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Stock price reaction and value relevance of recognition versus disclosure: the case of stock-based compensation ☆

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Abstract

This study examines the equity price reaction to the pronouncements related to accounting for stock-based compensation and assesses the value relevance of recognition versus disclosure in financial reporting. We document that firms exhibit significant abnormal returns around the issuance of the Exposure Drafts proposing to require recognition of stock-based compensation costs, and also around the event reversing that decision to require disclosure only (while encouraging recognition). We also document that the abnormal returns are most pronounced for high-tech, high-growth, and start-up firms. Our results are consistent with the contracting theory, and show that disclosure is not a substitute for recognition.

JEL classification: G14; M41; C39

Keywords: Capital market; Accounting standard; Stock option; Security price reaction

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1. Introduction

The past two decades have witnessed a significant growth in the number of public companies offering stock options and similar equity instruments (known as stock-based compensation, or SBC) to their executives and employees. Among others, start-up, high-tech, and high-growth companies, starving for cash, have been able to grant stock options, in lieu of a cash bonus or salary, to compensate their executives. The spread of SBC as an incentive plan was not only influenced by companies' desire to motivate employees and conserve cash outlays, but also by the fact that no compensation expense had to be recognized for most SBC plans under the Accounting Principles Board (APB) Opinion No. 25.[1]

As SBC plans were becoming more popular as a means of motivating and compensating employees, the accounting profession and the financial community became concerned about the inconsistency and inadequacy of APB No. 25 in accounting for SBC. In response to this concern, the Financial Accounting Standards Board (FASB) placed accounting for SBC on its agenda in 1984, but it took the Board until June 1993 to issue its highly controversial Exposure Draft (ED) entitled "Accounting for Stock-Based Compensation." The ED proposed recognition of compensation cost for all awards of SBC plans that would eventually vest, based on their fair value at the grant date (a proposal that was reversed later).

The responses to the ED on accounting for SBC were overwhelmingly negative. The vast majority of respondents objected to the recognition of compensation cost for fixed employee stock options. Significant objections were especially voiced by high-tech, high-growth, and start-up, companies on the grounds that the recognition of SBC expense would place them at a competitive disadvantage. After a long deliberation process, and under pressure from the financial community, the accounting profession, and the Congress, the FASB reached a decision to "encourage," but not require, recognition of compensation cost based on the fair-value method and to pursue expanded disclosure in the Statement of Financial Accounting Standards (SFAS) No. 123. Employers are permitted to continue application of APB Opinion No. 25 (the intrinsic-value method), but they are required to disclose the pro forma effect on net income and earnings per share (EPS, if presented) had the fair-value method been applied.

The main impetus for the criticism by Congress, the business community, and the accounting profession, was the prediction that recognition of SBC costs could lower the reported earnings by as much as 50% and would adversely affect stock prices (Berton, 1993). It was also predicted that high-tech, high-growth, and start-up,

[1] Under APB Opinion No. 25 (the intrinsic-value based method), compensation cost to the company is the excess, if any, of the quoted market price of the stock at the grant date or other measurement date over the amount an employee must pay to receive the stock. Most stock option plans are fixed with no intrinsic value and therefore require no cost recognition. Some SBC plans, however, including those with variable, performance based, features do require recognition of compensation cost under APB Opinion No. 25.

companies relying heavily on SBC programs would be more affected than other firms (see Wall Street Journal, e.g., on 2/26/92, 4/8/93, and 6/3/93).

In this study, we: (1) investigate whether equity prices reacted to the SBC pronouncements; (2) investigate whether abnormal returns varied cross-sectionally with firm-specific variables; and (3) assess the value relevance of recognition versus disclosure in financial reporting. The first two inquiries are similar to previous studies investigating the market reaction to various accounting pronouncements that required recognition (e.g., Espahbodi et al., 1991, 1995) or disclosure of some information (e.g., Clinch and Magliolo, 1992; Espahbodi and Tehranian, 1989). They not only provide insight into the market's assessment of the relative importance of each event, they offer some rationale for lobbying efforts and concerns by Congress, the business community, and the accounting profession, that eventually forced the FASB not to require recognition of SBC costs.

The distinguishing feature of this paper stems from the fact that the FASB never retreated from requiring recognition to allow a choice between disclosure and recognition for the same item of information. Thus, analysis of the economic consequences of SBC pronouncements not only allows us to test the significance of the contracting theory, but also to assess the value relevance of disclosure versus recognition.

Our results indicate that firms did exhibit significant abnormal returns around the issuance of the Exposure Drafts proposing to require recognition of stock-based compensation costs, and also around the event reversing that decision to require disclosure only (while encouraging recognition). We show that the abnormal returns are most pronounced for high-tech, high-growth, and start-up firms. We also document that the stock price impact is positively related to the existence of tax loss carry-forward, the extent of stock option usage (as reflected by its effect on EPS), and retained-earnings related debt constraint; and negatively related to the noise in stock price performance, free cash flows over total assets, and firm size.

