan and Chipalkatti 2001; Daley et al. 1988; Diether et al. 2002). To provide some context here, the interest in the variability of past performance as a predictor of analysts forecasts is motivated by early research in the area (e.g., Brown and Rozeff 1978) which reported that analysts' forecasts of stock returns were superior compared to time-series models predictions of stock returns based on the firm's previous earnings. Thus, we consider the variability of past performance as a firm characteristic that will interact with advertising and R&D expenditures to affect dispersion in analysts' forecasts.

Advertising and Variability of Past Performance. We anticipate that the advertising expenditure of a firm with variable past performance will be perceived by the analysts to be very risky, as analysts may not have confidence in the firm's ability to manage its advertising program, increasing the complexity of the analysts' forecasting task. In addition, the advertising expenditures of firms with variable past performance may also be, independently, subject to greater scrutiny and subjective interpretation by analysts, increasing the dispersion in their forecasts (Harris and Raviv 1993; Kandel and Pearson 1995). Thus,

H_{6a}: The interaction between the firm's advertising expenditure and the variability of its past performance will increase the dispersion in analysts' forecasts.

R&D and Variability of Past Performance. As with advertising, variability of past performance will increase the difficulty of the analysts' forecasting task, increasing the dispersion in the analysts' forecasts. Moreover, analysts will perceive such a firm's R&D

program, which is inherently risky to start with, to be even more risky as they may not have confidence in the firm's ability to effectively manage its R&D program. Further, as with advertising programs, R&D programs of firms with highly variable performance may also be subject to closer scrutiny and more subjective interpretation by analysts, increasing dispersion in analysts' forecasts. Thus,

> **H_{6b}:** The interaction between the firm's R&D expenditure and the variability of its past performance will increase the dispersion in analysts' forecasts.

Table 1 summarizes the hypotheses.

---- Insert Table 1 here ----

METHOD

Data

For the empirical testing of the hypotheses, we collected data on Fortune 300 firms for the period between 1995 and 2004. These firms are very actively covered by financial analysts and a large number of analysts follow them, creating the necessary variation in the dispersion in analysts' forecasts. In addition, the two marketing expenditures of interest, the advertising and R&D expenditures are more widely reported separately on the annual reports for large firms.

The criterion for inclusion of a firm in the study was its appearance in the Fortune 300 list anytime in the ten year period between 1995 and 2004, which resulted in 587 unique firms. We collected data on the firm's characteristics from the Compustat Annual database, the firm's stock's characteristics from CRSP and the analysts' forecasts from I/B/E/S. We measure all firm characteristics as at the end of the year that prior to the year of the forecast. The final data set for which there was complete data on all variables included 96 firms with 549 firm-years. These 96

firms are from diverse industries covering 23 industries defined by the two-digit SIC (Standard Industry Classification) codes.

To check for a possible sample bias, we compared the sample profile of the 96 firms with the Fortune 300 firms in the period 1995-2004 not included in the study (n= 489) on some key variables. We found no difference in dispersion in analysts' forecasts ($F_{[dispersion]} = .229$, ns), advertising expenditures ($F_{[advertising\ to\ sales]} = 2.552$, ns), R&D expenditures ($F_{[R\&D\ to\ sales]} = 2.150$ ns) and past performance ($F_{[past\ performance]} = 1.588$, ns) between the firms in the data set and the Fortune 300 firms. But, firms in the study were larger ($F_{[sales]} = 10.942$, $p < .01$, $F_{[market\ value]} = 69.05$, $p < .01$ and $F_{[employees]} = 39.996$ $p < .01$) than Fortune 300 firms in the time period. Thus, firms in the study appear to be representative of the Fortune 300 firms, although larger. This is not surprising, as large firms are favored in data sources and have higher analysts' following.

Measures

Dispersion. We measured dispersion in analysts' forecasts of year t+1 earnings per share as the standard deviation of different analysts' forecasts of earnings per share deflated by the firm's stock price on the forecast report date (Han and Manry 2000; Lang and Lundholm 1996).

The forecasts are as of the last month of the prior fiscal year, as these forecasts are more accurate than earlier forecasts, have lower optimism bias, and reflect firm-specific rather than economy-wide or industry-wide information (e.g., Elton et al. 1984). We also require that each firm-year has a minimum of three analysts providing the forecasts.

Advertising and R&D. We measured *advertising expenditure* as reported in DATA45 scaled by its sales reported in DATA12 in Compustat. We measured *R&D expenditure* as reported in DATA46 scaled by its sales.

We scale the firm's advertising and R&D expenditures by its sales for two reasons. First, it rules out the alternative explanation that the observed effect of advertising and R&D on the firm's analysts' forecasts may be because of the firm's size, because, in general, large firms, relative to small firms, have higher advertising and R&D expenditures. Second, the budgets for advertising and R&D expenditures are typically set as a percentage of sales. Thus, advertising and R&D expenditures scaled by the firm's sales reflects their budgeting processes. [2]

Firm Size. We measure the firm's size by the natural logarithm of its total assets in DATA6 to capture the effect of the firm's size on dispersion in analysts' forecasts (e.g., Duru and Reeb 2002). We also subsequently report on the robustness of the results to the firm's size measured by its market value.

