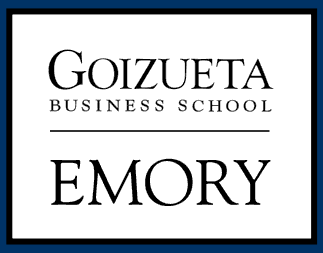

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New Product Preannouncements and Shareholder Value: Don't Make Promises You Can't Keep

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

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

Abstract

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, we 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, we 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.

Innovation is widely recognized as the cornerstone of firm growth and a primary source of competitive advantage. Firms, particularly those in technology markets, constantly strive to bring new product innovations fast to market. 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, the financial rewards to new product introductions are positive and significant (Bayus, Erickson, and Jacobson 2003; Chaney, Devinney, and Winer 1991; Pauwels et al. 2004). Therefore, a firm could potentially accelerate these financial gains by preannouncing the new product.

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 could 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 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 $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. Although these signals are

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

theorized to convey favorable information about the firm's future prospects, there is little or no empirical evidence that they translate into financial returns for stockholders.[2] Perhaps, the litmus test for the decision to preannounce is a determination of how preannouncements affect firm and shareholder value in both the short-term and the long-term. Such a determination is in line with an increased interest in understanding the effects of marketing activities and market based assets on shareholder value (e.g., Srivastava, Fahey, and Shervani 1998, 1999). Furthermore, 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 versus 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 are important to senior management for making appropriate decisions on preannouncements and the timing of product launches.

To address these questions, we develop relevant hypotheses based on the signaling and structural uncertainty theories, and 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 product preannouncements, investigate the determinants of these abnormal returns, and empirically test our hypotheses using data from the computer hardware and software industries. For the long-term returns model, we use the *calendar-time portfolio* methodology (e.g., Asquith, Pathak, and Ritter 2005; Gompers, Ishii, and Metrick 2003; Lyon, Barber, and Tsai 1999; Mitchell and Stafford 2000; Womak 1996), outlining its underpinnings and advantages.

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[2] Mishra and Bhabra (2002) found small positive short-term stock market returns to a sample of preannouncements reported in the *Wall Street Journal*.

[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 under financial distress (i.e., whose market value of equity is close to zero), in which case, changes in firm value are mostly captured by changes in the market value of debt. Because firms under financial distress are not the focus of our research, we use the terms, "firm value" and "shareholder value" interchangeably.

Theory and Hypotheses

New Product Preannouncements as Market Signals

In a marketing context, a preannouncement has been defined as a formal and deliberate communication from a firm before it undertakes a particular marketing action, such as the introduction of a new product (e.g. Bayus, Jain and Rao 2001; Eliashberg and Robertson 1988). Because it *precedes* the occurrence of a corporate event, it has been conceptualized as a market signal directed at influencing the behavior of one or more stakeholders of the firm (Eliashberg and Robertson 1988; Robertson, Eliashberg, and Rymon 1995). These stakeholders include customers, competitors, channel members, and investors, who evaluate the expected reaction of the other market participants and appropriately adjust the firm's stock market value.

We focus on *new product preannouncement*s. Consistent with previous literature, we define a new product preannouncement as an announcement made by the firm about the market availability of a new product from the firm at a future date (e.g., Bayus, Jain, and Rao 2001; Brokoff and Rao 1993; Eliashberg and Robertson 1988; Wu, Balasubramanian, and Mahajan 2004). Consistent with previous studies, we do not restrict our definition based on the degree of completion of the product or its expected time to introduction, as long as the introduction of the product is not imminent. New product preannouncements have been widely observed in many industries, but they appear to be more prevalent in high-tech industries, where speed of entry is particularly important (Bayus, Jain, and Rao 2001; Schatzel, Calantone, and Droge 2001; Wu, Balasubramanian, and Mahajan 2004).

Uncertainty and Information Asymmetry Associated with New Product Preannouncements

The value of a product preannouncement is intangible and is determined primarily by investors' perceived reactions of the other market participants. 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 the firm's market value. This effect is captured by the net present value (NPV) of the incremental future cash flows related to 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.

There is significant uncertainty and information asymmetry about the ultimate net present value of the preannouncement. The preannouncing firm has the latitude to keep some of the information about its new product private. In contrast, investors have to find answers to a slew of questions about the outlook of the preannounced product, using mainly the information released by the firm. Will the new product be introduced as promised? Will customers' purchasing behavior be impacted by the preannouncement? How will competitors react? Has the financial risk of the firm changed (Devinney 1992)? Although the sales of preannounced products can be forecasted to some extent (Brockhoff and Rao 1993), the incremental cash flows and the associated risks are not directly observable and easily predictable at the time of preannouncement. Managers and investors have to estimate these cash flows based on their expectations of various market participants' future reactions to the preannouncement.[4] Thus, 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 present relevant theory from signaling and rational learning, and introduce the appropriate metrics to capture the net present value of the preannouncement.

Timing and Determinants of Abnormal Returns to Preannouncements

Traditionally, changes in firm value resulting from signals carrying financial information have been measured using either stock market reactions or changes in Tobin's q ratio (Srinivasan and Bharadwaj

[4] Throughout the paper, we distinguish between "risk" and "uncertainty" based on the framework first proposed by Knight (1921). "Risk" refers to a situation related to an event whose outcome is not deterministic, but is governed by a known probability distribution. "Uncertainty," however, refers to a situation where even the probability distribution of the outcome is unknown.

2003). 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 the 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 particular announcement. The effects of customer satisfaction (Anderson, Fornell, and Mazvancheryl 2004), and branding activities (Rao, Agarwal, and Dahlhoff 2004) have been analyzed using Tobin's q as the metric for firm value.

In the case of corporate announcements (including new product preannouncements), stock market abnormal returns are a particularly appropriate metric of financial performance 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 announcement (e.g., Brown and Warner 1985), or a *longer-term* horizon that extends beyond the announcement date (e.g., Kothari and Warner 2005). We discuss below why and how returns to preannouncements accrue both in the short- and in the long-term.

Short- Term Effects of Preannouncements on Firm Value

Agency theory (e.g., Bergen, Dutta, and Walker 1992; Eisenhardt 1989) provides a theoretical framework for studying the effect of new product preannouncements on investor assessment of firm performance. The shareholders and investors in the preannouncing firm (the principals) depend on the firm's management (the agent) to run the firm in such a way that maximizes the value of their shares. Investors observe how the management carries out the contract with the shareholders, and adjust stock prices based on their assessment of how well the management is performing.

The preannouncement of a new product that is not yet available presents a classic information asymmetry problem that could lead to adverse selection. Adverse selection is a problem in agency theory whereby the agent most keen to do business with the principal is also most likely to produce an adverse outcome for the principal. The problem occurs because of information asymmetry between the principal and the agent, that is, the agent generally has some private information that the principal can only infer

based on the agent's signal. In a new product preannouncement context, true information about the development stage of the new product is known only to the managers, not to the investors. If investors are unable to observe the true development stage of the new product, they could infer that firms will likely preannounce when the management knows that the product is a potential flop (Akerlof 1970; Kirmani and Rao 2000; Mishra, Heide, and Cort 1998). This situation is similar to that in Akerlof's (1970) model, where used car buyers (the principals) cannot observe product quality, resulting in a market where only lemons trade.