The significance of the abnormal return around the event reversing the decision to only require disclosure is consistent with the contracting theory, and shows that market participants value disclosure and recognition differently (or that disclosure is not a substitute for recognition). Requiring companies to only disclose the cost of SBC rather than forcing recognition as was proposed earlier would involve no new information and should not affect security prices, except through the contracting and political cost hypotheses (as future earnings will be affected by recognition, but not by disclosure, of SBC costs).

Our results are in contrast with those of Dechow et al. (1996) who also examined the economic consequences of accounting for SBC, although their focus was on determining the characteristics of firms lobbying against (writing comment letters on) the exposure draft on SBC and those using employee stock options. Dechow et al. used three samples: companies writing a comment letter; bio-technology firms; and all firms in industries with high median option usage, as measured by the proportion of common shares reserved for conversion of stock options to common

shares outstanding. They did not find any equity price reaction to the ED announcement or the decision to rescind its requirements. Neither did they find any of their four firm-specific variables to be related to equity price reaction to the SBC pronouncements. We attribute all these differences to the sample and the variable set, and explore these differences in the results section. We contend that our sample selection criteria, and the use of the more recently available data on the impact of stock options on EPS, enable us to perform a more powerful test of the market reaction to SBC pronouncements.

The remainder of this paper is organized as follows. A review of the accounting pronouncements and issues pertaining to SBC appears in Section 2. Hypotheses on the capital market effects of these pronouncements are developed in Section 3. The fourth section describes the events, sample and data, and methodology. Section 5 presents the empirical results. The final section contains a summary and conclusion.

2. Accounting pronouncements and issues pertaining to SBC

Prior to the issuance of SFAS No. 123, accounting for SBC was governed by APB Opinion No. 25 and its interpretations. Under APB Opinion No. 25, most SBC plans were considered non-compensatory in nature and, accordingly, did not require recognition of compensation expense if the exercise price was equal to or less than market price on the measurement date (the first date on which both the number of shares and the exercise price were known). For fixed awards the expense was measured when the option was granted. For a variable plan, the expense was estimated and accrued between the date of the grant and the final measurement date. Variable plans typically have an exercise price that is below the stock's market price at the measurement date resulting in expense recognition while fixed plans generally have an exercise price that is equal to the market price of the stock on the grant date, resulting in no expense recognition. Thus, many companies have been taking advantage of the flexibility of APB Opinion No. 25 and avoiding expense recognition for SBC.

As SBC plans were becoming more popular as a means of motivating and compensating employees, the accounting profession and the financial community became concerned about the inconsistency and inadequacy of APB No. 25 in accounting for SBC. In response to this concern, the FASB placed accounting for SBC on its agenda in 1984. From 1985 to 1988, the Board considered the issues and conducted research on various aspects of SBC plans. Late in 1988, the Board set aside the stock compensation issue to first deliberate the related concepts of equity versus liability instruments. Based on comments received in response to a Discussion Memorandum, issued in August 1990, distinguishing between liability and equity instruments and accounting for instruments with characteristics of both, the Board decided that an entity's obligation to issue its own stocks is an equity (and not a liability) instrument because the entity has no obligation to transfer its assets. In February 1992, the Board decided not to pursue possible changes to the conceptual

distinction between equity and liability, and to resume work on the compensation project within the conceptual framework. The expectation that the Board may require companies to deduct the cost of stock options from their income was, for the first time, reported in New York Times on January 22, 1992. Thus, this was the first event that may have influenced investors' expectations about future reported earnings.

A highly controversial Exposure Draft (ED) entitled "Accounting for Stock-Based Compensation" was issued in June 1993. The ED proposed recognition of compensation cost for all awards of SBC plans that would eventually vest, based on their fair value at the grant date (a proposal that was reversed later). The ED would have required: (1) recognition of SBC cost, on the grant date, initially in the Balance Sheet as an asset (prepaid compensation) and as an element of stockholders' equity (stock options outstanding); and (2) amortization of the recognized SBC asset as compensation expense over the service period, usually the vesting period.

By proposing recognition of SBC expense at the grant date for both fixed and variable plans (the fair-value method), the FASB intended to mitigate the controversial issues surrounding APB Opinion No. 25. The Board argued that stock options and other forms of stock-based awards to employees represent compensation and should be treated as such. The proposal would have provided better uniformity in accounting for SBC and resolved the inconsistency among various forms of SBC plans.

The proposal, however, received great attention and criticism by Congress, the business community, and the accounting profession. Opponents of the fair-value method of accounting for SBC (see, e.g., Rouse and Barton, 1993; Derieux, 1994) argued that: (1) there is no out-of-pocket cost to the company for SBC; (2) SBC cannot be reliably measured; and (3) recognition of SBC expense puts most companies, especially high-tech, high-growth, and start-up companies, at a competitive disadvantage. Proponents of compensation expense recognition (see, e.g., Pacter, 1994) argued that: (1) mere disclosure of SBC costs ignores the fact that these options give employees valuable rights and are compensation for services already performed; (2) like other types of deferred compensation arrangements such as pensions and postretirement benefits, SBC costs should be accrued as expense over the service period; and (3) mere disclosure of SBC costs produces financial statements that are neither credible nor representationally faithful.