Past Performance. We measure the firm's past performance by the firm's return on equity which we compute as net income (DATA172) divided by stockholders' equity (DATA216) (Lang and Lundholm 1996).

Variability of Past Performance. We measure the variability in the firm's past performance which we compute as the standard deviation of its return on equity for the previous five years (Bhushan 1989).

We also included the following variables, shown by past research to affect analysts' forecasts. First, we include the firm's intangible value measured by its Tobin's Q (Chung and Pruitt 1994) to account for the firm's future growth prospects, which may introduce greater

[2] We use advertising and R&D expenditures from the firm's accounting data to proxy for its marketing actions not only because these marketing expenditures are important for the firm's senior executives (Rust et al. 2004), but also because we assume that sources outside the financial statements may not provide reliable information about the firm's marketing activities on a systematic basis for all firms. To the extent that this assumption is invalid, our tests are biased against finding a significant relationship between advertising and R&D expenditures and dispersion in analysts' forecasts.

information asymmetry between the firm and its analysts (McLaughlin, Safieddine and Vasudevan 1998). Second, we include the firm's earnings surprise indicated by the absolute value of the difference between the current year's earnings per share and last year's earnings per share, divided by price at the beginning of the fiscal year (Lang and Lundholm 1996). Third, we include financial leverage, which we measured as the ratio of the firm's long-term debt to its total assets as firms with higher debt may engage in manipulation of financial statements which may affect the volatility of their future performance (Jensen and Meckling 1976). Fourth, we include the difference in the number of days between fiscal year end and date of analysts' reports because analysts' forecasts closer to the end of the fiscal year have lower dispersion (Brown et al. 1987). Fifth, we include the number of analysts following the firms as more analysts following the firm lower dispersion (Bhushan 1989). Finally, we include environmental turbulence, measured as the coefficient of variation in industry sales (Haveman 1995) at the 2-digit SIC level to control for any industry-specific effects on dispersion in analysts' forecasts.

Descriptive Statistics

Table 1 provides the descriptive statistics for these firms. The correlations appear to be within acceptable limits (highest correlation = .529 between number of analysts following the firm and the firm's intangible value). Following Belsley, Kuh and Welsch (1980), we assessed the threats from multicollinearity. The VIF (Variance Inflation Factor) and condition numbers were lower than 10 (average = 1.083; maximum = 3.561) and 15 (average = 1.198 maximum = 4.052) respectively, suggesting that multicollinearity may not be a threat to the validity of the study's findings.

---- Insert Table 2 here ----

Estimation Approach

As the panel data set consists of repeated observations of firms, we estimated a fixed effects, cross-sectional, time series regression model (Woolridge 2002). Specifically, the model has the following structure:

$Y_{it} = \alpha + X_{it}\beta + \nu_i + \varepsilon_{it}$ i = 1,…., N; t = 1,…., T_i and where

ε_{it} is independent and identically distributed (i.i.d) with mean 0, and variance $\sigma^2{}_{\varepsilon}$ and ν_i are assumed to be fixed parameters that may be correlated with the explanatory variables X_{it}. Y_{it} is the dispersion in analysts' forecasts and X_{it} include the various explanatory variables and the associated interaction terms associated with the hypotheses in the theory section and the several control variables. We created all the interaction terms using mean-centered variables. To ensure complete model specification, we included the main effects of all the explanatory variables used to construct the interaction terms in the model.

RESULTS

We report the results of the fixed effects estimation of the proposed model in Column 1 of Table 2. The overall model is statistically significant ($F_{(26, 427)} = 46.932$, $p < .01$), and the R-square for the proposed model is 0.741. The need for fixed effects correction is reinforced by the rejection of the hypothesis of null fixed effects ($F_{(95, 427)} = 5.643$, $p < .01$).

---- Insert Table 3 here ----

We first discussed the effects of the various control variables. As expected, the firm's size (b = -.002, p < .05), its past performance (b = -.007, p < .01), and the number of analysts following the firm's stock (b = -.018, p < .10) decrease dispersion in analysts' forecasts.

Somewhat contrary to expectation, environmental turbulence decreases dispersion (b = -.013, p < .05). Again as expected, the variability of past performance (b = .017, p < .01), financial leverage (b = .006, p < .05), surprise in earnings per share (b = .002, p < .05), and the difference in the number of days between the fiscal year end and the date of the analysts' reports (b = .005, p < .05) increase dispersion. The firm's intangible value (b =.000, ns) does not affect dispersion.

We next discuss the hypothesized effects. With respect to main effects, as hypothesized in H_1 and H_2, respectively, the firm's advertising (b = -.087, p < .01) and R&D (b = -.174, p < .01) expenditures decrease dispersion in analysts' forecasts. However, we find no support for H_3, which pertains to the interaction effect between the firm's advertising and R&D expenditures on the dispersion in analysts' forecasts, although it is negative as hypothesized (b = -.507, ns).