The management of a firm with a potentially successful new product can mitigate the adverse selection problem by providing a credible signal of the true product development stage (i.e., how close the new product is to market introduction). According to signaling theory (Spence 1973), such a signal can create a separating equilibrium (a market outcome in which the firm with a new product that is closer to launch will credibly signal that private information, while the firm with a new product that is farther from introduction will refrain from sending the signal), if the cost of the preannouncement signal is higher for firms whose products are farther from introduction than it is for firms whose products are closer to launch.[5] We propose that the *specificity* of the preannouncement can act as a credible signal of the true product development stage.

We define *preannouncement specificity* as the amount of information provided in the preannouncement that is intended to reduce investor uncertainty associated with the forthcoming product. For the signal to be credible, it must offer some irreversible information or place some constraints on the firm that would make it costly for the firm to renege. Moreover, the cost must be higher for firms that are behind in the developmental process. 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 (Bayus, Jain, and Rao 2001). Alternatively, details regarding the price of the preannounced product may suggest that the firm already has

[5] In Spence's model, the level of education acts as a signal about the unobserved employee productivity, and each employee rationally chooses its own education level based on a tradeoff between the benefits resulting from higher education (higher wages) and the additional effort required to acquire it. Under certain standard conditions, the signal generates a sustainable separating equilibrium: those with high levels of productivity will acquire the minimum amount of education necessary to separate themselves from those with low productivity, who will remain uneducated, and employers can confidently infer that educated employees have higher productivity.

an advanced product version that might have been tested for pricing. The more specific the preannouncement, the fewer degrees of freedom the firm has with respect to the timing and manner of new product introduction, and the greater the probability of defaulting on the original promise.

Price and time to introduction are thus key indicators that will be factored in the market participants' decision to wait for the preannounced product. Recanting on such details will reduce the firm's ability to influence these stakeholders in the future (Prabhu and Stewart 2001), erode the firm's reputation (Roberts and Dowling 2002), and expose the firm to serious legal liabilities with potentially large monetary penalties (Bayus, Jain and Rao 2001). Therefore, we expect that specificity will create a separating equilibrium in which firms that are ahead of the product development curve use more specific preannouncements, while those that are behind the curve use less specific preannouncements.[6]

Upon the first public release of the preannouncement rational investors will recognize the role of specificity in creating a separating equilibrium, and will immediately adjust the firm's stock prices accordingly.[7] We, therefore, advance the following hypothesis:

H_1: The greater the new product preannouncement specificity, the higher the short-term abnormal returns to the preannouncement.

In addition to preannouncement specificity, the reliability of the firm making the preannouncement may influence investors' reactions to the new product preannouncement. We define the *preannouncement reliability* of a firm as the extent to which the firm has fulfilled claims it made in its previous product preannouncements. Preannouncement reliability can be viewed as a component of firm reputation, which is central to successful firm performance (Holmstrom 1979; Wilson 1985). Firms with high reputation have been shown to enjoy numerous advantages. For

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[6] The role played by *specificity* is similar to that played by the warranty in Akerlof's (1970) model. By choosing to sell the lemons "as is," but offering a warranty on plumes, the salesman is signaling the unobserved car quality. The signal is credible and results in a separating equilibrium because it would be costly for the salesman to cheat and offer a warranty on a lemon. In addition, "specificity" in our paper can also be viewed as analogous to the level of education in Spence's model. In his model, education is less costly (in terms of effort) for productive workers, allowing employers to use the observed level of education as a credible signal to separate workers based on the unobserved productivity level. Similarly, we argue that specificity is less costly for firms that are ahead in product development, allowing investors to use it as a credible signal that separates firms on the unobservable true product development stage.

[7] Similar arguments have been used in the finance literature to demonstrate the signaling effect of various corporate events. For instance, John and Williams (1985) show that firms use the strength of the dividend (i.e., the amount of dividend divided by the share price) to signal future favorable prospects. Vermaelen (1981) shows that firms use stock repurchases to signal the management's favorable private information, and this signal results in a 15% abnormal stock return surrounding the day of the announcement. Eckbo (1986) shows that the issuance of convertible debt signals management's unfavorable private information and this signal results in a -1.25% abnormal stock return surrounding the day of the announcement.

instance, favorable reputations may enable firms to inhibit the mobility of their rivals (Fombrun and Shanley 1990), have better access to capital markets (Beatty and Ritter 1986), charge premium prices (Milgrom and Roberts 1986), and sustain superior profit outcomes over time (Roberts and Dowling 2002). Thus, the costs of a loss of reputation are greater for high-reputation firms than they are for low-reputation firms. In our context, the cost of defaulting on the preannouncement promises should be higher for firms with greater preannouncement reliability.

Investors will likely view the preannouncements of firms that have good records of delivering on their past preannouncements more favorably than those of firms that do not have good records of delivering on their promises. They face less uncertainty in estimating the future cash flows associated with the preannounced products of firms having greater preannouncement reliability than those of other firms. Therefore, we hypothesize that:

H_2: The greater the product preannouncement reliability of the preannouncing firm, the higher the short-term abnormal returns to the product preannouncement.

The effect of specificity on short-term abnormal returns is also likely to depend on the reliability of the preannouncing firm. Market participants, including investors and customers, could view a firm which 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. While specificity potentially reduces the adverse selection problem, reliability magnifies the costs associated with specificity, and can diminish the perceived adverse selection problem even further (Mishra, Heide, and Cort 1998). Indeed, recanting on specific preannouncement information would be very costly for high reliability firms, which enjoy the advantages that reputation brings along (e.g., Fombrun and Shanley 1990). Such firms would not risk losing these advantages, which further increases the likelihood that they would introduce the preannounced product as promised.

Alternatively, if all firms had low levels of preannouncement reliability, there may not be a significant difference between the high specificity signals issued by firms that are ahead in the new product development process and those issued by firms that are behind because both types of firms would not have

too much to lose. Thus, for low levels of preannouncement reliability, we would expect a pooling equilibrium in which investors view the preannouncements from both types of firms as equally credible. In sum, the higher the reliability the more likely that specificity will convey a meaningful signal and produce a separating equilibrium. Hence, we hypothesize that:

H_3: 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

We have argued that because adverse selection theory offers investors a basis for assessing the informational content of preannouncements, its predictions will be incorporated into stock prices around the event date, justifying the use of short-term abnormal returns as an appropriate measure for change in firm value. However, the impact of preannouncements on firm value is not limited to the effects predicted by the adverse selection theory. During the time period that follows the preannouncement, the firm learns more about the development of the preannounced product. As this additional information becomes available, the firm may chose to disseminate it to the public and the informational content of these updates may have an additional effect of firm value.

