MARKETING SCIENCE INSTITUTE

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Reports

2006

WORKING PAPER SERIES

ISSUE THREE

NO. 06-003

MARKETING SCIENCE INSTITUTE

MSI Reports

2006

WORKING PAPER SERIES

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NO. 06-003

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New Product Preannouncements and Shareholder Value: Don't Make Promises You Can't Keep

Alina Sorescu, Venkatesh Shankar, and Tarun Kushwaha

Do the returns on new product preannouncements outweigh the risks? This study confirms the long-term value of a preannouncement strategy, but cautions managers to periodically update investors as they await product release. Most important, make sure prerelease information is reliable.

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Report Summary

New product preannouncements are strategic signals that firms direct at their customers, competitors, channel members, and investors. They have been touted as effective means of deterring competitor entry, informing potential customers, and even tipping the balance of technological standard battles in favor of the preannouncing firms. However, preannouncements also carry the risks of unwanted competitive reaction and the negative consequences of undelivered promises. From a shareholder value standpoint, do the benefits outweigh the risks of preannouncing?

To address this question, authors Sorescu, Shankar, and Kushwaha develop hypotheses about the effects of preannouncements on shareholder value and empirically test these hypotheses on a sample of software and hardware new product preannouncements.

Using both short-term and long-term metrics of changes in firm value, the authors show that the financial returns from preannouncements are not significantly different from zero in the short term, but are significantly positive in the long term (about 13% in one year or up to product introduction). The short-term abnormal returns are positively related to preannouncement specificity (i.e., content), whereas the long-term abnormal returns are positively associated with preannouncement updating (i.e., information follow-up). The results also show that preannouncement reliability (i.e., the credibility of the preannouncing firm) positively moderates these relationships.

The primary contributions of the study are: (1) identifying the timing and determinants of abnormal stock returns to the firm from new product preannouncements and (2) introducing to the marketing literature a new methodology for measuring long-term abnormal returns to marketing events, namely, the calendar-time portfolio methodology. ■

Introduction

Innovation is widely recognized as the cornerstone of growth and a primary source of competitive advantage. Firms, particularly those in technology markets, constantly strive to bring product innovations to market fast. Many of them also preannounce the introduction of their new products. By some estimates, over 50% of new products are preannounced (Bayus, Jain, and Rao 2001). Should firms preannounce their new products? There are arguments both for and against this decision.

There are many reasons for firms to preannounce. Preannouncements can preempt competition (Bayus, Jain, and Rao 2001; Farrell 1987). They can educate consumers[1] and potentially prompt them to wait for the preannounced products rather than buy available competitive offerings (Eliashberg and Robertson 1988; Greenleaf and Lehmann 1995). They can also help establish dominant industry standards (Farrell and Saloner 1986). Furthermore, short-term abnormal returns to firms from new product introductions are positive and significant (Chaney, Devinney, and Winer 1991), as is the effect of new product introduction on a firm's ratio of market capitalization to book value (Pauwels et al. 2004). Therefore, preannouncing a new product offers significant potential gains.

There are also good reasons for firms to refrain from preannouncing. First, informing the market about an upcoming product can alert competitors, whose defensive actions may outweigh the potential benefits of preannouncements (Robertson, Eliashberg, and Rymon 1995). Second, if a firm cannot deliver on its preannouncement promise, its reputation may suffer (Hoxmeier 2000). For example, the CEO of the information storage company EMC argued, "One way we have gained that credibility is in our refusal to follow the common practice of "preannouncing" products months in advance of their release—the vaporware phenomenon, designed to get customers to hold off planned purchases of competing products. Because we don't do this, there is never that familiar delay in the launch" (Hemp 2001, p. 134). Finally, broken promises can also hurt the bottom line. Hendricks and Singhal (1997) found that on average, delayed product launches decrease the market value of the firm by 5.25% or an average of $119.3 million.

Do the advantages of new product preannouncements outweigh the disadvantages? Despite the pitfalls of preannouncements, academic research has, in general, viewed them as valuable signaling tools and has focused mainly on the reasons for, and timing of preannouncements. There is, however, little or no empirical evidence that they translate into financial returns for stockholders.[2] But it seems clear that the decision to preannounce should be made based on how preannouncements affect firm and shareholder value in both the short term and the long term. From a marketing perspective, making such a determination is in line with increased interest in understanding what effects marketing activities and market-based assets have on shareholder value (e.g., Srivastava, Shervani, and Fahey 1998, 1999). The need to go beyond a short-term window in assessing the effect of firm assets and actions on firm value has been highlighted by emerging literature in marketing (Srivastava and Reibstein 2005) and finance (e.g., Brav and Heaton 2002; Gompers, Ishii, and Metrick 2003).

The primary purpose of this paper is to examine the relationship between new product preannouncements and firm value.[3] To better understand this relationship, we need to assess the financial returns to firms from preannouncements and also determine the time horizon (short-term or long-term) and conditions under which these returns accrue to the firm's shareholders. Are these returns significantly positive, and if so, are they of any economic significance? When do these returns accumulate? What are the determinants of these returns? Answers to these questions will aid senior managers in making appropriate decisions on preannouncements.

To address these questions, we develop relevant hypotheses based on the signaling and structural uncertainty theories, and we construct a time-dependent framework for stock market returns to preannouncements. Building on advances in the finance literature, we formulate risk-adjusted models of short- and long-term abnormal stock returns to firms from product preannouncements, investigate the determinants of the abnormal returns, and empirically test our hypotheses using data from the computer hardware and software industries.

A secondary purpose of our paper is to introduce to the marketing literature a new methodology for measuring the long-term financial value of marketing events. Drawing on recent insights from the finance literature, we present the underpinnings and advantages of the *calendar-time portfolio* methodology (e.g., Asquith, Pathak, and Ritter 2005; Gompers, Ishii, and Metrick 2003; Mitchell and Stafford 2000; Womack 1996) and apply it to assess the long-term effects of new product preannouncements on firm value. This methodology offers researchers in marketing a valuable tool for assessing the long-term financial effects of any set of marketing events or strategies, particularly those that are clustered in time and whose long-term effects may overlap.

Theory and Hypotheses

In the marketing context, preannouncements are formal and deliberate communications from firms before they undertake a particular marketing action, such as the introduction of a new product (Eliashberg and Robertson 1988). They are signals directed at one or more stakeholders of the firm, such as customers, competitors, channel members, and investors (Calantone and Schatzel 2000; Eliashberg and Robertson 1988; Robertson, Eliashberg, and Rymon 1995). The value of a product preannouncement is intangible and is primarily determined by investors' perceptions of how other market participants will react to that signal. For instance, consumers may choose to wait and purchase the preannounced product rather than buy an existing competing product (Greenleaf and Lehmann 1995). Competitors may or may not elect to introduce rival products (Bayus, Jain, and Rao 2001; Farrell 1987). Channel partners may start developing complementary products, increasing the demand for the new product. To the extent these stakeholders' actions impact the future cash flows of the preannouncing firm, the preannouncement affects firm value, and its effect is captured by the net present value (NPV) of discounted incremental future cash flows expected from the preannouncement, as indicated below:

$$NPV = \sum_{t=0}^{\infty} \frac{\Delta CF_t}{(1+k)^t} \quad (1)$$

where ΔCF_t are the expected incremental cash flows resulting from the preannouncement at time t (net of any potential costs that may arise from adverse stakeholder actions) and k is the discount rate that reflects the risk associated with these incremental cash flows.

Although the sales of preannounced products can be forecasted to some extent (Brockhoff and Rao 1993), neither the incremental cash flows nor the risks associated with the preannouncement decision are directly observable or easily predicted at the time of preannouncement. The broader the expected scope of market participants' reactions to the preannouncement, the larger the uncertainty about the expected incremental cash flows associated with the preannouncement.

Any method for measuring the net present value in Equation 1 must capture both predictable and unpredictable effects from the preannouncement and therefore should be rooted in a theoretical framework that accounts for information uncertainty and learning. The following sections discuss relevant theory from signaling and rational learning and introduce appropriate metrics for capturing the net present value of the preannouncement.

Traditionally, changes in firm value resulting from information-carrying signals have been measured using either stock market reactions or changes in Tobin's *q* ratio. The financial impact of announcements such as new product introductions (e.g., Chaney, Devinney, and Winer 1991; Pauwels et al. 2004; Srinivasan et al. 2004), corporate name changes (Horsky and Swyngedouw 1987), brand extensions (Lane and Jacobson 1995), joint ventures (Houston and Johnson 2000), additions of an Internet channel (Geyskens, Gielens, and Dekimpe 2002), and celebrity endorsements (Agrawal and Kamakura 1995) have been studied using short-term stock market abnormal returns measured around the day of the announcement. The effects of customer satisfaction (Anderson, Fornell, and Mazvancheryl 2004), information technology investments (Bharadwaj, Bharadwaj, and Konsynski 1999), and branding activities (Rao, Agarwal, and Dahlhoff 2004) have been analyzed using Tobin's *q*.