With respect to the interaction effects with firm characteristics, supporting H_{4a} and H_{4b} respectively, the interaction between advertising expenditure and the firm's size (b = -.046, p < .05) decreases dispersion in analysts' forecasts, and the interaction between R&D expenditure and the firm's size (b = .036, p < .01) increases dispersion in analysts' forecasts. As expected in H_{5a} and H_{5b}, respectively, the interactions between advertising and past performance (b = -.075, p < .01) and R&D and past performance (b = -.143, p < .01) decrease dispersion in analysts' forecasts. With respect to variability of past performance, the results do not support the interaction effect between advertising expenditure and variability of past performance (b = .013, ns) as hypothesized in H_{6a}. However, H_{6b} positing a positive interaction effect of R&D expenditure and variability of past performance (b = .442, p < .01) on dispersion is supported.

Thus, the findings support the model that proposes a contingent effect of the firm's advertising and R&D expenditures, in conjunction with the firm's size and its performance

characteristics on the dispersion in analysts' forecasts. We next report additional analyses that examine the robustness of the results.

Additional Analyses

Model Comparisons. First, we compared the proposed model with all main and interaction effects to a baseline model with only the variables considered in past accounting research. In other words, the baseline model excluded the advertising and R&D expenditures and all related interaction terms (Column 2 of Table 3). The proposed model (BIC (Bayesian Information Criterion) = -3857.989; lower is better) outperformed the baseline model (BIC = -3486.146). Second, we compared the proposed model with a model that included main effects of advertising and R&D expenditures along with other explanatory variables but excluded the interaction effects (Column 3 of Table 3). The hypothesized model (BIC = = -3857.989) once again outperformed the model that excluded the hypothesized interaction effects (BIC = -3498.172).

Alternative Scaling of Advertising and R&D Expenditures. In the results reported in Column 1 of Table 3, the firm's advertising and R&D expenditures were scaled by its sales. We re-estimated the model with measures of advertising and R&D expenditures scaled by the firm's assets and the firm's operating expenditure (Barth et al. 2001; Kwon 2002) in Columns 4 and 5, respectively, of Table 3. The results with the assets-scaled variables (Column 4 of Table 3) indicate a good model fit ($F(26, 427) = 48.609$, $p < .01$), with results generally consistent with respect to the effects of advertising expenditure and R&D expenditure, although the parameter estimates and the significance levels are different from the model results reported in Column 1 of Table 3. However, the overall model fit of this model with advertising and R&D expenditures scaled by assets (BIC = -3709.751) was inferior compared to the model with advertising and

R&D expenditures scaled by sales (BIC = -3857.989). Likewise, the results with the operating expenditure-scaled advertising and R&D variables (Column 5 of Table 3) indicate a good model fit ($F (26, 427) = 29.093$, $p < .01$). However, the hypothesized interaction effects between the firm's size and R&D expenditure ($b = .005$, ns) and advertising and past performance ($b = -.021$, ns) are not significant when the advertising and R&D expenditures are scaled by operating expenditure. Again, the overall model fit with advertising and R&D expenditures scaled by operating expenditure (BIC = -3675.876) was inferior compared to the model with advertising and R&D expenditures scaled by sales (BIC = -3857.902). We conjecture that the lower model fit and the null results may be arising because scaling advertising and R&D expenditures by operating expenditure may not be capturing their budgeting processes.

Alternative Measure of the Firm's Size. In the model results reported in Column 1 of Table 3, we measured the firm's size by the natural logarithm of its assets. We re-estimated the model measuring the firm's size by the natural logarithm of its market value. The results with the market value as the firm's size (Column 6 of Table 3) indicate a good model fit ($F (26, 427) = 45.609$, $p < .01$) and the results are generally consistent with respect to the effects of advertising and R&D expenditures and related interactions, although the magnitude and the significance levels are marginally different from the model results reported in Column 1 of Table 2. However, the overall model fit with the firm's size measured by market value (BIC = -3845.542) was inferior compared to the model where we measured size by the firm's assets scaled by sales (BIC = -3857.989) (Column 1 of Table 2).

In sum, the proposed model with the advertising and R&D expenditures and the hypothesized interaction effects explained dispersion in analysts' forecasts better than models with only accounting data or models that excluded the interaction effects, and the results appear

to be generally robust to alternative operationalizations of advertising and R&D expenditures and the firm's size.

DISCUSSION

Theoretical Contributions

This paper's findings contribute to the marketing metrics and the analysts' expectations literatures.

Marketing Metrics. First, as noted in the introduction, there is a gap on the relationship, if any, between marketing strategy and ex-ante measures of firm performance, important to the stock market's valuation of firms. By providing evidence of the value relevance of the firm's advertising and R&D expenditures to dispersion of analysts' forecasts of earnings, we take a first step toward addressing this gap.

Specifically, the effects of advertising and R&D expenditures on the dispersion of analysts' forecasts suggest that analysts are, indeed, paying attention to the firm's marketing activities as exemplified by its advertising and R&D expenditures. Indeed, the support for the various interaction effects between the firm's characteristics, including its past performance and its advertising and R&D expenditures, suggests that analysts are not only paying close attention to the firm's marketing, but also that their interpretation of the effects of advertising and R&D expenditures on the firm's future performance is contingent on the firm's size and characteristics of its past performance. Thus, a firm's marketing actions are not only value relevant to investors as suggested by past research in marketing and accounting, but also to financial analysts who are key players in the capital market.