We argue that this effect will not be captured by the short-term stock returns measured around the preannouncement date, but by the *long-term* returns, measured after the preannouncement. This is because the use of short-term returns implicitly assumes that investors *immediately* understand *all* the financial consequences of corporate announcements, including those related to future competitor responses and other future events about which there is a high level of initial uncertainty. This assumption of a "complete and immediate investor response" is a fundamental premise of the "efficient market" (or "rational expectations") paradigm. But is it a reasonable assumption in our context? An assessment of the two fundamental assumptions of the "efficient markets" paradigm and their implications for new product preannouncements is warranted.

The first assumption of the "efficient market theory" is that economic agents (or investors) are *rational*. This implies that they use all publicly available information, instantly update their posterior

probabilities according to Bayes' rule, and always make decisions that are consistent with the expected utility theory. In the context of preannouncements, this assumption implies that investors process the totality of the information conveyed by the preannouncement (along with all its strategic consequences) in a deliberate and rational manner, and make optimal decisions without any behavioral biases.[8]

The second assumption is that investors are endowed with complete *structural knowledge* of the economy. This assumption means that they are presumed to have a complete understanding of the "laws of nature" that govern the relation between various economic variables (e.g., Friedman 1979; Kurz 1994). For preannouncements, this assumption implies that investors completely understand not only the supply, demand, and equilibrium price for the upcoming product, but also the manner in which the responses of market participants will affect the equilibrium outcome of this complex dynamic system.

If investors were indeed endowed with structural knowledge, the entire effect of a preannouncement would be incorporated by the stock market over a short-term horizon. But the structural knowledge assumption seems particularly strong in the case of new product preannouncements. If investors are so clairvoyant, why would product delays be penalized by investors, who should have expected them 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 investors' structural knowledge assumption of the "efficient market theory," 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 their

[8] The rationality assumption has been relaxed in the behavioral finance literature (e.g., Odean and Barber 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.

economic outcomes. This process indirectly enables investors to learn about the probability distribution function of the firm's future cashflows, which, in turn, results in a change in firm value. 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. In sum, 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 to new product preannouncements. 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 and risk of incremental future cash flows, and understand the equilibrium response strategy that may be adopted by the firm's stakeholders.

As argued earlier, we believe that for investors to learn 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 to the market. Every time the firm releases new information about the preannounced product (such as a revised date of introduction, price or product features), it reduces the uncertainty surrounding it (Jacoby et al. 1994). If the update does not provide any new information, then investors might not take the next 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 post-preannouncement information flow the more likely it is that the preannouncement is better understood and viewed as more credible. As a result, investors gain the structural knowledge necessary to better estimate the future cash flows and the risk levels associated with the preannouncement, and stock prices gradually adjust to reflect this new knowledge.

The amount of preannouncement updating can also reduce the moral hazard problem that investors as principals face after the management (agent) makes the preannouncement (Holstrom 1979; Mishra, Heide and Cort 1998). If managers believe that the preannouncement has attained its purpose in influencing market participants' behavior, do they still have an incentive to deliver on the preannouncement promises? In addition to safeguarding reputation, the incentive comes from the firm's desire to fully realize the financial potential of the preannouncement. Indeed, the moral hazard problem will likely cause investors to significantly discount the value of the preannouncement at the time it is made. This is because uncertainty increases the discount rate to a level above and beyond of what is a fair compensation for risk (Merton 1987; Varian 1985). Thus, in the presence of uncertainty related to future moral hazard, investors will initially penalize the preannouncing firms by requiring a higher than normal rate of return on their stock, resulting in lower than normal stock prices on the preannouncement date.

However, every time a firm updates investors about the prospects of the forthcoming product, moral hazard is mitigated and investors' uncertainty is reduced accordingly. Over time, this resolution of uncertainty will be reflected in an accrual of long-term stock returns to the preannouncing firm. These arguments yield H_4.

H_4: The greater the updating of a new product preannouncement, the greater the long-term abnormal returns following 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 coming from firms with high reliability. Thus, we expect that the effect of preannouncement updating on long-term stock returns will be moderated by the reliability of the preannouncing firm, such that updating information will be deemed more meaningful if backed by strong preannouncement reliability. Indeed, a reliable firm has a high incentive to keep the preannouncement current *only* when it observes favorable private information about the preannounced product's development process. Doing otherwise would result in significant reputation costs that may well exceed the potential benefits associated with updating. That is, a high-reliability firm has less incentives to "cheat" by providing "false" updates than does a low-reliability firm. As a result, investors may not respond as positively to the updates made by firms with low preannouncement reliability, which are unlikely to convey meaningful

information about the product's ultimate introduction prospects (Riley 2001). This reasoning leads to our next hypothesis.[9]

H_5: Preannouncement reliability of the preannouncing firm moderates the relationship between preannouncement updating and the long-term stock returns to 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 test our hypotheses in a high tech context comprising the software and hardware industries. Data from these industries have been used in the context of new product introductions (Bayus, Erickson, and Jacobson 2003) and preannouncements (Bayus, Jain, and Rao 2001). 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 identified two publications, *Computerworld* and *Newsbytes,* as potential sources of software and hardware new products that could have been preannounced. Together, these publications covered a significant portion of new products introduced in the software and hardware industries during the period of study.[10] We searched these two publications for all articles published between 1984 and 2000 that contained the words "launch", "announce", "beta", and "introduce."[11] We scanned several thousand articles to create a list of products that were either preannounced or announced at

[9] 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, therefore, do not expect preannouncement reliability to have a direct effect on long-term returns.

[10] Computerworld and Newsbytes are two of the longest-running magazines in the computer business and the only industry-specific publications that were featured in Lexis-Nexis for the entire period we study

[11] 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."

introduction. In the second step of the data collection, we sought to identify the true preannouncements among the new products identified through the first step. Specifically, we searched, across all news sources available in Lexis-Nexis (including news wires), for the first date the product was announced in the marketplace. If this first date coincided with, or followed the introduction date, we did not retain the product in our sample, given our focus on preannouncements. We classified a new product-related announcement as a preannouncement if the firm stated that the product will be introduced at a later date, where the introduction date was either unspecified or specified to follow the preannouncement by at least a week. We conducted a broad search to retrieve an accurate preannouncement date, which is the earliest date when information about the product became publicly available, and necessarily corresponds to the date around which the short-term stock market reaction to the preannouncement takes place. We further eliminated preannouncements that did not belong to publicly traded firms and product introduction announcements that were not preceded by a preannouncement. We did not include in our sample any preannouncements where the firm had stated that the product was ready to ship, regardless of the time lag between the preannouncement date and the stated expected introduction date. 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 preannouncements that offered an expected time of introduction.

In addition to gathering preannouncement information, we also collected information on the ultimate introduction of the preannounced products in our sample. We conducted Lexis-Nexis searches across all available news sources to retrieve either introduction announcements made by the firms themselves 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. In

addition, we were able to retrieve the approximate introduction dates for another 41 products by using information from various news sources which mentioned that the product was already on the market. The average time from preannouncement to introduction for these products is 156 days.

We obtained stock returns 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 announcement day. 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).