In the case of corporate announcements (including new product preannouncements), stock market abnormal returns are a particularly appropriate metric because they provide a forward-looking measure of changes in firm value. Abnormal returns can be measured using either a short-term horizon surrounding the date of the corporate announcement (e.g., Brown and Warner 1985), or a longer-term horizon that extends beyond the announcement date (e.g., Kothari and Warner 2005).

Short-term effects of preannouncements on firm value

The magnitude of the short-term stock market reaction depends on the strength of the preannouncement signal. Signaling theory suggests that the strength of a signal can be used to infer unobservable characteristics about the economic agent sending the signal (e.g., Riley 2001; Spence 1973). Because we do not directly observe the strength of the preannouncement signal, we use the preannouncement content or specificity as a proxy. The preannouncement specificity is the amount of information provided in the preannouncement that is intended to reduce investor uncertainty associated with the forthcoming product. For instance, a specific time to introduction may suggest that the firm has a concrete timetable in mind and is confident of meeting that deadline. Alternatively, details regarding the price of the product in the preannouncement may suggest that the firm already has an advanced version of the product that it may already have tested for pricing.

Furthermore, the greater the details that a firm provides, the greater the pressure it experiences to deliver exactly according to its promise, to protect its reputation. In other words, specificity imposes constraints that are costly for the firm, which loses freedom regarding the timing and manner of the new product introduction. Given that the cost of preannouncement increases with the preannouncement's specificity, it follows directly from signaling theory that specificity can act as an effective means of distinguishing one preannouncement from another (Riley 2001; Spence 1973).

If market participants perceive the information provided in a highly specific preannouncement to be costly, they are more likely to expect it to represent the new product's features accurately (Prabhu and Stewart 2001). By contrast, a vague, nonspecific preannouncement is unlikely to be costly for the firm in the event promises go unfulfilled. Given that fact, adverse selection theory (e.g., Akerlof 1970) predicts that investors will typically infer that a firm whose preannouncement is nonspecific does not have any immediate or specific plans to bring the product to the market.

Greater preannouncement specificity also increases the likelihood that the various market participants will react to the preannouncement. According to consumer information processing theory, consumers perceive less uncertainty about a product or category if greater information is available for judgment and decision making (Sujan 1985). Similarly, competitors tipped by the preannouncement may drop

development plans for similar products if the information relayed persuades them that the preannounced product is not likely to be vaporware. Rational investors should factor the predictions of signaling and information processing theory into their assessment of short-term changes in firm value. Thus, we advance the following hypothesis:

H1: The greater the specificity of the new product preannouncement, the higher the short-term abnormal returns to the preannouncement.

Another factor that influences investors' reactions to a new product preannouncement is the reliability of the firm making the preannouncement. We define preannouncement reliability as the extent to which a firm has fulfilled claims made in previous product preannouncements. Preannouncement reliability can be viewed as a component of firm reputation, which is central to good performance (Holmstrom 1979; Wilson 1985). Investors are likely to view the preannouncements of firms that have good records of delivering on their past preannouncements more favorably than those of firms whose records are poorer. Investors can estimate the future cash flows of firms whose preannouncements are more reliable with greater certainty than they can those of other firms. Therefore, we hypothesize that:

H2: The greater the reliability of the preannouncing firm's past product preannouncements, the higher the short-term abnormal returns from the current product preannouncement.

The effect that preannouncement specificity has on short-term abnormal returns is also likely to depend on the reliability of the preannouncing firm. Market participants, including investors and customers, are likely to view a firm that has failed to deliver on past promises as a boy who cried "wolf," and may fail to take seriously even a new product preannouncement with detailed content or high specificity. They are likely to react more positively to a highly specific preannouncement if they believe that the preannouncing firm reliably delivers on the promises it makes in preannouncements. Thus, investors can more accurately estimate the future cash flows associated with highly specific preannouncements made by reliable firms than those made by unreliable firms. This reasoning leads to the following hypothesis about the interaction effect of preannouncement reliability and preannouncement specificity on short-term abnormal returns:

H3: Preannouncement reliability interacts with preannouncement specificity to impact the short-term abnormal returns to the preannouncement such that the relationship between preannouncement specificity and short-term abnormal returns is stronger for firms with high reliability than it is for firms with low reliability.

Long-term effect of preannouncements on firm value

To the extent that signaling theory offers investors some basis for forming expectations about the causes and consequences of a preannouncement, the preannouncement will have some effect on stock returns in the short term. However, the use of a short-term horizon implicitly assumes that investors *immediately* understand *all* the financial consequences of corporate announcements, that they are rational, and that they are endowed with complete structural knowledge of the economy.[4]

One has to ask, however, if investors were indeed endowed with structural knowledge, then why would they penalize product delays—which they should have expected in the first place (Hendricks and Singhal 1997)? Why would intentional vaporware be able to deter entry, rather than being ignored by investors and competitors alike (Bayus, Jain, and Rao 2001)?

An emerging stream of research in finance and economics, commonly referred to as the rational-learning or structural-uncertainty literature, has relaxed the assumption of investors' structural knowledge while maintaining the rationality

assumption in decision making (e.g., Brav and Heaton 2002; Brennan and Xia 2001; Gompers, Ishii and Metrick 2003; Kurz 1994; Lewellen and Shenken 2002; Lewis 1989). According to this literature, investors are rational, but they neither know the underlying laws of economics nor act as if they did. As more information becomes available, they update, in a Bayesian manner, their prior beliefs about the particular set of laws that govern a given relationship. In general, this process involves the observation of a series of realized events over time, as well as the returns (or other economic outcomes) associated with it. This process indirectly enables investors to update the probability distribution function of future stock returns, which, in turn, results in a change in the value of the stock. Thus, 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. Consequently, long-term stock returns accrue to any event whose impact on firm value is not fully understood by investors at the time of its occurrence, and about which more information becomes available during the subsequent months or years.

The rational-learning paradigm provides an appropriate justification for examining the long-term abnormal stock returns from new product preannouncements, which set in motion a market dynamic that is sufficiently complex to be initially misunderstood by investors in the short term. In most cases, the absence of consistent time series of past data makes it difficult for investors to form any type of expectation about the ultimate development and introduction of the preannounced product because no two preannouncement events are the same. Thus, investors are likely to require considerable time to learn about each preannouncement before they can estimate the level of, and risk to incremental future cash flows and understand the equilibrium response strategy that may be adopted by the firm's other stakeholders. Consequently, stock market returns measured over a longer-term period are more likely than short-term abnormal stock market returns to reflect the process of learning about the upcoming new product, the strategic responses of other stakeholders, and the gradual resolution of uncertainty regarding future firm value.

For investors to learn more about the preannounced product, new relevant information must become available after the preannouncement. We define preannouncement updating as the extent to which the preannouncing firm continues to disseminate information about the preannounced product. Every time the firm releases new information about the preannounced product, it reduces the uncertainty surrounding it (Jacoby et al. 1994). If an update does not provide any new information, then investors may not take a subsequent update from the firm seriously. We treat preannouncement updating as a variable that represents the net positive incremental information about the new product (net of negative information such as introduction delays). Thus, the greater the information flow following the preannouncement, the more likely it is that the preannouncement will be well understood and viewed as credible. With more information, investors gain the structural knowledge necessary to better estimate the future cash flows and the risk levels associated with the preannouncement, and the stock price gradually adjusts to reflect this new knowledge.[5] These arguments yield H4.

H4: The greater the updating of a new product preannouncement, the greater the long-term abnormal returns from the preannouncement.

As we argued in the case of short-term abnormal returns, investors and stakeholders are likely to place greater weight on the information contained in preannouncements that come from firms judged to be reliable. Thus, the effect of preannouncement updating on stock returns should also be contingent on the reliability of the preannouncing firm. A reliable firm should keep its preannouncement current through

updates; doing otherwise would result in significant reputation costs. For reliable firms, preannouncement updating serves as a continuous-time credible signal of the new product's introduction prospects. Investors will correctly comprehend the strength of high-reliability firms' preannouncement updating signal and will gradually learn more about the consequences of the preannouncement, update their priors on the expected cash flows associated with it, and update the stock price of the firm accordingly (Kurz 1994). In contrast, investors may not respond as positively to less reliable firms' updates as those firms' updates may not be trusted to convey meaningful information about the new product's introduction prospects (Riley 2001). Thus, we expect firms' reliability to moderate the effect of preannouncement updating on long-term abnormal returns, leading to the next hypothesis.[6]

H5: The reliability of the preannouncing firm moderates the relationship between preannouncement updating and the long-term returns from a preannouncement such that the relationship is stronger for firms with high reliability than it is for firms with low reliability.