Second, the market-based assets theory (Srivastava, Shervani and Fahey 1998, 1999), which has seen extensive empirical validation, posits that marketing actions affect shareholder

value through their effects on increased cash flow, increased speed of cash flows, and lower risk of cash flows. Past empirical studies have focused on the levels and variability of various ex-post or "actual" performance metrics (e.g., cash flow, stock returns, and shareholder value). The several main and interaction effects of advertising and R&D expenditures on the dispersion of analysts' forecasts indicate that a firm's marketing actions do, indeed, affect shareholder value through their effects on the ex-ante variability of firm performance. This is a novel finding highlighting an additional theoretical mechanism (i.e., analysts' expectations) by which a firm's market-based assets affect its shareholder value. Future research that explores this linkage in other contexts focusing on other properties of analysts' forecasts (e.g., accuracy, errors) and on mediating effects (e.g., cash flows, speed of cash flows, systematic risk) will be useful.

Third, in a departure from most past studies in both the marketing and accounting literatures, which have used a functional silo-based approach (i.e. using either marketing or accounting measures, respectively) to study the value relevance of marketing strategy (exception: Srinivasan (2006)), this paper's findings support key interactions between aspects of the firm's marketing investments in advertising and R&D and aspects of the firm's past performance. For example, when the firm's past performance is superior, advertising and R&D expenditures decrease dispersion in their forecasts. Likewise, when the firm's past performance is more variable, advertising and R&D expenditures increase the dispersion in their forecasts. Exploring the boundaries of such interchangeability across marketing and other aspects of business strategies (e.g. finance, accounting, human resources, etc.) and performance metrics (e.g. employee morale, customer satisfaction) on the ex-ante variability of firm performance is an interesting area for future research.

Analysts' Expectations. The paper's findings also contribute to the research on analysts' expectations. First, the study's approach addresses two limitations of past research in the accounting literature. Specifically, our theoretical approach includes a contingency-based model that considers not only the main effects of a firm's advertising and R&D expenditures (as is the case in past accounting studies), but also includes related interactions with firm characteristics. Second, the empirical estimation approach uses a fixed effects regression model that accommodates unobserved firm heterogeneity and dependencies across observations of firms from diverse industries. By addressing these limitations of past studies, this paper's findings take a step toward clarifying the mixed evidence in the accounting literature on the effects of advertising and R&D expenditures on the dispersion in analysts' forecasts. Further research that explores other such contingency conditions will be useful.

Second, accounting researchers, investors, and analysts are interested in obtaining less dispersed forecasts of earnings as a proxy for the capital markets' expectations of earnings (Schipper 1991). Identification of the roles of additional determinants of dispersion in analysts' forecasts, including advertising, R&D expenditures, and their related interactions with firm characteristics, is useful to these users of accounting information. Specifically, our findings and the results of the additional analyses comparing the performance of the hypothesized models with the baseline models that exclude the hypothesized effects, indicate that researchers and analysts should control for both the main and interaction effects of firms' advertising and R&D expenditures when calculating the dispersion in analysts' forecasts.

Managerial Implications

The study's findings also generate some implications for managerial practice. First, the different main and interaction effects of advertising and R&D expenditures on the dispersion in

analysts' forecasts indicate that their value relevance extends beyond the domain of ex-post measures of shareholder value metrics such as cash flow, stock returns, and intangible value but also encompasses dispersion in analysts' forecasts, an ex-ante performance metric. In doing so, the study's findings highlight that the 'long arm' of marketing's extends beyond the firm's boundary to include a key stock market participant, the financial analysts.

Second, this paper adds to the emergent empirical evidence in the marketing metrics literature for the dual benefits of advertising and R&D for firm value (e.g., Grullon et al. 2004; McAlister et al. 2007; Mizik and Jacobson 2003; Singh et al 2005), suggesting that firms must be cautious in cutting back on advertising and R&D programs, especially under conditions of poor or variable past performance. A reduction in a firm's advertising or R&D program can have a double whammy, negative effect not only reducing its sales, market share and financial performance, but also send a negative signal to analysts, increasing the dispersion in analysts' forecasts further lowering its future stock returns.

Third, armed with the insight that marketing expenditures influence dispersion in analysts' forecasts and thereby the firm's future stock returns, senior marketing executives can be empowered to not only invest in strong marketing programs but also be more vocal and effective advocates for marketing investment with internal constituencies in the firm (i.e., finance executives and CEOs) who control the purse strings for the marketing programs, and may be tempted to cut back these 'discretionary' marketing expenditures to bolster their current performance (Perry and Grinaker 1994). However, the support for the contingent effects of advertising and R&D expenditures suggests that their value relevance for dispersion in analysts' forecasts depends on other firm characteristics.

Finally, the study's findings are also relevant to policymakers. Current Financial Accounting Standards Board (FASB) regulations do not mandate any disclosure of advertising and R&D expenditures. The paper's evidence suggests that advertising and R&D expenditures, both independently and in conjunction with other firm characteristics, affect dispersion in analysts' forecasts. This suggests that stock market participants and the firm valuation process will benefit from expanded reporting requirements for advertising and R&D expenditures.