< Table 1 about here >

Methods to Measure Short- and Long-Term Abnormal Returns

The methodologies we use for measuring short- and long-term abnormal returns are strikingly different from each other. Both methods entail a comparison of realized stock returns with those that would have occurred if the event had not taken place (i.e., the "expected" returns), but the similarities stop here. For short-term returns, a simple *event study* methodology is generally appropriate (Brown and Warner 1985). Since 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), we briefly outline the computation of the cumulative abnormal returns (CAR), our measure of short-term performance, in Appendix 1.

The event study methodology, however, has a major limitation which makes it inappropriate for measuring long-term abnormal returns to events that are clustered in time: the inability to properly account for cross-sectional dependency (or overlap) between events that could lead to misleading statistical inferences (Barber and Lyon 1997; Kothari and Warner 2005; Mitchell and Stafford 2000). To appropriately measure long-term returns, we use a new methodology from the finance literature: the *calendar-time portfolio* analysis. In this method, we first construct a portfolio (called "calendar-time portfolio") to include all stocks of the preannouncing firms and then measure the long-term abnormal returns to that portfolio. We present details on portfolio construction in Appendix 2.

After constructing the calendar-time portfolio, we measure 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 the CAPM (Fama and French 1993), posits that the expected rate of return of a portfolio is a function of the 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 regress the raw returns of the calendar-time portfolio on the market, size, and book-to-market factors as follows:

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

where R_{pt} is the rate of return of the calendar-time portfolio p during month t, and R_{ft} is the rate of return on a US Treasury bond f during the same period. R_{mt} is the average rate of return of all stocks trading on the US stock market, SMB_t is the difference between the rate of returns of small and big firm stocks (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, α is the model intercept, and β, γ, and δ are parameter loadings of the three factors used in the model.[12]

[12] 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.

If the portfolio's post-event stock performance is "normal" given its market risk, size, and book-to-market characteristics, the variation in post-event returns R_{pt} is entirely captured 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 expositional ease, 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 (Lyon, Barber, and Tsai 1999, p. 193, 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 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 must first be 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 relationships between abnormal returns and event-specific independent variables. Therefore, to test H_4, we divide our events into two groups based on the values of preannouncement updating, and form a calendar-time portfolio for each 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 updating and reliability as required in H_5, we classify the events into four sub-groups, representing the intersection of the two sub-groups based on updating and the two sub-groups formed independently based on reliability. For each sub-group, we estimate a separate

calendar-time portfolio and obtain a separate regression intercept. To test H_5, we examine all pairwise differences among the four portfolio intercepts.[13]

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 due to past firm 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 which is observed when a firm's stock performance during the past year continues during the subsequent 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 that these high stock returns would continue over the next year *even in the absence of a preannouncement*. Thus, the three-factor abnormal returns could capture only this momentum effect instead of the change in firm value associated with the preannouncement. To eliminate this possibility, we control for momentum by including a fourth factor in Equation (2). Specifically, we compute an alternative measure of abnormal returns using the following model:

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

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 loading on the momentum factor, η_{pt} is the error term, and the rest of the terms are as defined in Equation (2).[14] The new intercept, α'_p, provides a measure of monthly abnormal stock returns that control for the firm's prior performance.

[13] Because the number of sub-portfolios 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.

[14] 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 Ken French's website, http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor.html.

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 instead of other idiosyncratic events that may occur during the measurement window. Consistent with studies in the finance literature, we assume that the unexpected informational content of these other events has a mean equal to zero (Kothari and Warner 2005). 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 Lyon, Barber and Tsai (1999) and by Mitchell and Stafford (2000). These authors show 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. Their results suggest that the informational content 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 content analyzed the preannouncements to identify the extent to which they provide 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 or an expected time to introduction. Because 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, which has been theorized to act as a credible signal about product development costs (Bayus, Jain and Rao 2001). As indicated earlier in the description of the calendar-time portfolios, we must create a dichotomous variable of preannouncement specificity and use it to separate events into two portfolios based on high and low levels of specificity. We operationalize the specificity of each preannouncement using a dummy variable that equals unity if either a time to introduction, or a price for the product is provided, and zero otherwise.[15]

[15] If there were two or more relevant announcements 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 Lexis-Nexis

Product Preannouncement Reliability. 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 which equals one if the firm delivered its most recently preannounced product on time, and zero otherwise. 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, the last preannouncement, which contains the most current information, is the one they will weight more heavily.[16]

To reduce or eliminate the possibility of left censoring in the reliability variable, we conducted an additional round of searches outside our sample period (prior to 1984) to retrieve any preannouncements that preceded our sample. Specifically, we went back three years from the date of any preannouncement made during 1984-1986 and conducted a comprehensive search in Lexis-Nexis to identify any out-of-sample preannouncements, as well as information regarding their ultimate introduction, using the same procedure as in the original sample. In all, we were able to compute a reliability measure for 341 of the 419 sample preannouncements.

*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. Firms can communicate with its stakeholders through different avenues. For instance, firms can disclose proposed new products privately to their suppliers, or demonstrate beta versions of the product at trade shows. We use the public release of information relevant to the preannouncement as a proxy for this information flow. While the firm may use other channels of communication, the updating of information in those channels is likely to be correlated with the updating of information released through public channels. To measure the public flow of preannouncement-specific information, we use the number of press releases or news wires

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searches, that no other mentions of the preannounced product were made prior to the date we use as 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. In addition, we explored two other potential measures of specificity. First, we collected data on the geographical scope of the media vehicle through which the announcement was made (national vs. regional). Only three of the 419 preannouncements were made in the regional media. Second, we considered patent applications. We spent considerable time studying patent data available on the Delphion database, but concluded that patents are not readily traceable to specific products. Investors would therefore have the same difficulty in using patent information as a measure of specificity of the new product preannouncement.

[16] We subsequently report the results to robustness tests using reliability measures based on a weighted scheme that uses the past two and three preannouncements, while weighting the last preannouncement more than previous ones. Using such a measure, however, imposes a drastic reduction in sample size because many firms in the sample did not preannounce multiple times.

occurring after the preannouncement, and containing information about the preannounced product. We considered only updates that were released during the first year after the preannouncement, or until the product was introduced (whichever occurred first). We obtain these updates from the Lexis-Nexis database, and classify as an update any press release or news wire in which the preannounced product is mentioned, even if it is not the main focus of the news item. Since the median number of updates for the preannouncements in our sample equals one, we construct 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 contain negative information such as announcements of delays in product shipment. The very small number of negative 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 non-negative 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 "any news" about the preannounced product.

Additional Independent 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 has 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 content analyzed the preannouncements to assess the innovativeness claims made by preannouncing firms. Based on a list of key words (e.g., "major breakthrough", "shattered industry barriers", "the product is an industry first"), we classified the products as radical or incremental. We operationalize this variable as a dummy that takes the value zero if the claimed innovativeness is incremental, and one if it is radical.

Product Category (Software/Hardware). To control for differences in abnormal returns that may accrue due to differences in market potential across product categories, we created a dummy variable which takes

the value one if the preannounced product is a hardware product, and zero if it is a software product. Because the preannouncements which contained both software and hardware products were only a few and generally focused on the hardware product, we combined them with the hardware preannouncements.