Data and Empirical Context

We tested our hypotheses in a high-tech context comprising the software and hardware industries. In high-tech industries, new technologies proliferate rapidly, making it important for firms to keep their stakeholders abreast of forthcoming innovations. There is a perception among managers in these industries that product life cycles are getting shorter, prompting firms to introduce and announce their next-generation or upgraded products faster. Furthermore, due to the heightened competitiveness in these industries, investors look for product preannouncement signals to evaluate a firm's competitive advantage over its peers. It is therefore unsurprising that about half of the products in these industries are preannounced (Bayus, Jain, and Rao 2001).

The first step in data collection involved conversations with industry experts and a review of publications covering new product announcements in electronic format during the period for which data were collected (1984-2000). We used two publications, *Computerworld* and *Newsbytes*, to collect our first round of data. Together, these publications covered almost all the products preannounced in the software and hardware industries during the period of study.[7] We searched these two publications for all articles published between 1984 and 2000 that contained the words *launch, announce, beta,* and *introduce*.[8] We scanned several thousand articles to create a list of products that were preannounced.

In the second step of the data collection, we extended our search to all industry publications and company newswires available in electronic format. We classified an announcement relating to a new product as a preannouncement if the firm stated that the product was to be introduced at a later date and the introduction date was either unspecified or specified to follow the preannouncement by at least a week. We conducted a broad search across all news sources and business wires to retrieve an accurate preannouncement date, which is the earliest date when information about the product first became available. We eliminated preannouncements from companies that were not publicly traded and product introduction announcements that were not preceded by a preannouncement. We obtained a usable sample of 419 preannouncements made by 100 firms during 1984-2000. We painstakingly checked the accuracy of the preannouncement dates through several rounds of searches.

The data indicate that preannouncements are made by all types of firms, ranging from large, dominant firms with as much as $80 billion in assets to small firms with approximately $4 million in assets. There is also substantial variation in preannouncement specificity, which includes the announced lead time to introduction. The time between preannouncement date and the expected introduction date ranged from

one week to two years among the 223 preannouncements that offered an expected time of introduction.

In addition to gathering preannouncement information, we also collected information on the introduction of the preannounced products in our sample. We conducted LexisNexis searches across all available news sources to retrieve either the firms' introduction announcements or news articles from which it could be inferred that the preannounced product had been introduced. Only 37 of the 419 preannounced products had formal introduction announcements; we were able to retrieve the approximate introduction dates for another 41 products by using information from various news sources that mentioned that the product was already on the market.

We obtained stock price data from the Center for Research on Security Prices (CRSP) at the University of Chicago. Our long-term abnormal return metrics (discussed subsequently) require the use of the three factors proposed by Fama and French (1993), as well as the momentum factor proposed by Carhart (1997). We obtained data on these four factors from Ken French's website at Dartmouth College (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor.html). Finally, we obtained firm-level accounting data on control variables from COMPUSTAT.

Measures and Models

Dependent variables: Abnormal stock returns

Testing our hypotheses requires metrics of abnormal stock returns for both short- and long-term horizons. The short-term horizon typically consists of a narrow five-day window centered on the day of the announcement. The long-term horizon starts after the end of the short-term window and generally extends for at least one year. Table 1 provides a brief illustration of the type of events that produce significant long-term abnormal returns, along with the measurement metric used and the magnitude of the abnormal returns measured (for an extensive review, see Kothari and Warner 2005).

Methods of Measuring Short- and Long-term Abnormal Returns. We used strikingly different methodologies for measuring short- and long-term abnormal returns. Both methods entail a comparison of realized stock returns with those that would have occurred if the event had not taken place (the "expected" returns), but the similarities stop there. For short-term returns, a simple event-study methodology is generally appropriate (Brown and Warner 1985). This methodology has been used in several marketing studies (e.g., Agrawal and Kamakura 1995; Chaney, Devinney, and Winer 1991; Geyskens, Gielens, and Dekimpe 2002; Horsky and Swyngedouw 1987; Lane and Jacobson 1995); a brief outline of the computation of the cumulative abnormal returns (CAR), our measure of short-term performance, can be found in Appendix 1.

The event study methodology, however, has a major limitation that makes it inappropriate for the measurement of the long-term abnormal returns from events that are clustered in time: its inability to properly account for cross-sectional dependency (or overlap) between events (Barber and Lyon 1997; Kothari and Warner 2005; Mitchell and Stafford 2000). The event overlap problem is not serious for short-term horizons, but is critical for longer-term horizons and failure to correct it will lead to misleading statistical inferences (e.g., Barber and Lyon 1997; Kothari and Warner 2005; Mitchell and Stafford 2000). To measure long-term returns appropriately, we introduce to the marketing literature a new methodology used in finance: the calendar-time portfolio analysis. In this method, we first construct a portfolio (called a calendar-time portfolio) to include all stocks of the preannouncing firms, and then we measure the long-term abnormal returns for the portfolio. We present details on portfolio construction in Appendix 2.

Table 1
Selected Studies in Finance Literature Using Long-term Abnormal Returns

Event or Strategy Type	Study	Sign of Abnormal Return (at Announcement)	Sign and Annualized Magnitude of the Long-term Post-event Return (% per Year)	Long-term Metric Used
Long-term Abnormal Returns for an Event				
Seasoned equity offerings	Loughran and Ritter (1995)	–	−5.4% −11.0%	Calendar-time three-factor abnormal returns, long-term cumulative abnormal returns
Dividend initiations	Michaely, Thaler, and Womack (1995)	+	+7.5%	Buy-and-hold abnormal returns
Changes in analyst recommendations	Womack (1996)	+ for upgrades – for downgrades	+4.8% for upgrades −4.6% for downgrades	Calendar-time three-factor abnormal returns
Long-term Abnormal Returns for a Strategy				
Momentum	Jegadeesh and Titman (1993)	N/A	+14.5% for simultaneous long positions on past winners and short positions on past losers	Calendar-time hedge portfolios using raw returns
High prior short interest [a]	Asquith, Pathak, and Ritter (2005)	N/A	−26% to −46%	Calendar-time four-factor abnormal returns
Governance quality	Gompers, Ishii, and Metrick (2003)	N/A	+8.5% for simultaneous long positions in good-governance and short positions in bad-governance firms	Calendar-time four-factor abnormal returns
High dispersion of analyst forecasts	Diether, Malloy, and Scherbina (2002)	N/A	−4% to −7%	Calendar-time three-factor and four-factor abnormal returns

Notes: + indicates a significantly positive abnormal return; – indicates a significantly negative abnormal return. [a] Short interest, measured monthly, is the ratio of the total number of shares sold short to the total shares issued by the company.

After constructing the calendar-time portfolio, we measured its abnormal returns using the three-factor model proposed by Fama and French (1993). This model, which has been shown to produce a better estimate of expected stock returns than does the capital asset pricing model, posits that the expected rate of return for a portfolio is a function of overall stock market returns, as well as the size and book-to-market ratio of the portfolio.

To compute abnormal returns using this three-factor model, we regressed the raw returns of the calendar-time portfolio on market, size, and book-to-market factors as follows:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \gamma_p SMB_t + \delta_p HML_t + \varepsilon_{pt} \quad (2)$$

where R_{pt} is the rate of return of the calendar-time portfolio during month t, and R_{ft} is the rate of return on a U.S. Treasury bond during the same period. R_{mt} is the average rate of return of the U.S. stock market, SMB_t is the difference between the rates of return of stocks of small and big firms (small minus big), and HML_t is the difference in returns between high and low book-to-market stocks (high minus low), all during month t; ε_{pt} is an error term, and α, β, γ, and δ are parameters associated with the variables in the model.[9]

If the portfolio's postevent stock performance is "normal" given its market risk, size, and book-to-market characteristics, the variation in post-event returns R_{pt} is captured entirely by the three risk factors and the regression intercept is zero. Thus, the intercept α_p is the mean monthly abnormal return of the portfolio. For ease of exposition, we report all abnormal returns on an annual basis, multiplying the intercept by 12.

The main advantage of the calendar-time method is that it automatically accounts for cross-sectional correlation of returns (see Lyon, Barber, and Tsai 1999, p. 193 and Mitchell and Stafford 2000, p. 288). This is because the standard error of the abnormal return estimate α_p is not computed from the cross-sectional variance, as is the case with the event study method, but from the intertemporal variation of portfolio returns. Given rational investors, monthly stock returns are serially uncorrelated (Kothari and Warner 2005), so the methodology is well specified, and statistical inferences are likely to be more accurate than those obtained with the event studies, in which the standard error is computed within the cross-section.