Opportunities for Future Research

In this first study on the effects of a firm's marketing activities on properties of analysts' forecasts of earnings, we focused on the firm's advertising and R&D expenditures reported on its financial statement. However, we do not consider the effectiveness of the firm's marketing expenditures (i.e. the quality of its new product and communications programs) and other aspects of its marketing mix (e.g. channel decisions), which may also affect the properties of analysts' forecasts. Also, the use of secondary data precluded consideration of organizational factors (e.g., culture, trust, organizational structure, etc.) that may interact with the firm's marketing expenditures in affecting the ex-ante variability of its performance. Future research on the performance implications of the firm's marketing activities on properties of analysts' forecasts using other methods (e.g., in-depth interviews, surveys) across diverse industry contexts incorporating other environmental and firm characteristics will be useful.

Also, the choice of Fortune 300 firms allowed us to study firms that reported advertising and R&D expenditures and that are being followed by a large number of analysts, enabling a clean test of our hypotheses. However, the study's sample (n=96) is small. Future research on the effects of the firm's marketing activities in other settings (e.g., foreign market entry, outsourcing,

etc.) with larger sample sizes would represent useful extensions to examine the generalizability of this paper's findings.

The dependent variable in this study is the dispersion in analysts' forecasts of earnings per share. While dispersion is a key measure of the ex-ante variability of the firm's financial performance, with the potential to affect stock returns, it measures only one aspect of analysts' forecasts. Research extensions using other properties of analysts' forecasts, including the errors, accuracy, and changes in dispersion, would complement and extend the study's findings. Also, we study forecasts at the aggregate level, and there is a large body of research in the accounting literature on the properties of individual analysts' forecasts (e.g., Butler and Lang 1991). Future research that relates firms' marketing activities to properties of individual analysts' forecasts would be useful.

In sum, this study takes a first step toward relating firms' marketing activities to ex-ante performance metrics by focusing on one such metric: the dispersion in analysts' forecasts of earnings per share. We hope this paper stimulates further work in the area.

TABLE 1
Summary of Hypothesized Effects and Results

Variable	Dispersion in Analysts' Forecasts
Main Effects	
Advertising	**H_1:** The greater the firm's advertising expenditure, the lower the dispersion in analysts' forecasts. **(supported)**
R&D	**H_2:** The greater the firm's R&D expenditure, the lower the dispersion in analysts forecasts. **(supported)**
Interaction Effects	
Advertising × R&D	**H_3:** The interaction between the firm's advertising and R&D expenditures will decrease the dispersion in analysts' forecasts. **(not supported)**
Advertising × Size	**H_{4a}:** The interaction between the firm's advertising expenditure and its size will decrease the dispersion in analysts' forecasts. **(supported)**
R&D × Size	**H_{4b}:** The interaction between the firm's R&D expenditure and its size will increase the dispersion in analysts' forecasts. **(supported)**
Advertising × Past performance	**H_{5a}:** The interaction between the firm's advertising expenditure and its performance will decrease the dispersion in analysts' forecasts. (**supported)**
R&D × Past performance	**H_{5b}:** The interaction between the firm's R&D expenditure and its performance will decrease the dispersion in analysts' forecasts. **(supported)**
Advertising × Variability of past performance	**H_{6a}:** The interaction between the firm's advertising expenditure and the variability of its past performance will increase the dispersion in analysts' forecasts. **(not supported)**
R&D × Variability of past performance	**H_{6b}:** The interaction between the firm's R&D expenditure and the variability of its past performance will increase the dispersion in analysts' forecasts. **(supported)**

TABLE 2
Descriptive Statistics and Correlation Matrix

Variable	Mean (standard deviation)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Dispersion in analysts' forecasts	.002 (.045)	1.000											
2. Advertising expenditure (scaled to sales)	.045 (.043)	-.057	1.000										
3. R&D expenditure (scaled to sales)	.042 (.061)	-.029	.009	1.000									
4. Firm's size (natural log of total assets)	8.802 (1.038)	-.113	-.029	.332	1.000								
5. Past performance	.237 (3.389)	-.411	.010	-.014	.055	1.000							
6. Variability of past performance	.410 (1.722)	.417	-.072	-.079	-.065	.292	1.000						
7. Intangible value of firm	2.398 (1.827)	-.103	.197	.190	.235	.018	-.081	1.000					
8.Financial leverage	1.208 (30.286)	.078	.013	-.013	-.061	-.386	-.485	.014	1.000				
9. Surprise in earnings per share	.736 (.970)	.187	-.122	.123	.087	-.042	.176	-.116	-.040	1.000			
10. Number of days between forecasts date and fiscal year end	16.565 (22.082)	.260	.009	.031	-.002	-.102	.157	.048	.046	.000	1.000		
11. Number of analysts	17.919 (8.512)	-.113	.064	.343	.456	.004	-.173	.529	.016	.032	-.023	1.000	
12. Environmental turbulence	.114 (.097)	.029	.-167	.150	-.085	-.061	-.032	-.000	.004	.037	-.013	.065	1.000

Correlations > 0.11 significant at $p < .01$, correlations > .08 significant at $p < .05$ and correlations > .06 significant at $p < .10$.