Firm Size. Firm size is a potential determinant of the financial returns to 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 abnormal returns. Consistent with previous research, we use the log of firm's assets as a measure of size.

Spokesperson. The spokesperson making the new product preannouncement could potentially signal its importance, as well as its likelihood of introduction. The costs of losing credibility in the event of non-delivery arguably increase with the rank of the spokesperson. Consequently, preannouncements made by the CEO or members of the senior management of the firm could be perceived as more committed and credible than those made by lower-ranked employees. We operationalize this variable as a dummy variable taking the value one if the preannouncement is made by the CEO or a member of the top management team and zero otherwise.

Table 2 provides a summary of our operationalization of the independent, dependent and control variables, along with the source of data for each variable.

< Table 2 about here >

Results

Main Results

Table 3 presents mean values and correlation matrix of the short-term abnormal returns to new product preannouncements, their determinants, and other independent variables, and the preannouncement updating variable. On average, the short-term returns are positive, but not significantly different from zero at the 10% significance level. Thus, despite the 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 average short-term return conceals a large variance (approximately 8%). This

result indicates that there are indeed preannouncements that generate significantly positive short-term abnormal returns, and highlights the importance of identifying their determinants. None of the correlations among the variables of interest are very high, suggesting that multicollinearity is not an issue in the data.

< Table 3 about here >

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 H_1. The coefficient associated with the specificity variable is approximately 1.8% in both models, and is statistically significant ($p < .05$ or better). Thus, consistent with our hypothesis, new product preannouncements with high specificity are perceived as credible signals of the unobserved product development process, leading to an increase in firm value.

< Table 4 about here >

The effect of preannouncement reliability on short-term abnormal returns, however, is not significant ($p > .10$). Thus, H_2 is not supported. A possible explanation is that the specific details in a preannouncement might 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 of the firm may not have a direct effect on firm value.

Our results support H_3. The interaction between preannouncement specificity and reliability has a positive effect on short-term returns ($p < .01$), suggesting that specificity is more likely to create a separating equilibrium in the presence of high reliability. Because preannouncement reliability does not have a direct significant impact on the short-term abnormal returns, its effect can be interpreted as *moderating* the relationship between preannouncement specificity and short-term abnormal returns, consistent with H_3. 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 additional independent variables on short-term abnormal returns reveals that the claimed innovativeness of the preannounced products does not significantly impact short-

term abnormal returns, although its effect is in the positive direction as expected. This result suggests that investors may view a firm's self-proclaimed radical innovation with some skepticism. Alternatively, it may also reflect a low level of statistical power, since only about 5% of the preannounced products are touted as radical. Consistent with previous research that found changes in firm value to be negatively related to firm dominance (Srinivasan et al. 2004), we find that firm size has a negative impact on the short-term abnormal returns ($p < .05$). Intuitively, because 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 in response to events such as preannouncements. The coefficient of the product category variable is not significant either ($p > .10$), suggesting that product category does not materially change the market perception of the credibility of the preannouncement. The coefficient of the spokesperson variable is positive (as expected), but does not attain statistical significance ($p > .10$). We acknowledge, however, that the effect of the spokesperson or other control variables could be specific to the data or the industry. Finally, the percentage of variation explained by the regression model is in line with those from other studies of short-term abnormal returns around corporate events.[17]

Because the average short-term abnormal returns are not significantly different from zero, and because positive abnormal returns are observed for preannouncements with high specificity and/or reliability, a question arises as to whether there are any categories of preannouncements for which the abnormal returns are negative. The answer to this question can be found by examining the second and fourth models in Table 4. In both cases, the intercept is negative (-60 and -80 basis points, respectively), although insignificant ($p > .10$). That is, preannouncements with low specificity, low reliability, and those made by non-senior executives may well earn negative abnormal returns. Such preannouncements could arguably be viewed as vaporware or desperate attempts at influencing marketplace participants.

Determinants of Long-Term Abnormal Returns

The calendar-time one-year abnormal returns across the entire sample are positive and statistically significant (12.89%, $p < .01$ for the three-factor model, and 14.10%, $p < .01$ for the four-factor model),

[17] For instance, Chaney, Devinney, and Winer (1991) obtain R^2 values ranging from 1% to 10% when investigating the effect of new product introductions on short-term abnormal returns.

suggesting that financial returns to new product preannouncements accrue in the long-term. The results appear in Panel A of Table 5.

< Table 5 about here >

To compute the long-term abnormal returns to new product preannouncements and test H_4 and H_5, we first assign firms in our sample to four different portfolios based on the values of the two variables of interest: preannouncement updating and preannouncement reliability. Within each portfolio, we measure the long-term abnormal returns, using the three- and four-factor models described in Equations (2) and (3).

Panel B of 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 34% abnormal returns per year, after controlling for the risk factors and the momentum effect. Conversely, the abnormal returns for stocks in Cells (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 H_4, 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, higher updating should lead to higher returns. We find that both differences are statistically significant at the 1% level or better, suggesting that preannouncement updating has a positive effect on long-term abnormal returns, supporting H_4.[18]

To test H_5 or the moderating effect of reliability on the relationship between preannouncement updating and long-term abnormal returns, we must 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

[18] 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, product category and spokesperson. However, since none of these control variables 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.

effect of updating is stronger at high levels of preannouncement 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), i.e., that the effect of preannouncement reliability on long-term abnormal returns is stronger at high levels of preannouncement updating. We present the results of 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 H_5, we find a significantly positive abnormal return for this hedge portfolio, indicating that the difference in returns between portfolios (d) and (c) is greater than that between (b) and (a) by approximately 11% to 12% per year. Moreover, this difference is statistically significant ($p < .10$ or better).

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 not statistically significant for both the three-factor and the four-factor models ($p > .10$), suggesting the absence of a main effect of preannouncement reliability on long-term 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 preannouncement updating levels. Since the actual realization of preannouncement updating cannot be predicted on the day of the preannouncement, it is unlikely that investors could have realized these returns ex-ante.

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 sub-sample analyses of new product preannouncements. We compute both the short- and long-term abnormal returns for the sub-sample of preannouncements that were followed by formal introduction announcements, as well as for the sub-sample of preannouncements for which we found evidence of introduction. The results appear in Panel A of Table

6. In neither case are the short-term abnormal returns significantly different from zero, although they appear to be higher than the average of the entire sample (however, the power of the test for a sample of 37 observations is markedly low). Moreover, the short-term returns to the introduction announcements are not significantly different from zero ($p > .10$). This finding suggests that investors do not accurately predict which products would eventually be introduced. If they did, the returns to this sub-sample of preannouncements would have been positive. However, the long-term abnormal returns to these sub-samples are significantly different from zero ($p < .10$). These results provide additional support for the main finding of this study: there are positive financial rewards to new product preannouncements, but they accrue only in the long-term.