A drawback of the calendar-time portfolio method is that it does not produce separate measures of abnormal returns for each event. Instead, stocks are grouped into a portfolio and a single measure of abnormal returns is obtained for the entire group. Because of this grouping, it is not possible to use a cross-sectional regression model to analyze the relationship between abnormal returns and event-specific independent variables. Therefore, to test H4, we divide our events into two groups based on the values of preannouncement updating and form a calendar-time portfolio for each event group. The first group contains all events whose preannouncement updating values are at least equal to the sample median. The second group contains the below-median events. By comparing the intercepts from the two groups, we can determine the effect of updating on long-term abnormal returns.

To test the interaction effects of two independent variables, as in H5, we classify the events into four subgroups, representing the intersection of the two subgroups based on updating and the two subgroups based on reliability. For each subgroup, we estimate a separate calendar-time portfolio and obtain a separate regression intercept. To test H5, we examine all pairwise differences among the four portfolio intercepts.[10]

Accounting for Momentum and Direction of Causality. In any study of long-term abnormal returns, it is important to determine if the measured returns are due to the event or the firm's past performance. For instance, it could be argued that firms that do well are more likely to preannounce, which would reverse the direction of causality. The concern is of particular relevance in view of the momentum effect that is observed when a firm's stock continues to perform in a subsequent year as it has in the prior year (Jegadeesh and Titman 1993). Suppose firms preannounce only after they experience higher-than-usual stock returns. Using Jegadeesh and Titman's result, we would expect these high stock returns to continue over the next year even in the absence of a preannouncement. Thus, the three-factor abnormal returns might simply be capturing this momentum effect, not the economic rents associated with the preannouncement. To eliminate this possibility, we controlled for the momentum effect by including a fourth factor in Equation 2. Specifically, we computed an alternative measure of abnormal returns using the following model:

$$R_{pt} - R_{ft} = \alpha'_p + \beta'_p(R_{mt} - R_{ft}) + \gamma'_p SMB_t + \delta'_p HML_t + \lambda_p UMD_t + \eta_{pt} \quad (3),$$

where UMD_t is a momentum factor proposed by Carhart (1997), defined as the difference in the returns of firms with high and low prior stock performance ("up" minus "down") during month t, λ is the parameter associated with the momentum factor, η_{pt} is the error term, and the rest of the terms are as defined in Equation 2.[11] The new intercept, α'_p, provides a measure of monthly abnormal stock returns that accounts for the firm's prior performance.

Accounting for Other Events Occurring in the Long-term Window. A potential concern with any measure of long-term stock performance is the extent to which it captures the abnormal returns caused by the event under study as opposed to other idiosyncratic events that occur within the measurement window. Consistent with studies in the finance litera-

ture, we assume that the unexpected informational content of these other events has mean zero. Indeed, although firms in our sample might have experienced a series of favorable or unfavorable idiosyncratic events, we assume that, on average, these events cause stock prices to move as expected, so their abnormal returns are zero. This assumption is validated by Mitchell and Stafford (2000), who show, in a series of simulations, that for a sample of randomly selected firms (for which event dates are also chosen at random), the average calendar-time portfolio abnormal returns are zero during the one year following the simulated event. This result suggests that the informational effect of all idiosyncratic events that occurred during their sample period is such that the abnormal returns are, on average, zero.

Independent variables

Product Preannouncement Specificity. We analyzed the content of preannouncements to identify the extent to which they provided specific, objective information that investors could use to evaluate them. We found that in addition to a technical description of the product, detailed preannouncements provided information about the price of the upcoming product, an expected time to introduction, or both. Because the technical claims are not directly comparable from one product to another, we focused on price, which has been shown to be a useful signal to assess the quality of a new product (Winer 1986), and the time to introduction. As indicated earlier, we had to create a dichotomous variable of preannouncement specificity so that we could construct two portfolios for preannouncements, one for high and one for low levels of specificity. We operationalized the specificity of each preannouncement using a dummy variable that takes the value 1 if either a time to introduction or a price for the product is provided, and 0 otherwise.[12]

Product Preannouncement Reliability. As discussed earlier, investors assess the credibility of the preannouncement based on the extent to which the preannouncing firm has delivered on its past promises. We measure preannouncement reliability using a dummy that takes the value 0 if the firm did not deliver its most recently preannounced product on time and 1 if it did deliver the product on time. Research on recency effects (Miller and Campbell 1959; Wyer and Scrull 1989) suggests that although investors may take into account the entire preannouncing history of the firm, they will weigh the last preannouncement, which contains the most current information, more heavily.[13]

Product Preannouncement Updating. Measuring the extent to which a preannouncing firm continues to disseminate information related to the preannounced product is not a straightforward task. A firm communicates with its stakeholders in many ways. For instance, firms can provide news about their proposed new products privately to their suppliers or demonstrate beta versions of the product at trade shows. We used the extent to which firms publicly released information relevant to the preannouncement as a proxy for this information flow. While the firm may use other channels of communication, the updating of the information in those channels is likely to be correlated with the updating of information released through public channels of communication. To measure the extent of the updating, we used the number of press releases or newswires between preannouncement and product introduction that contained information about the product. We obtained those updates from the LexisNexis database. We counted as an update any press release or newswire in which the preannounced product was mentioned, even if the product was not the main focus of the press release. Since the median number of updates was one, we constructed two calendar-time portfolios, one for preannouncements with no updates and one for preannouncements with at least one update.

Of the 354 information updates we identified, only four contained negative information, such as announcements of delays in the shipment of the product. The very small number of negative

Table 2
Variables, Measures, and Data Sources

Variable	Operational Measure	Data Source
Financial returns	1. Short-term abnormal returns five days around the preannouncement	CRSP
	2. Long-term calendar-time portfolio-level returns (one year after the preannouncement or up to product introduction, whichever comes first)	CRSP
	3. Fama-French, Carhart's momentum factors	Ken French's website
Preannouncement specificity	1. Price of the new product	LexisNexis
	2. Announced time of introduction of the new product	LexisNexis
Preannouncement reliability	Whether the firm's most recently preannounced product was introduced on time	LexisNexis
Preannouncement updating	Number of new mentions in the press about the preannounced product, measured within a year from the preannouncement, or up to introduction, whichever comes first	LexisNexis
Product category: software/hardware	Whether the preannounced product was a computer software or hardware product	LexisNexis
Innovativeness	Claimed innovativeness of the new product (incremental or radical)	LexisNexis
Firm size	Assets	COMPUSTAT

updates prevents us from creating a separate portfolio to assess the returns of this separate group. Instead, consistent with our conceptual arguments, we use only updates with nonnegative information in our analysis and exclude the four preannouncements followed by negative updates from the calendar-time portfolios. This practice is also consistent with the well-documented tendency of firms to convey good news ahead of time, which means that the number of updates is a proxy for the quantity of good news—rather than all news—about the preannounced product.

Control variables

Innovativeness. The innovativeness of a preannounced product could affect the financial returns to the firm's stockholders. A product preannounced as a radical innovation may be viewed by the financial market as having the potential to yield greater returns than other preannounced products (e.g., Sorescu, Chandy, and Prabhu 2003). To measure the innovativeness of preannounced products, we analyzed the content of preannouncements to assess firms' innovativeness claims. Based on the presence or absence of certain key words (e.g., "major breakthrough," "shattered industry barriers," "the product is an industry first"), we classified the products as either radical or incremental. We operationalized this variable as a dummy that takes the value 0 if the claimed innovativeness is incremental and 1 if it is radical.

Product Category (Software/Hardware). To control for differences in abnormal returns that may accrue because our two product categories may have different market potentials, we created a dummy variable that takes the value 1 if the preannounced product is a hardware product and 0 if it is a software product. Because there were only a few preannouncements that contained both software and hardware products and those generally focused on the hardware product, we combined joint preannouncements with hardware preannouncements.

Firm Size. Firm size is a potential determinant of the financial returns from a product preannouncement. The financial returns to a small firm, for whom the preannounced product may be critical, could arguably be larger than the returns to a large firm. Moreover, for a constant dollar return, the relative return as a proportion of firm value is lower for larger firms. We therefore expect firm size to have a negative effect on

Table 3
Short-term Abnormal Returns Model: Means and Correlation Matrix of Variables

Variable	Mean	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CAR market-adjusted model *(1)*	.52%	1.00							
CAR market model *(2)*	.41%	.99 (.00)	1.00						
Preannouncement reliability *(3)*	.11	.12 (.03)	.11 (.06)	1.00					
Preannouncement specificity *(4)*	.40	.17 (.00)	.17 (.00)	–.01 (.81)	1.00				
Product category *(5)*	.52	.06 (.26)	.06 (.26)	–.04 (.46)	.03 (.58)	1.00			
Innovativeness *(6)*	.05	–.01 (.88)	–.01 (.90)	.09 (.14)	–.09 (.08)	–.06 (.27)	1.00		
Firm size *(7)*	$17,173m	–.13 (.02)	–.11 (.05)	–.03 (.54)	–.06 (.25)	.22 (.00)	.05 (.41)	1.00	
Preannouncement updating *(8)*	.40	–.04 (.53)	–.03 (.64)	–.04 (.44)	.08 (.18)	.03 (.64)	.07 (.22)	.05 (.41)	1.00

Note: The values in parentheses are *p*-values of significance.

abnormal returns. We used the log of a firm's assets as a measure of its size.