TABLE 3
Advertising, Research and Development and Dispersion in Analysts' Forecasts

Variables	Proposed Model Firm's size – Logarithm of Assets (Column 1)	Only accounting data (Column 2)	Accounting Data + Main effects of Advertising and R&D (Column 3)	Advertising and R&D scaled by Assets (Column 4)	Advertising and R&D scaled by Operating expenditure (Column 5)	Firm's size - Logarithm of Market value (Column 6)
Intercept	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)	.000 (.000)	-.004 (.001)***
H_1: Advertising expenditure	-.087 (.033)***	-	-.049 (.023)**	-.046 (.023)**	-.063 (.030)***	-.064 (.039)**
H_2: R&D expenditure	-.174 (.023)***	-	-.134 (.065)**	-.173 (.022)	-.092 (.022)***	-.158 (.021)***
H_3: Advertising × R&D	-.507 (.376)	-	-	-.497 (.339)	.680 (.558)	-.734 (.384)*
H_{4a}: Advertising × Size	-.046 (.023)**	-	-	-.058 (.025)**	-.039 (.021)*	-.032 (.015)**
H_{4b}: R&D × Size	.036 (.012)***	-	-	.021 (.012)**	.005 (.012)	.032 (.014)**
H_{5a}: Advertising × Past performance	-.075 (.015)***	-	-	-.032 (.006)***	-.021 (.015)	-.072 (.015)***
H_{5b}: R&D × Past performance	-.143 (.016)***	-	-	-.074 (.008)***	-.147 (.017)***	-.143 (.016)***
H_{6a}: Advertising × Variability of past performance	.013 (.026)	-	-	.042 (.012)***	.060 (.024)***	.001 (.026)
H_{6b}: R&D × Variability of past performance	.442 (.038)***	-	-	.208 (.021)***	.402 (.042)***	.438 (.039)***
Size	-.002 (.001)**	-.002 (.001)**	-.002 (.001)**	.001 (.001)	-.003 (.001)***	-.001 (.001)
Past performance	-.007 (.001)***	-.003 (.001)***	-.003 (.001)***	-.003 (.001)***	-.009 (.001)***	-.007 (.001)***
Variability of past performance	.017 (.001)***	.004 (.001)***	.004 (.001)***	.006 (.001)***	.019 (.002)***	-.017 (.001)***
Intangible firm value	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.001 (.001)
Financial leverage× 10^{-2}	.006 (.003)**	.009 (.003)***	.009 (.003)***	.004 (.002)**	.027 (.034)	.007 (.003)**
Surprise in earnings per share	.002 (.001)**	.002 (.001)**	.001 (.001)	.002 (.001)**	-.006 (.005)	.002 (.001)**
Days between end of year and analysts' report date × 10^{-2}	.005 (.002)***	.010 (.005)**	.010 (.002)***	.001 (.001)	.007 (.002)***	.005 (.001)***
Number of analysts × 10^{-2}	-.018 (.011)*	-.002 (.001)*	-.002 (.002)*	-.014(.007)**	-.003 (.001)***	-.020 (.012)*
Environmental turbulence	-.013 (.006)**	-.013 (.007)*	-.013 (.007)*	-.004 (.004)	-.014 (.007)**	-.013 (.006)**
R-sq	.741	.447	.448	.703	.639	.736
Observations (firms); F (degrees of freedom)	549 (96); 46.932 (26, 427) ***	549 (96); 20.712 (17, 436) ***	549 (96); 18.503 (19, 434) ***	549 (96); 48.609 (26,427) ***	549 (96); 29.093 (26, 427)***	549 (96); 45.609 (26, 427) ***

[#] Coefficient (standard errors) in the columns rounded off to three decimal places. *** denotes $p < .01$, ** $p < .05$ and * $p < .10$. The models also include time dummies, some of which are significant at $p < .01$.

REFERENCES

Aaker, D. A., and J. M. Carman (1982), "Are You Overadvertising?" *Journal of Advertising Research*, 22(4), 57-70.

Abarbanell, J. S., W. N. Lanen, and R. E. Verrecchia (1995), "Analysts' Forecasts as Proxies for Investor Beliefs in Empirical Research," *Journal of Accounting and Economics*, 20(1), 31-60.

Aboody, D., M. E. Barth, and R. Kasznik (1999), "Revaluations of Fixed Assets and Future Firm performance: Evidence from the UK," *Journal of Accounting and Economics*, 26(1-3), 149-178.

Affleck-Graves, J., C. M. Callahan, and N. Chipalkatti (2002), "Earnings Predictability, Information Asymmetry, and Market Liquidity," *Journal of Accounting Research*, 40(3), 561-583.

Ajinkya, B., R. Atiase, and M. J. Gift (1991), "Volume of Trading and the Dispersion in Financial Analysts' Earnings Forecasts," *The Accounting Review*, (April), 389-401.

Ajinkya, B., and M. J. Gift (1985), "Dispersion of Financial Analysts' Earnings Forecasts and the (Option Model) Implied Standard Deviations of Stock Returns," *Journal of Finance*, 40(5), 1353-1365.

Akerlof, G. A. (1970), "The Market for "Lemons": Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 84(3), 488-500.