< Table 6 about here >

Panel B of Table 6 presents descriptive statistics for the sub-sample of preannounced products for which we were able to verify introduction. The proportion of firms with high preannouncement reliability in this sub-sample 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 in their expectations, as suggested by the lack of a simple main effect of preannouncement reliability in Table 4. Alternatively, there does not appear to be a difference in the specificity of preannouncements between the sample containing preannouncements of products eventually introduced and the overall sample, despite the fact that specificity was a significant determinant of short-term abnormal returns.

Second, we examined whether preannouncement reliability is correlated with preannouncement updating. Presumably, the reliable firms are the ones which have greater incentives 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 re-estimated our models using alternative measures of reliability that were based on the most recent two and three new product preannouncements made by the same 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 reduced sample size.

Fourth, we estimated our models for various sub-samples. The results for the sub-sample of hardware preannouncements are similar to those of the overall sample. The results for the sub-sample of software preannouncements also are consistent with those of the overall sample with the exception of the main effect of specificity, which remains positive, but only attains significance in one of the four models. This finding can be explained by the fact that software preannouncements are typically viewed as leading sources of vaporware and their content is highly discounted. Alternatively, the weak statistical significance may reflect the loss of power resulting from splitting the sample. In support of this conjecture, we note that the estimate of the specificity variable remains positive and similar in magnitude to that obtained with the entire sample. We also estimated our models on a sub-sample that excludes all preannouncements made by Microsoft, which is notorious for vaporware (Desmond 2005), and found the results to be similar to those of the overall sample. We found only weak support for H_5 in the sub-sample analyses in the sense that the point estimate of the hedge portfolio intercept remains positive (as expected) and similar in magnitude to that of the entire sample, but no longer attains statistical significance. Again, we conjecture that this is caused by a loss of power resulting from smaller sample sizes.

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 to new product preannouncements. Building on information asymmetry and rational learning theories, we developed hypotheses on the timing and determinants of stock market abnormal returns from preannouncements. Empirical results on a sample of software and hardware new product preannouncements 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, averaging approximately 13% during the one year after the preannouncement, or up to introduction, whichever comes first.

Our results also reveal that the more specific the content of a preannouncement, the higher the stock returns in the short-term. Furthermore, updating investors after the preannouncement leads to higher stock returns in the long-term. However, this finding does not mean that firms should provide updates at any cost, even with unreliable information, because doing so can damage their reputations and have a detrimental effect on their future market values. We also uncover the role played by preannouncement reliability in moderating the relationship between preannouncement specificity and short-term abnormal returns, as well as the relationship between preannouncement updating and long-term abnormal returns. These relationships are stronger for firms with greater preannouncement reliability.

The findings support the predictions of the structural uncertainty theory. Consistent with this theory, we find that the average abnormal returns in the short-term are zero, while the average long-term abnormal returns are positive. This finding 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. At the time of the preannouncement, investors face substantial uncertainty about the ultimate prospects of the product introduction. Changes can arise after the preannouncement, including the possibility that the product may never be launched. Faced with this uncertainty, investors are likely to significantly discount the expected cash flows from the proposed new product. As the firm updates the market after the preannouncement, this uncertainty is reduced over the long-term, resulting in positive abnormal stock returns during the one year following the preannouncement. In addition, 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 study makes an important contribution to research on innovation. We extend prior research on the relationship between product innovation and firm value. Such research shows that there are positive financial returns to new product introductions (Bayus, Erickson, and Jacobson 2003; Chaney, Devinney, and Winer 1991; Pauwels et al. 2004; Sorescu, Chandy, and Prabhu 2003; Srinivasan et al. 2004). Our

study suggests that firms can accelerate these returns by preannouncing the new products with specific information, keeping their preannouncement promises, and periodically updating investors.

We obtain our results by using a new-to-marketing methodology for assessing long-term abnormal stock returns: the calendar-time portfolio methodology. This technique has been extensively used in finance to measure the long-term returns to corporate events and strategies (see Table 1). It offers several desirable features such as unbiased estimates of long-term abnormal returns and the ability to control for cross-correlation among events, making it appropriate for a broad range of marketing events and strategies.

Third, our results add new insights to extant research on vaporware. Previous research argues that intentional vaporware could be used to deter entry (Bayus, Jain, and Rao 2001). Our results suggest that while that is possible, doing so will likely reduce the abnormal returns to future preannouncements for a typical firm. Once a firm is known to have produced vaporware, positive financial returns to its future preannouncements may not materialize. Therefore, while vaporware can deter entry in the short-run, it might be detrimental to firm value in the long-run. Microsoft, however, may be an exception. Despite a spate of vaporware announcements, Microsoft does not appear to have suffered any significant erosion in its shareholder value possibly because investors have adjusted their expectations about the firm based on their experience with the firm over a long period of time (Desmond 2005).

Implications for Practice

Our results also have several managerial implications. Managers should wait to preannounce their new products until they are 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 failed to deliver on previous preannouncement promises. To realize any short-term abnormal returns, managers should provide investors with truthful information about the product, including details on its price and introduction date. After the preannouncement, they may wish to provide periodic updates, so that market participants may adjust their expectations about the upcoming product.

Not all corporate preannouncement strategies are consistent with these implications. Consider Apple computers. While Apple is prudent about not promising much in its preannouncements, its strategy

of infrequently updating the market after a preannouncement, may be sub-optimal. For example, after it preannounced its Xserve product, Apple did not indicate how committed it was to the product line as it refused to reveal the 50 advanced management features that it had planned for the product. Because Apple did not adequately update the market, many potential customers bought competing products, possibly to the detriment of Apple's profitability.

Fortune favors the prepared firms. Consistent with previous findings indicating that firms which 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 would result in higher long-term market valuation for their corporations.

Limitations and Future Research

Our study has some limitations that could be addressed by future research. First, we examine new product preannouncements in the software and hardware industries. It would be useful to extend our study to other industries such as pharmaceuticals and biotechnology, where preannouncements are also common. Second, it would be interesting to study how the market reacts when information about products under development leaks before firms are ready to share this information with the market. Third, studying new product preannouncements in industries where an objective measure of the innovativeness of the product is available (e.g., the pharmaceutical industry, where the type of FDA review – priority or standard – can be used as an indicator of the newness of the product relative to existing drugs) would yield additional insights on the impact of innovativeness on preannouncement returns.

Whether managers are enthusiastic or reluctant to preannounce, we believe that our study provides useful tools and insights for making informed new product preannouncement decisions. We also hope that our research offers researchers the impetus to examine the long-term financial value of other types of marketing announcements and strategies.

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Table 1
Summary of Selected Studies in the Finance Literature that Use Long-Term Abnormal Returns

Event or Strategy Type	*Study*	*Sign of the Announcement Abnormal Return*	*Sign and Annualized Magnitude of the Long-term Post Event Return (% PerYear)*	*Long-term Metric Used*
Long-term abnormal returns to an event				
Seasoned equity offerings	Loughran and Ritter (1995)	–	–5.4% –11.0%	Calendar-time 3-factor abnormal return, 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 3-factor abnormal returns
Long-term abnormal returns to 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 4-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 4-factor abnormal returns
High dispersion of analyst forecasts	Diether, Malloy and Scherbina (2002)	N/A	–4% to –7%	Calendar-time 3-factor and 4-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.