Table 2 provides a summary of our operationalization of the independent, dependent, and control variables, along with the source of data for each variable. The data for financial returns were collected from the Center for Research in Security Prices (CRSP); those for most determinant and control variables came from LexisNexis.

Results and Robustness Checks

Table 3 presents the means and correlation matrix of short-term abnormal returns from new product preannouncements, their determinants, the control variables, and the preannouncement updating variable. On average, the short-term returns are not significantly different from zero at the 10% significance level. Thus, despite several advantages of new product preannouncements hypothesized in the literature, it appears that on average the stock market does not recognize their value in the short term. However, the variance in the short-term returns is large (7.91% and 8.11% for market-adjusted and market-model measures of CAR, respectively). This large variance indicates that there are indeed preannouncements that generate significantly positive returns in the short term, and it highlights the importance of identifying the determinants of these types of preannouncements. None of the correlations are very high, suggesting that multicollinearity is not an issue in the data.

Determinants of short-term abnormal returns

The results from the market and market-adjusted models of short-term abnormal returns appear in Table 4. New product preannouncements with high specificity generate significantly positive short-term abnormal returns, supporting H1. The short-term cumulative abnormal returns to high-specificity preannouncements are approximately 1.5% in both the models, significantly higher than zero

Table 4

Cross-sectional Short-term Abnormal Returns[a]

	CAR Market-adjusted Model		CAR Market Model	
	with control variables	without control variables	with control variables	without control variables
Intercept	.040*	–.004	.031	–.006
	(.022)[b]	(.005)	(.022)	(.005)
Preannouncement reliability	.009	.008	.005	.004
	(.016)	(.016)	(.016)	(.016)
Preannouncement specificity	.018**	.018**	.017**	.018**
	(.008)	(.008)	(.008)	(.008)
Preannouncement reliability x	.046*	.046*	.046*	.047*
Preannouncement specificity	(.025)	(.025)	(.025)	(.025)
Product category	.013	–	.012	–
	(.008)		(.008)	
Innovativeness	.006	–	.006	–
	(.017)		(.017)	
Firm size	–.006**	–	–.005**	–
	(.002)		(.002)	
Adjusted R^2	.058	.041	.048	.038
Sample size	308	319	308	319

[a] Around product preannouncement date; [b] Standard errors in parentheses below each coefficient; ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

and greater than those for low-specificity preannouncements ($p < .05$). Thus, new product preannouncements with high specificity are perceived as credible signals, leading to an increase in firm value.

The effect of preannouncement reliability on short-term abnormal returns, however, is not significant ($p > .10$). Thus, H2 is not supported. For a given level of preannouncement specificity, investors appear to value a new product preannouncement from a firm with high reliability no differently from a preannouncement from a firm with low reliability. A possible explanation is that the specific details in a preannouncement may provide sufficient information to evaluate the future cash flows and the risk levels associated with the preannounced product, so that in the presence of preannouncement specificity, the signal provided by preannouncement reliability may not have a direct effect on firm value.

We find marginal support for H3. The interaction between preannouncement specificity and reliability has a positive effect on short-term returns ($p < .10$), suggesting that the short-term changes in firm value are enhanced by the reputation of the preannouncing firm. However, because preannouncement reliability does not have a direct significant impact on short-term abnormal returns, its interaction effect should be interpreted as a *moderating* effect on the relationship between preannouncement specificity and short-term abnormal returns. Thus, we find that the effect of specificity on stock returns is stronger for preannouncements with high reliability than it is for those with low reliability.

An examination of the effect of control variables on short-term abnormal returns reveals that the claimed innovativeness of firms' preannounced products does not significantly impact short-term abnormal returns ($p > .10$). Investors arguably view a firm's self-proclaimed radical innovation with skepticism. Furthermore, consistent with previous research that found that changes in firm value are negatively related to firm dominance (Srinivasan et al. 2004), we find that firm size has a negative impact on the short-term abnormal returns. Intuitively, since our measures of abnormal returns are percentage changes in firm value, it makes sense that bigger firms experience a smaller percentage increase in firm value due to events such as new product preannouncements. The coefficient of the product category variable is not significant either ($p > .10$), suggesting that product category does not affect the market perception of the credibility of the preannouncement. Finally, the percentage of variation explained by the regression model is in line with those from other studies of abnormal stock returns from corporate events.[14]

Determinants of long-term abnormal returns

The calendar-time one-year abnormal returns across the entire sample are positive and significant (12.27%, $p < .05$ for the three-factor model and 13.33%, $p < .05$ for the four-factor model), suggesting that financial returns from new product preannouncements accrue in the long term. The results appear in Panel A of Table 5.

To compute the long-term abnormal returns from new product preannouncements and test H4 and H5, we first assign firms in our sample to four different portfolios based on the values of the two independent variables of interest: preannouncement updating and preannouncement reliability. Within each of these portfolios, we measure the long-term abnormal returns using the three- and four-factor models from equations 2 and 3.

Panel B, Table 5 shows the returns of portfolios formed according to preannouncement updating and preannouncement reliability. For expositional ease, we label each of the cells in Panel B using the letters (a) to (d); Cell (c), for instance, refers to the portfolio of firms having low preannouncement updating and high reliability. The highest long-term abnormal returns appear in Cell (d), for stocks of firms with both high updating and high reliability. These stocks earn over 40% abnormal returns per year, after controlling for the risk factors and the momentum effect. Conversely, the abnormal returns for stocks in Cell (a), those with low preannouncement updating and low reliability, are smaller and insignificant.

To test the simple main effect of preannouncement updating, we perform pairwise comparisons of Cells (a) and (b) and of Cells (c) and (d) and present the results in the top section of Panel C. According to H4, the abnormal returns in Cell (b) should be significantly higher than those in Cell (a), and the abnormal returns in Cell (d) should be significantly higher than those in Cell (c). That is, after controlling for reliability, we examine if higher updating leads to higher returns. We find that both differences are statistically significant at the 5% level or better, suggesting that preannouncement updating has a positive effect on long-term abnormal returns, supporting H4.[15]

To test the moderating effect of reliability on the relationship between preannouncement updating and long-term abnormal returns (H5), we need to show that the difference in abnormal returns between portfolios (d) and (c) is higher than that between portfolios (b) and (a). That is, we need to show that the effect of preannouncement updating on abnormal returns is stronger at high levels of preannouncement reliability than it is at low levels of reliability. This test is equivalent to showing that the difference between Cell (d) and Cell (b) is higher than that between Cell (c) and Cell (a), that is, the effect of preannouncement reliability on long-term abnormal returns is stronger at high levels of preannouncement updating than it is at low levels of updating. We present the results of

Table 5

Portfolio Analysis of Long-term Calendar-time Abnormal Returns[a]

Panel A:

Average Abnormal Returns across Entire Sample	**Three-factor model**	**Four-factor model**
Post-event portfolio-based calendar-time one-year	12.27%**	13.33%**
	(4.97)[b]	(5.17)

Panel B:

Average Abnormal Returns within Each Portfolio

		Preannouncement updating low			high	
Methodology		**Three-factor-model calendar-time**	**Four-factor-model calendar-time**		**Three-factor-model calendar-time**	**Four-factor-model calendar-time**
Preannouncement reliability	low (a)	5.62%	7.20%	(b)	18.31%	18.64%
		(4.80)	(4.99)		(6.59)***	(6.98)***
	high (c)	20.37%	18.18%	(d)	46.13%	48.04%
		(6.87)***	(7.10)***		(9.66)***	(10.49)***

Panel C:

Differences in Abnormal Returns between Portfolios

				Difference in returns between long and short portfolios	
		Portfolio with long (buy) positions	**Portfolio with short (sell) positions**	**Three-factor-model calendar-time**	**Four-factor-model calendar-time**
Test for the main effect of preannouncement updating					
	(b) – (a)	low reliability and high updating	low reliability and low updating	12.69%	11.44%
				(5.26)**	(5.52)**
	(d) – (c)	high reliability and high updating	high reliability and low updating	25.77%	29.23%
				(8.57)***	(8.69)***
Test for the main effect of preannouncement reliability					
	(c) – (a)	high reliability and low updating	low reliability and low updating	14.75%	11.61%
				(8.38)*	(8.68)
	(d) – (b)	high reliability and high updating	low reliability and high updating	27.82%	29.40%
				(9.64)***	(10.72)***
Test for the moderating effect of preannouncement reliability on the relationship between preannouncement updating and long-term abnormal returns					
	(d) + (a) – (b) – (c)			13.07%	17.79%
				(6.77)*	(6.81)***

[a] Following product preannouncement date; [b] Standard errors in parentheses below each measure; ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

this test in the bottom section of Panel C. The abnormal returns shown correspond to those of a hedge portfolio that takes long positions in portfolios (d) and (a) and short positions in portfolios (b) and (c). Consistent with H5, we find a significantly positive abnormal return for this hedge portfolio: the difference in returns between portfolios (d) and (c) is greater than that

between (b) and (a) by 13% to 18% per year. Moreover, this difference is statistically significant ($p < .01$ for the four-factor model and $p < .10$ for the three-factor model).