Atiase, R. K. (1985), "Predisclosure Information, Firm Capitalization, and Security Price Behavior around Earnings Announcements," *Journal of Accounting Research*, 23(1), 21-36.

Barron, O E., D. Byard, C. Kile, and E.J. Riedl (2002), "High-Technology Intangibles and Analysts' Forecasts," *Journal of Accounting Research*, 40(2), 289-312.

----, O. Kim, S.C. Lim, and D.E. Stevens (1998), "Using Analysts' Forecasts to Measure Properties of Analysts' Information Environment," *Accounting Review*, 73(4): 421-433.

----, and P. S. Stuerke (1998), "Dispersion in Analysts' Earnings Forecasts as a Measure of Uncertainty," *Journal of Accounting, Auditing and Finance*, 13(3), 245-270.

Barry, C. B. and S. J. Brown (1985), "Differential Information and Security Market Equilibrium," *Journal of Financial & Quantitative Analysis*, 20(4): 407-22.

----, and R. H. Jennings (1992), "Information and Diversity of Analyst Opinion," *Journal of Financial and Quantitative Analysis*, 27(2), 169.

Barth, M. E., and G. Clinch (1998), "Revalued Financial, Tangible, and Intangible Assets: Associations with Share Prices and Non-Market-Based Value Estimates," *Journal of Accounting Research*, 36(3), 199-233.

----, R. Kasznik, and M.F. McNichols (2001), "Analyst Coverage and Intangible Assets" *Journal of Accounting Research*, 39 (1), 1-34.

Belsley D., E. Kuh, and R. Welsch (1980), *Regression Diagnostics*. New York, NY: Wiley Publishers.

Bhushan, R. (1989), "Firm Characteristics and Analyst Following," *Journal of Accounting and Economics*, 11(2/3), 255-274.

Brown, L. D., and M. S. Rozeff (1978), "The Superiority of Analyst Forecasts as measures of Expectations: Evidence from Earnings," *Journal of Finance*, 33(1), 1-16.

Brown, L. D., G.D. Richardson, and S.J. Schwaeger (1987), "An Information Interpretation of Financial Analyst Superiority in Forecasting Earnings," *Journal of Accounting Research*, 25(1), 49-67.

Butler, K. C., and L. H. P. Lang (1991), "The Forecast Accuracy of Individual Analysts: Evidence of Systematic Optimism and Pessimism," *Journal of Accounting Research*, 29(1), 150-156.

Chung, K. H., and Pruitt, S. W. (1994), "A Simple Approximation of Tobin's Q," *Financial Management*, 23, 70-74.

Daley, L. A., D. W. Senkow, and R.L. Vigeland (1988), "Analysts' Forecasts, Earnings, Variability, and Option Pricing: Empirical Evidence," *Accounting Review*, 63(4): 563.

Diamond, D., and R. E. Verrecchia (1991), Disclosure, Liquidity and the Cost of Capital, *Journal of Finance*, 46, 1325–1359.

Diether, K. B., C. J. Malloy, and A. Scherbina (2002), "Differences of Opinion and the Cross Section of Stock Returns," *Journal of Finance*, 57(5), 2113-2141.

Duru, A., and D. M. Reeb (2002), "International Diversification and Analysts' Forecast Accuracy and Bias," *Accounting Review*, 77(2), 415-33.

Eisenhardt, Kathleen, M., and Shona L. Brown (1998), "Time Pacing: Competing in Markets that won't Stand Still," *Harvard Business Review*, March-April, 59-69.

Elton, E. J., M. J. Gruber, and M. N. Gultekin (1984), "Professional Expectations: Accuracy and Diagnosis of Errors," *Journal of Financial and Quantitative Analysis*, 19(4), 351.

Gruca, Thomas S. and Lopo L. Rego (2005), "Customer Satisfaction, Cash Flow and Shareholder Value," *Journal of Marketing*, 69 (2), 115-30.

Grullon, Gustavo, George Kanatas, and James P. Weston (2004), "Advertising, Breadth of Ownership and Liquidity," *The Review of Financial Studies*, 17 (2), 439-61.

Han, B. H., and D. Manry (2000), "The implications of dispersion in analysts' earnings forecasts for future ROE and future returns," *Journal of Business Finance and Accounting*, 27(1/2), 99-112.

Harris, M., and A. Raviv (1993), "Differences of Opinion Make a Horse Race," *Review of Financial Studies*, 6(3), 473-506.

Haveman, H. A. (1995), "The Demographic Metabolism of Organizations: Industry Dynamics, Turnover, and Tenure Distributions," *Administrative Science Quarterly*, 40(4), 586-618.

Heil, Oliver, and Thomas S. Robertson (1991), "Toward a Theory of Competitive Market Signaling: A Research Agenda," *Strategic Management Journal*, 12(6), 403-418.

Jensen, M., and W. Meckling (1976), "Theory of the Firm: Managerial Behavior: Agency Costs and Ownership Structure," *Journal of Financial Economics*, 3, 305-60.

Johnson, T. C. (2004), "Forecast Dispersion and the Cross Section of Expected Returns," *Journal of Finance*, 59(5), 1957-1978.