Table 2
Variables, Measures, and Data Sources

Variable	*Operational Measure*	*Data Source*
Financial returns	Short-term abnormal returns five days around the preannouncement	CRSP
	Long-term calendar-time portfolio-level returns (one year after the preannouncement or up to product introduction, whichever comes first)	CRSP
	- Fama-French, Carhart's momentum factors	Ken French's website
Preannouncement specificity	- Price of the new product	Lexis-Nexis
	- Announced time of introduction of the new product	Lexis-Nexis
Preannouncement reliability	Whether the most recently preannounced product by the firm was introduced on time	Lexis-Nexis
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	Lexis-Nexis
Product category: Software/hardware	Whether the preannounced product was a computer software or hardware product	Lexis-Nexis
Innovativeness	Claimed innovativeness of the new product (Incremental/Radical)	Lexis-Nexis
Firm size	Assets	COMPUSTAT
Spokesperson	Whether the preannouncement was made by the CEO/Top management executive vs. Others in the company	Lexis-Nexis

Table 3
Means and Correlation Matrix of Variables Primarily Used in Short-Term Abnormal Returns Model

	Mean	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
CAR Market-adjusted model *(1)*	.59%	1.00								
CAR Market model *(2)*	.42%	.99 (.00)	1.00							
Preannouncement specificity *(3)*	.43	.20 (.00)	.19 (.00)	1.00						
Preannouncement reliability *(4)*	.13	.15 (.00)	.15 (.00)	.03 (.52)	1.00					
Product category *(5)*	.52	.02 (.63)	.02 (.62)	.00 (.94)	-.10 (.06)	1.00				
Innovativeness *(6)*	.05	.02 (.65)	.03 (.57)	-.08 (.12)	.09 (.09)	-.02 (.70)	1.00			
Firm size *(7)*	$21,483m	-.14 (.00)	-.13 (.01)	-.07 (.15)	-.10 (.05)	.20 (.00)	.05 (.30)	1.00		
Spokesperson (8)	.60	.05 (.30)	.06 (.27)	.09 (.09)	.07 (.15)	-.01 (.81)	.11 (.03)	-.10 (.06)	1.00	
Preannouncement updating *(9)*	.32	-.05 (.32)	-.04 (.47)	.05 (.32)	-.02 (.65)	.04 (.42)	.07 (.15)	.01 (.76)	.15 (.00)	1.00

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

Table 4
Cross-Sectional Short-Term Abnormal Returns around Product Preannouncement Date

	Model			
	CAR Market-adjusted Model		*CAR Market Model*	
	With Additional Variables	*Without Addl. Variables*	*With Additional Variables*	*Without Addl. Variables*
Intercept	.032	-.006	.025	-.008
	(.020)	(.006)	(.020)	(.006)
Preannouncement specificity	.018**	.018**	.017**	.017**
	(.008)	(.007)	(.008)	(.007)
Preannouncement reliability	-.000	.002	-.001	.001
	(.015)	(.014)	(.015)	(.014)
Preann. reliability x Preann. specificity	.058***	.055***	.059***	.056***
	(.021)	(.021)	(.021)	(.021)
Product category	.009		.009	
	(.007)	-	(.007)	-
Innovativeness	.016		.017	
	(.016)	-	(.016)	-
Firm size	-.005**		-.004**	-
	(.002)	-	(.002)	
Spokesperson	.002	.002	.003	.003
	(.007)	(.007)	(.007)	(.007)
Adjusted R^2	.082	.064	.077	.062
Sample size	326	341	326	341

Notes: The standard errors are shown in parentheses below each coefficient.
***, **, * indicate statistical significance at the 1, 5 and 10 percent levels, respectively.

Table 5
Portfolio Analysis of Long-Term Calendar-Time Abnormal Returns Following the Product Preannouncement Date

Panel A: Average Abnormal Returns Across the Entire Sample

Post-event portfolio-based calendar-time one-year abnormal returns	12.89%*** (4.85) 3-factor model	14.10%*** (5.07) 4-factor model

Panel B: Average Abnormal Returns within Each Portfolio

		Preannouncement Updating			
		Low		*High*	
Methodology for Measuring Abnormal Returns ➔		*3-Factor Model Calendar-time*	*4-Factor Model Calendar-time*	*3-Factor Model Calendar-time*	*4-Factor Model Calendar-time*
Preann. reliability	Low	(a) 6.22% (4.76)	7.86% (4.95)	(b) 20.03% (6.51)***	20.90% (6.86)***
	High	(c) 9.15% (6.02)	9.37% (6.07)	(d) 34.17% (8.56)***	34.88% (8.93)***

Panel C: Differences in Abnormal Returns between Portfolios

			Difference in Returns Between "Long" and "Short" Portfolios	
	Portfolio with "Long" (or "Buy") Positions	*Portfolio with "Short" (or "Sell") Positions*	*3-Factor Model Calendar-time*	*4-Factor Model Calendar-time*
Test for the Main Effect of Preannouncement Updating				
(b)-(a)	Low Reliability & High Updating	Low Reliability & Low Updating	13.80% (5.33)**	13.04% (5.96)**
(d)-(c)	High Reliability & High Updating	High Reliability & Low Updating	25.02% (6.74)***	25.51% (6.84)***
Test for the Main Effect of Preannouncement Reliability				
(c)-(a)	High Reliability & Low Updating	Low Reliability & Low Updating	2.93% (7.67)	1.51% (7.83)
(d)-(b)	High Reliability & High Updating	Low Reliability & High Updating	14.14% (7.53)*	13.98% (8.01)*
Test for the Moderating Effect of Preannouncement Reliability on the Relationship between Preannouncement Updating and Long-term Abnormal Returns				
(d)+(a)-(b)-(c)			11.21% (5.71)*	12.47% (5.75)**

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

Table 6
Analysis of Preannouncements Followed by Verified Product Introductions

Panel A: Abnormal Returns

Sample	*No. Obs.*	*Short-Term Abnormal Returns*		*Long-Term Abnormal Returns*	
		Market-adjusted Model	*Market Model*	*3-Factor Model*	*4-Factor Model*
Preannouncement followed by a formal product introduction announcement	37	1.25% (1.20%)	0.92% (1.20%)	25.47% (10.00%)**	18.08% (9.94%)*
o Return on preannouncement					
o Return on introduction		0.20% (0.83%)	-0.18% (0.85%)		
Preannouncement for a new product with confirmed introduction	78	0.84% (0.81%)	0.59% (0.80%)	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 percent levels, respectively.

Panel B: Descriptive Statistics on the Breakdown of the Sample

		Percentage of Observations for which the Corresponding Independent Variable Dummy Equals Unity				
Sample	*No. Obs.*	*Reliability*	*Specificity*	*Reliability x Specificity*	*Updating*	*Reliability x Updating*
Entire sample	341	13.1%	43.4%	6.2%	32.3%	3.8%
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%)**

Notes Standard errors of the differences between the sub-sample and the full sample are shown in brackets below each sub-sample measure.
***, **, * indicate statistical significance at the 1, 5 and 10 percent levels, respectively.