For completeness, we also include, in the middle section of Panel C, a test of the main effect of reliability, although it is not a part of our formal hypotheses. Recall that we expect the effect of reliability to be fully incorporated in the short-term returns, since this information is available at the time of the preannouncement. The difference in abnormal returns between Cells (c) and (a) is only marginally significant for the three-factor model ($p < .10$) and not statistically significant for the four-factor model, suggesting there is no main effect of preannouncement reliability on long-term abnormal stock returns.

Because some of the returns shown in Panel B are large in magnitude, a natural question arises as to whether investors could have earned those abnormal returns ex ante. We note that the largest returns are associated with stocks having high levels of preannouncement updating. Since the level of preannouncement updating cannot be predicted on the day of the preannouncement, investors could not have realized these returns ex ante.

Could investors have earned positive long-term abnormal returns by purchasing a well-diversified portfolio containing the stocks of *all* preannouncing firms? No, the significantly positive long-term abnormal returns do not necessarily signal an arbitrage opportunity for small investors. To obtain these returns, an investor would have to rebalance, on a monthly basis, a portfolio of firms that preannounce their products, as firms are added to or dropped from the portfolio according to their preannouncing activities. The round-trip transaction costs associated with rebalancing are often above 1% per month for individual investors, so a 12% annual return may not be exploitable by most investors.

Robustness checks

We performed several robustness checks on our results. First, to control for the possible effect of new product introduction on abnormal returns, we performed subsample analyses of new product preannouncements. We computed both the short- and the long-term abnormal returns for the subsample of preannouncements that were followed by formal introduction announcements, as well as for the subsample of preannouncements for which we found evidence of introduction. The results appear in Table 6. In neither case are the short-term abnormal returns significantly different from zero at the 10% level, although they appear to be higher than the average of the entire sample. Moreover, the short-term returns from the introduction announcements are not significantly different from zero ($p > .10$). This finding suggests that investors did not accurately predict which products would eventually be introduced. If they had, the returns from this subsample of preannouncements would have been positive. However, the long-term abnormal returns from these subsamples are significantly different from zero ($p < .10$). These results provide additional support for the main finding of this study: new product preannouncements offer positive financial rewards, but only in the long term.

Panel B of Table 6 provides additional interesting insights in the form of descriptive statistics for the subsample of preannounced products for which we were able to verify introduction. The proportion of firms with high preannouncement reliability in this subsample is significantly higher than the one in the overall sample, suggesting that the preannouncement reliability of a firm could be an indicator of the likelihood of introduction. Investors, however, did not appear to factor reliability into their expectations, as suggested by the lack of a simple main effect of preannouncement reliability in Table 4. On the other hand, the sample containing preannouncements of products that were eventually introduced does not appear to differ in preannouncement specificity from the overall sample, despite the fact that specificity was a significant determinant of short-term abnormal returns.

Table 6

Analysis of Preannouncements Followed by Verified Product Introductions

Panel A: Abnormal Returns

Sample	Number observed	Short-term abnormal returns: Market-adjusted model	Short-term abnormal returns: Market model	Long-term abnormal returns: Three-factor model	Long-term abnormal returns: Four-factor model
Preannouncement followed by a formal product introduction announcement	37	1.25% (1.20%)	.92% (1.20%)	25.47% (10.00%)**	18.08% (9.94%)*
■ Return on preannouncement		.20%	–.18%		
■ Return on introduction		(.83%)	(.85%)		
Preannouncement for a new product with confirmed introduction	78	.84% (.81%)	.59% (.80%)	13.47% (7.67%)*	15.26% (8.32%)*

Notes: Standard errors are shown in brackets below each measure. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel B: Descriptive Statistics on the Breakdown of the Sample

Sample	Number observed	Percentage of observations for which the corresponding independent variable dummy equals unity: Reliability	Specificity	Reliability x specificity	Updating	Reliability x updating
Entire sample	324	10.8%	40.2%	4.32%	52.2%	7.72%
Preannouncement followed by a formal product introduction announcement	37	27.3% (8.08%)**	37.8% (8.57%)	6.1% (4.35%)	94.6% (4.49%)**	24.2% (7.72%)**
Preannouncement for a new product with confirmed introduction	78	23.1% (5.55%)**	44.9% (6.16%)	7.69% (3.51%)	97.4% (3.03%)***	21.5% (5.36%)**

Standard errors of the differences between the subsample and the full sample are shown in parentheses below each subsample measure. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Second, we examined whether preannouncement reliability is correlated with preannouncement updating. Presumably, the reliable firms have greater incentive to update investors on the progress of their preannounced product. The correlation between preannouncement reliability and updating is, however, not significantly different from zero ($p > .10$).

Third, we also estimated our models using alternative measures of reliability that were based on the most recent two and three new product preannouncements of the firm. While these measures resulted in a significant reduction in sample size, the signs and substantive magnitudes of the various effects on abnormal returns remained unchanged. However, a few effects were not significant ($p > .10$), possibly due to the lower power resulting from the reduction in sample size.

Fourth, to control for any possible effect of the lead time from preannouncement to product introduction, we also performed our analyses with subsamples having different lead times. The substantive results of the study remained unchanged.

Finally, we estimated an alternative short-term returns regression by adding another control variable, firm reputation (using Fortune 100 reputation data). Because we did not have data on this variable for all the firms in our sample, we had to estimate this model on a reduced

sample size. This variable, however, did not turn out to be significant ($p > .10$).

Discussion, Contributions, Limitations, and Future Research

The goal of this paper is to provide a framework and methodology for assessing the timing, magnitude, and determinants of financial returns from new product preannouncements. Building on the signaling and rational-learning theories, we developed hypotheses on the timing and determinants of abnormal stock market returns attributable to preannouncements. Empirical results on a sample of preannouncements for new software and hardware products show that the financial returns from preannouncements are not significantly different from zero in the short term but are significantly positive in the long term (average of around 13% in one year, or up to product introduction).

Our results also reveal that the more specific the content of a preannouncement, the more likely it is that investors will reward it in the short term. Furthermore, updating investors after the preannouncement leads to higher long-term stock returns. However, this finding does not mean that firms should update the market at any cost, even with unreliable information, because doing so can damage their reputations and potentially diminish their market values. We also uncovered a moderating effect of preannouncement reliability on the relationship between preannouncement specificity and short-term abnormal returns, as well as on that between preannouncement updating and long-term abnormal returns. The relationships are more positive for firms with greater preannouncement reliability.

The findings support the predictions of structural uncertainty theory. Consistent with that theory, we find that the average abnormal returns in the short-term are zero, while the average long-term abnormal returns are positive. This result suggests that investors update their initial beliefs and gradually revise their cash flow expectations as they increase their understanding of the economic effects the preannouncement. Our results show that preannouncement reliability has a higher correlation with the likelihood of introduction than does preannouncement specificity, underscoring investors' lack of structural knowledge at the time of the preannouncement.

Contributions to research

Our research makes important contributions to research on innovation. First, we extend prior research on the relationship between product innovation and firm value. Prior research shows that there are positive financial returns from new product introductions (Chaney, Devinney, and Winer 1991; Pauwels et al. 2004; Sorescu, Chandy, and Prabhu 2003; Srinivasan et al. 2004). Our results suggest that firms can accelerate these returns by preannouncing the new products with specific information, keeping their preannouncement promises, and periodically updating investors.

Second, from a methodological standpoint, we introduce to the marketing literature the calendar-time portfolio methodology for assessing long-term abnormal returns. This technique has been used extensively in finance to measure the long-term returns to the firm from firm events and corporate strategies (see Table 1). It offers a number of desirable features such as unbiased estimates of long-term returns and the ability to control for cross-correlation across events, making it appropriate in a broad range of marketing contexts, including marketing strategy valuation.

Third, our results add new insights to extant research on vaporware. Previous research argues that intentional vaporware can be used to deter entry (Bayus, Jain, and Rao 2001). However, our results suggest that while that is possible, preannouncing vaporware will likely reduce the abnormal returns from future preannouncements. Once a firm is known to have produced vaporware, it may be unable to obtain positive financial returns from future preannouncements.