Joshi, Amit K., and Dominique M. Hanssens (2005), "Advertising Spending and Market Capitalization," Marketing Studies Center, UCLA Anderson School of Management.

Kandel, E., and N. D. Pearson (1995), "Differential Interpretation of Public Signals and Trade in Speculative Markets," *Journal of Political Economy*, 103(4), 831-72.

Kothari, S.P., T. Laguerre, and A. Leone (2002), "Capitalization versus Expensing: Evidence on the Uncertainty of Future Earnings from Capital Expenditures versus R&D Outlays," *Review of Accounting Studies*, 7, 355-82.

Kwon, S. S. (2002), "Financial Analysts' Forecast Accuracy and Dispersion: High-Tech versus Low-Tech Stocks," *Review of Quantitative Finance and Accounting*, 19(1), 65-91.

Lang, M. H., and R. J. Lundholm (1996), "Corporate Disclosure Policy and Analyst Behavior," *Accounting Review*, 71(4), 467-492.

Lev, Baruch (2001), *Intangibles: Management, Measurement, and Reporting*. Brookings Institution Press, Washington, D.C.

----, and Ramu S. Thiagarajan (1993), "Fundamental Information Analysis," *Journal of Accounting Research*, 31(2), 190-215.

Mansfield, E. (1981), "Composition of R&D Expenditures: Relationship to Size of Firm, Concentration and Innovative Output," *Review of Economics and Statistics*, 63(4), 610-15.

Merino, Maria M., Raji Srinivasan, and Rajendra K. Srivastava (2007), "Advertising, R&D Expenditures and Variability of Cash flow and Intangible Value," working paper, University of Texas at Austin.

McAlister, Leigh, Raji Srinivasan, and MinChung Kim (2007), "Advertising, Research and Development, and Systematic Risk of the Firm," *Journal of Marketing*, 71 (1), 35-48.

McLaughlin, R., A. Safieddine, and G.K. Vasudevan (1998), "The Information Content of Corporate Offerings of Seasoned Securities: An Empirical Analysis," *FM: The Journal of the Financial Management Association*, 27(2), 31-45.

Mizik, Natalie, and Robert Jacobson (2003), "Trading Off Between Value Creation and Value Appropriation: The Financial Implications of Shifts in Strategic Emphasis," *Journal of Marketing*, 67 (1), 63-76.

Pauwels, Koen, Jorge Silva-Risso, Shuba Srinivasan, and Dominique M. Hanssens (2004), "New Products, Sales Promotions, and Firm Value: The Case of the Automobile Industry," *Journal of Marketing*, 68 (4), 142-56.

Perry, S., and R. Grinaker (1994), "Earnings Expectations and Discretionary Research and Development Spending," *Accounting Horizons*, 8(4), 43-51.

Picconi, M. J. (1977), "A Reconsideration of the Recognition of Advertising Assets on Financial Statements," *Journal of Accounting Research*, 15(2), 317-326.

Rust, Roland T., Tim Ambler, Gregory S. Carpenter, V. Kumar, and Rajendra K. Srivastava (2004), "Measuring Marketing Productivity: Current Knowledge and Future Directions," *Journal of Marketing*, 68 (4), 76-89.

Schipper, Katherine (1991), "Analysts' Forecasts," *Accounting Horizons*, 5(4), 105-121.

Singh, Manohar, Sheri Faircloth, and Ali Nejadmalayeri (2005), "Capital Market Impact of Product Marketing Strategy: Evidence From the Relationship Between Advertising Expenses and Cost of Capital," *Journal of the Academy of Marketing Science*, 33 (Issue 4), 432-44.

Spence, A. M. (1980), "Notes on Advertising, Economies of Scale and Entry Barriers," *Quarterly Journal of Economics*, 95(3), 493-507.

---- (1973), "Job Market Signaling," *Quarterly Journal of Economics*, 87(3), 355-374.

Srinivasan, Raji (2006), "Dual Distribution and Intangible Firm Value: Franchising in Restaurant Chains" *Journal of Marketing*, 70(3), 120-35.

----, Gary L. Lilien, and Arvind Rangaswamy (2006), "The Emergence of Dominant Designs," *Journal of Marketing*, 70 (1), 1-17.

Srivastava, Rajendra K., Tasadduq A. Shervani, and Liam Fahey (1998), "Market-Based Assets and Shareholder Value: A Framework for Analysis," *Journal of Marketing*, 62 (1), 2-18.

---- (1999), "Marketing, Business Processes, and Shareholder Value: An Organizationally Embedded View of Marketing Activities and the Discipline of Marketing," *Journal of Marketing*, 63 (Special Issue), 168-79.

Teece, D. J. (1986), "Profiting from Technological Innovation," *Research Policy*, 15(6), 285–305.

Woolridge, Jeffrey M. (2002), *Econometric Analysis of Cross Sections and Panel Data*. Cambridge, MA: The MIT Press.

Zeithaml, Valarie A., P. Rajan Varadarajan, and Carl P. Zeithaml (1988), "The Contingency Approach: Its Foundations and Relevance to Theory Building and Research in Marketing," *European Journal of Marketing*, 22 (7), 37-64.