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 widow, 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):

$$AR_{it} = R_{it} - E\{R_{it}|\Omega_{t-1}\} \tag{A1.1}$$

where R_{it} is the daily return of firm i on day t and $E\{R_{it}|\Omega_{t-1}\}$ is the expected return of 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:

$$E\{R_{it}|\Omega_{t-1}\} = \hat{\alpha} + \hat{\beta} R_{mt} \tag{A1.2}$$

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:

$$E\{R_{it}|\Omega_{t-1}\} = R_{mt} \tag{A1.3}$$

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:

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

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

Before we introduce the concept of calendar time portfolios, we will address the limitations of the short-term event study methodology. Consider the following simple example illustrated in Figure A2.1. The figure shows a timeline comprised of days and months, where we assume that each month contains exactly 20 trading days. Suppose there are three preannouncements made by two firms, A and B. 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 pre-announcements.

< Figure A2.1 about here >

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 event study 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, we would compute, for each event, abnormal returns for the 12-month period immediately following the event window as illustrated in the middle section of Figure A2.1.[19] However, as is apparent from this 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 also the returns of Event B1 could be correlated with the other two,

[19] 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.

because of potential market- or industry-wide 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 in which we gradually "purchase" stocks after each preannouncement and hold them for a pre-determined time period (in this case, one year).[20] 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 re-balanced 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 since 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 thereof 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

[20] 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 instances, firms are kept in the portfolio up to that particular date of introduction if such an event 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). Instead, we seek to capture the abnormal returns that arise from investors' expectations of the effect that the preannouncement decision would have on the firm's future cash flows.

beginning of Month 2, so during Month 2 the portfolio will hold a two-dollar position in Stock A.[21] 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 since 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 the three-, or four-factor models previously outlined in the paper.

Suppose now we wish to find out why some preannouncements generate better returns than others; i.e. we wish to measure the impact of an independent variable on portfolio-level returns. In that case, we divide our events into two groups based on the value the respective independent variable, and form a calendar-time portfolio for each event group. The first group contains all events whose values on the independent variable of interest 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.

Importantly, the calendar-time portfolio method has the advantage of offering unbiased estimates of long-term returns. Mitchell and Stafford (2000) have shown that if a random series of simulated events (with both positive and negative consequences on stock returns) are imputed to a random sample of firms, the average one-year calendar-time portfolio abnormal return for this sample will be zero. This finding suggests that the average informational effect of all idiosyncratic events that firms may experience during the measurement period is, on average, zero, and any non-zero effects can be attributed to the event studied.

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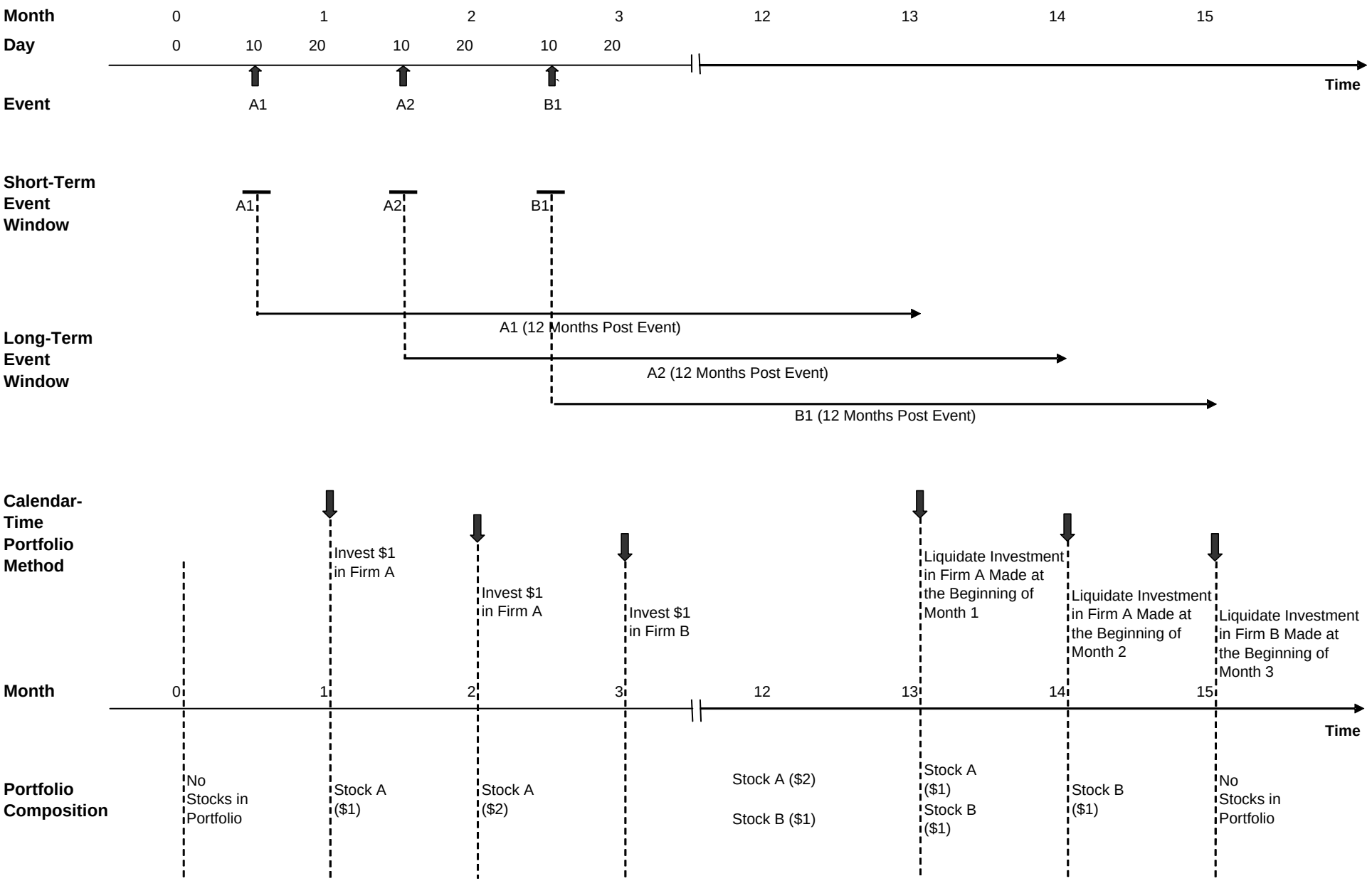
[21] We also re-balance the portfolio at the beginning of Month 2. That is, we cash our gains (or inject additional funds in case of losses) to ensure that the value of the investment related to event A1 is kept at one dollar at the beginning of the month. This results in the portfolio being equally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

Figure A2.1: An Illustration of Short-Term Abnormal Returns Event Study and Calendar-Time Methodologies



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The Institute works with top management teams to solve pressing issues in brand strategy.

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