Therefore, although vaporware can deter entry in the short term, it may be detrimental to firm value in the long term.

Implications for practice

Our results also have several managerial implications. Managers should wait to preannounce their new products until they can be reasonably certain that they can fulfill their promises. They should also wait to preannounce until they have accurate information about the new product, particularly if the firm has failed to deliver on previous preannouncement promises. To realize any short-term abnormal financial returns, managers should also provide investors with truthful information about the new product, including details on its price and introduction date. After preannouncing a new product, a firm may want to periodically inform investors of the status of the new product, so that they and other market participants can update their expectations about the product.

Not all firms appear to have product preannouncement strategies that are consistent with these implications. Consider Apple Computer. While Apple is prudent about not promising much in its preannouncements, its strategy of not frequently updating the market after a preannouncement may be suboptimal. For example, by refusing to reveal the 50 advanced management features that it had planned for its Xserve product after it preannounced the product, Apple missed an opportunity to show how committed it was to the product line. Because Apple did not adequately update the market, many potential customers bought competing products, leading to possibly diminished financial returns for Apple.

Fortune favors the prepared firms. Consistent with previous findings indicating that firms that can accurately forecast the behavior of market participants perform better (Glazer, Steckel, and Winer 1989), our results imply that managers who are confident about a new product should preannounce it, because doing so will result in higher long-term market valuation for their corporations.

The results have prescriptive implications for investors as well. Investors who hold a well-diversified portfolio of stocks that preannounce may earn a rate of return that is modestly above what could be earned in other assets of similar risk.

Limitations and future research

Our research has some limitations that might fruitfully be addressed by future research. First, we examine new product preannouncements in the software and hardware industries. New product preannouncements are also common in such industries as pharmaceuticals and biotechnology. It would be useful to extend our study to these industries as well. Second, it would be interesting to study what happens when information about a firm's product under development leaks to the market before the firm is ready to share this information with the market. Understanding how the market reacts in this case would add useful insights to research on new products.

Whether managers are enthusiastic or reluctant to preannounce, we believe that our research provides them with new insights in making their new product preannouncement decisions. We hope that our research also provides researchers with an impetus to study the long-term financial value of other types of marketing announcements. ■

Acknowledgments

The authors thank participants at the 2005 AMA Doctoral Consortium, the 2005 Marketing Science conference, and seminars at Tulane University and the University of Houston for their helpful comments.

Appendix 1

Measurement of Short-Term Abnormal Returns

The event study method entails computing a separate measure of abnormal returns for each event under study. A narrow time window surrounding the event (typically five days) is utilized in the computation of short-term abnormal returns. During each day in the event window, abnormal returns are computed as the difference between the realized stock returns and the returns that would have obtained had the preannouncement not occurred (the expected returns):

$$AR_{it} = R_{it} - E\{R_{it}|\Omega_{t-1}\} \quad \text{(A1.1)}$$

where R_{it} is the daily return to firm i on day t and $E\{R_{it}|\Omega_{t-1}\}$ is the expected return to firm i on day t given the information set Ω available on day $t-1$. The expected return is generally estimated using either the market model or the market-adjusted model (Brown and Warner 1985).

In the case of the market model, the expected return is given by:

$$E\{R_{it}|\Omega_{t-1}\} = \hat{\alpha} + \hat{\beta}\, R_{mt} \quad \text{(A1.2)}$$

where R_{mt} is the return on the stock market index on day t, and α and β are the parameters estimated from an Ordinary Least Squares (OLS) regression of R_{it} on R_{mt} during the 100 trading days prior to the preannouncement.

In the case of the market-adjusted model, the proxy for expected returns is the average return of the entire stock market, R_{mt}, which can be expressed as:

$$E\{R_{it}|\Omega_{t-1}\} = R_{mt}. \quad \text{(A1.3)}$$

The daily abnormal returns are then cumulated over the five-day event window, resulting in one measure of cumulative abnormal returns *(CAR)* for each event given by:

$$CAR_{i(-2,2)} = \sum_{t=-2}^{2} AR_{it}. \quad \text{(A1.4)}$$

Finally, to obtain a single *CAR* estimate for the whole sample, we compute the cross-sectional average of all event-specific CAR_i measures and assess the statistical significance of the sample mean using the cross-sectional standard error.

Appendix 2

Measurement of Long-term Abnormal Returns Using the Calendar-time Portfolio Methodology

To better understand the limitation of the short-term event study methodology and the construction of calendar-time portfolios, consider the simple example illustrated in Figure A2.1. The figure shows a timeline composed of days and months, in which each month contains exactly 20 trading days. Suppose two firms (A and B) make three preannouncements between them. Firm A makes two preannouncements, one on Day 10 of Month 0, and the other on Day 10 of Month 1. Firm B makes a single preannouncement on Day 10 of Month 2. We refer to these three events as A1, A2, and B1, respectively. For now, assume we are interested in measuring only the short- and long-term average stock market reactions to the three preannouncements.

There are three separate sections in Figure A2.1. At the top of the figure immediately below the timeline, we illustrate the application of the event study methodology for measuring short-term abnormal returns. In the middle section, we illustrate how that same methodology could be employed to measure long-term returns, but we will argue that this method fails to account for the overlap between event windows and is therefore unusable in our study. Instead, we propose the calendar-time portfolio method as a better alternative, and illustrate it in the lower section of the figure.

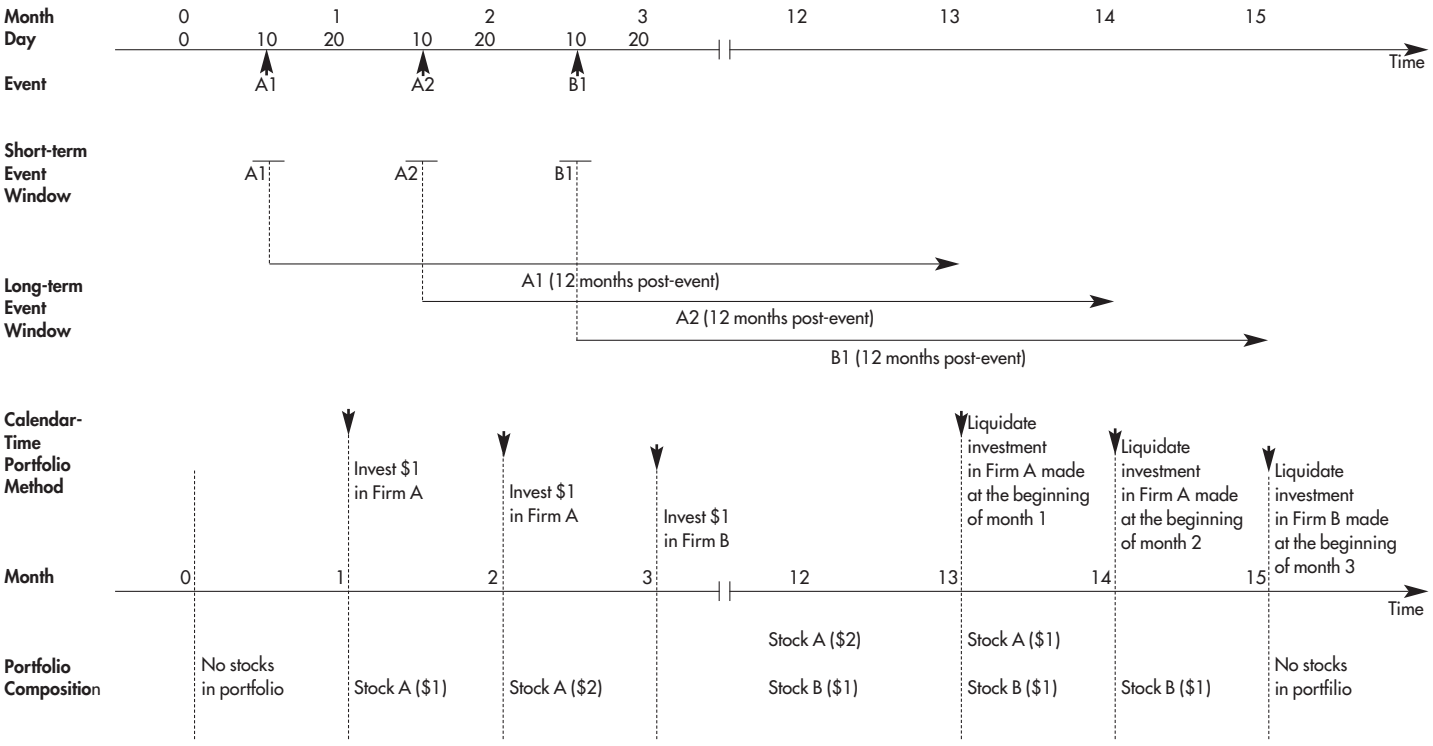
If we wanted to apply the short-term event-study methodology to long-term returns, then for each event we would compute abnormal returns for the 12-month period immediately following the event window, as illustrated in the middle section of Figure A2.1.[1] However, as is apparent from the figure, this would produce a significant overlap between the three event windows, which would lead to significant cross-sectional correlations among the three abnormal-return measures. Not only will the returns that follow Events A1 and A2 be correlated (because, by construction, they share an 11-month common measurement period), but the returns of Event B1 could be correlated with the other two because of potential market- or industrywide events during that period. The cross-sectional correlation will cause the standard errors to be biased toward zero, resulting in inflated t-statistics and misleading statistical inference (Mitchell and Stafford 2000). We note that this cross-sectional correlation is not a major problem for short-term horizons because there is generally very little overlap between short-term event windows, as illustrated at the top of Figure A2.1.

To address the cross-sectional correlation problem, following the finance literature, we lump all events into a single portfolio *before* computing abnormal returns. The calendar-time portfolio method produces a single abnormal return measure for the entire sample, unlike the several, event-specific measures produced by the event study method.

The calendar-time portfolio is a hypothetical portfolio for which we "purchase" stocks after each preannouncement,

Figure A2.1

Short-term Abnormal Returns: Event Study and Calendar-Time Methodologies



holding them for a predetermined time period (in this case, one year).[2] Since the methodology typically uses monthly returns, we add stocks to the portfolio on the first trading day of the month following each event date. The portfolio is equally weighted and rebalanced monthly, meaning that the same dollar amount is invested in each stock at the beginning of each month.

The bottom section of Figure A2.1 illustrates the construction of the calendar-time portfolio. During Month 0 there are no stocks in the portfolio because the first event occurs in the middle of the month. At the beginning of Month 1, we invest one dollar in Stock A to account for the long-term effect of Event A1. Thus, during Month 1, the portfolio's only position is in Stock A, and the number of shares of Stock A is kept constant throughout the month.

To account for the long-term effects of Event A2, we invest another dollar in Stock A at the beginning of Month 2, so during Month 2 the portfolio will hold a two-dollar position in Stock A.[3] To account for the effects of B1 we invest one dollar in Stock B at the beginning of Month 3. The portfolio now contains a two-dollar position in Stock A and a one-dollar position in Stock B, and these positions are maintained during the next nine months as there are no new preannouncement events. At the beginning of Month 13, we liquidate the first one-dollar position in Stock A to reflect the end of the 12-month period following Event A1. The following month, we liquidate the second one-dollar position in Stock A, leaving only a one-dollar position in Stock B in the portfolio. Finally, when the one-year measurement period associated with Event B1 is over (at the beginning of Month 15), we liquidate the remaining stock, leaving no holdings in the portfolio. After constructing the calendar-time portfolio, we measure its abnormal returns using either the three-factor or the four-factor model outlined earlier in the paper.

As described in the main body of the paper, if we wish to find out why some preannouncements generate better returns than others—that is, if we wish to measure the impact of an independent variable on portfolio-level returns—we must divide our events into two groups based on the value of that variable and form a calendar-time portfolio for each event group. The first group contains all events whose values for the independent variable are at least equal to the sample median. The second group contains below-median events. By comparing the intercepts from the two groups we can determine the effect of the independent variable on long-term abnormal returns to preannouncements.

Appendix Notes

1. Returns could be either cumulated or compounded during this post-event window. Either way, the short-

term-return event-study method would lead to misleading inferences because of the overlap (or cross-sectional correlation) problem.

2. The only exceptions to the one-year holding period are the 37 observations for which we are able to identify an exact introduction date and the additional 41 observations for which we have an approximate date of introduction. In both those cases, firms are kept in the portfolio only until the date of introduction if introduction occurs within the one-year window; otherwise, firms are kept for the full year like the rest of the sample. We use this method to ensure that we do not capture abnormal returns that are due to the performance of the product itself (after the introduction).

3. We also rebalance the portfolio at the beginning of Month 2. That is, we cash our gains (or inject additional funds in case of losses) to ensure that the value of the investment related to event A1 is kept at one dollar at the beginning of the month. This results in the portfolio being equally weighted.

Notes

1. For expositional ease, we use the terms *consumer* and *customer* interchangeably throughout the paper.

2. Mishra and Bhabra (2002) found small positive short-term stock market returns from a sample of preannouncements reported in the *Wall Street Journal*, arguably a sample of relatively more important preannouncements.

3. Strictly speaking, the term "firm value" refers to the sum of the market values of the firm's debt and equity. When there are changes in firm value, they are usually captured by the change in the market value of equity (shareholder value) because debt holders usually receive a fixed rate of interest on their investment. The only exception occurs for firms in financial distress (i.e., those whose market value of equity is close to zero). For those firms, changes in firm value are captured by changes in the market value of debt. Because our research does not focus on firms in financial distress, we use the terms *firm value* and *shareholder value* interchangeably.

4. The rationality assumption has been relaxed in the behavioral finance literature (e.g., Barber and Odean 2000, 2001; Shefrin 2005). Specifically, this literature assumes that investors make decisions using non-Bayesian updating schemes and value functions that are different from the expected-utility paradigm. We do not follow the behavioral finance approach in this paper since we have no a priori expectations about any behavioral biases that may arise when investors value preannouncements.

5. The effect of preannouncement updating on long-term abnormal returns can also be inferred from game theoretic models of signaling. When an informed agent (in our context, the preannouncing firm) sends a signal under conditions of information asymmetry, market participants—competitors, consumers, channel members and investors—assign a probability distribution to the agent's future actions. This probability distribution corresponds to a Nash equilibrium, commonly referred to as sequential equilibrium (e.g., Cho and Kreps 1987). A sequential equilibrium suggests that a different optimal action corresponds to each different belief that market participants may hold about a signal. As market participants' understanding of the consequences of the product preannouncement improve, and as their beliefs change, so do their optimal actions, resulting in a new equilibrium. These changes in beliefs and actions and their corresponding sequential equilibrium will translate into gradual changes in the stock returns of the preannouncing firm.

6. To the extent that preannouncement reliability has a direct effect on firm value, we expect this effect to be incorporated in the short-term abnormal returns, because all information about reliability is available at the time of the preannouncement. We do not, therefore, expect preannouncement reliability to have a direct effect on long-term returns.

7. Studies that examined the effects of various firm announcements on market value used information that appeared in the *Wall Street Journal* (e.g., Chaney, Devinney, and Winer 1991; Tellis and Johnson 2004). We extended the source list to other publications to minimize any potential bias toward radical innovations; our assumption was that a prestigious publication such as the *Wall Street Journal* might not typically cover minor innovations on the grounds that those innovations are not newsworthy.

8. This approach is consistent with Hendricks and Singhal (1997), who searched for product delay announcements in the Dow Jones News Service using the key words *product introduction, delay, postpone,* and *move*.

9. Because the number of firms in the calendar-time portfolio changes in each month, we estimate Equation 2 using the Weighted Least Squares (WLS) method (in which the weighting vector is the square root of the number of firms with preannouncements in the relevant calendar month), to provide greater weight to the calendar months in which the portfolio contains more firms.

10. Because the number of subportfolios increases exponentially with the number of independent variables, it would be impractical to deal with three or more independent variables, as that would dramatically reduce the number of observations in each portfolio, causing a significant loss of power in the empirical tests.

11. The momentum factor is constructed monthly as the size-adjusted difference between the rate of returns of a portfolio of stocks whose return performance was in the

top 30% during the previous year and the rate of returns for a portfolio of stocks whose return performance was in the bottom 30% during the previous year. Additional details are available at the following page on Ken French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor.html.

12. If more than one relevant announcement was made (by the firm or any press source) in the two-day window following the preannouncement, we used the one with the most detailed content. We did so while also verifying, through extensive LexisNexis searches, that no other mentions of the preannounced product were made prior to the date we had determined to be the preannouncement date. Thus, we ensure that the five-day window over which we measure the short-term returns captures the first mention of the preannouncement and as many preannouncement details as were publicly available to investors.

13. We subsequently report the results of robustness tests using reliability measures based on a weighted scheme that uses the last two and three preannouncements, while weighting the last preannouncement more than previous ones. Using such a measure, however, severely reduces our sample size because many firms do not preannounce multiple times.

14. For instance, Chaney, Devinney, and Winer (1991) obtain R-squares ranging from 1% to 10% when investigating the effect of new product introductions on short-term abnormal returns.

15. The calendar-time portfolio abnormal returns account for firm size, risk, and momentum by design, but do not account for the other control variables included in the short-term regression: innovativeness and product category. However, since those control variables did not significantly impact the short-term abnormal returns—despite the relevant information being available at the time of the preannouncement—we do not expect them to impact the long-term abnormal returns.

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Report No. 06-116