In October of 1995, after more than a decade of deliberation, the FASB issued Statement No. 123, "Accounting for Stock-based Compensation." However, under pressure from companies and even the Congress, SFAS No. 123 only encourages employers to recognize compensation expense for SBC based on their estimated fair value at the grant date. Specifically, companies offering SBC have a choice of either applying the fair-value based accounting method or the intrinsic-value based method. However, companies that use the intrinsic-value method of accounting under APB Opinion No. 25 must disclose pro forma net income and EPS figures as if they had used the fair-value method.

3. Hypotheses on the capital market effects of SBC accounting

Under SFAS No. 123, publicly held companies may either recognize or disclose compensation costs for fixed (as well as variable) SBC. Compared to APB Opinion No. 25, under which most companies reported no compensation expense for fixed options, recognition (disclosure) of SBC costs can have a significant effect on reported (pro forma) income. Bear, Stearns & Co. estimated that recognition of SBC costs could lower the reported earnings by as much as 50% which would adversely affect stock prices (Berton, 1993). In addition to reducing reported (or pro forma) earnings, SFAS No. 123 also increases the number of shares considered outstanding and thus results in a lower reported (or pro forma) EPS.

In general, the announcements that increased the probability of recognizing the SBC costs could cause a decrease in stock prices by eliminating an efficient contracting definition of earnings (i.e., one that avoids recognition of present and future SBC costs). As Watts and Zimmerman (1986) point out, accounting practice tends to trade-off information asymmetry (reliability) against timeliness. The comments to the FASB suggest that reliability was a serious problem with the Exposure Draft (ED) requirements so that earnings based on the ED would be less useful for contracting, causing stock prices to drop. Stock prices could also decrease for firms with retained-earnings related debt constraints, as the ED would increase the probability that debt covenants would be violated and thus increase the expected cost of a technical default (Watts and Zimmerman, 1986, p. 286). (Leverage related debt covenants would have actually loosened, i.e., debt to assets or debt to equity ratios would have decreased, as both assets and owners' equity would have increased under the proposed standard.) Finally, if recognizing the SBC costs was expected to result in rewriting compensation contracts (or in curtailing the use of options), a negative price reaction to the events that would increase the probability of recognizing SBC costs would be observed since a dead-weight cost would be imposed on the firms.

On the other hand, announcements related to recognition of SBC costs could result in stock price increases, especially for larger firms, through reduction of political costs. Prices could also increase slightly for firms with income-based compensation plans, as recognition of SBC costs would reduce managers' ability to increase their compensation (Watts and Zimmerman, 1986, pp. 286–287). Although the direction of the net stock price reaction to SBC related announcements is an empirical issue, based on the findings of previous studies (e.g., Espahbodi et al., 1991; Collins et al., 1981; Lys, 1984), we formulate our first hypothesis as follows:

H_1: Firms with SBC plans should experience a negative (positive) abnormal return around the events that increase (decrease) the probability of forcing companies to "recognize" the cost.

The impact of the pronouncements on SBC, of course, is not expected to be the same for all firms that provide these benefits to their employees. Among others, start-up and high-tech companies, starving for cash and relying heavily on SBC plans,

would be more affected than other firms (see, e.g., Akresh and Fuersich, 1994).[2] Therefore, our next hypothesis is:

H_2: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for start-up and high-tech companies.

Smith and Watts (1992) and Gaver and Gaver (1993) document that executive compensation policies are related to measures of investment opportunity set (such as the availability of growth options and firm size). They show that firms with more growth options have higher executive compensation and make greater use of stock-option plans. Thus, firms with higher growth options should be more adversely affected by the requirement of expensing the SBC costs.

Following Smith and Watts (1992), we use the book value of total assets over total firm value as the base measure of investment opportunity set (growth option). Since the investment opportunity set is unobservable and only imperfectly measured by any single proxy measure, we test the robustness of our results to the definition of investment opportunity set by considering two alternative measures: book over market value of common equity, and research and development expense over total assets. The greater the investment opportunity set available to a firm (as measured by a higher research and development cost over total assets, a lower book value of total assets over total firm value, and a lower book over market value of common equity), the larger is the option usage and thus the greater is the economic consequence of expensing the SBC costs. Thus, our third hypothesis is:

H_3: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms that have higher investment opportunities.

In addition to the investment opportunity set, option usage has been shown to vary with the amount of noise in stock price performance and tax position (see, e.g., Sloan, 1993; Matsunaga, 1995). The lower the noise in stock prices in measuring managerial performance, the better option values reflect that performance and hence the more they are used. Firms with tax loss carry-forward benefits also use options to a greater extent because they can not take advantage of the tax deductibility of cash compensation (or they may not have the cash). Thus, firms with a tax loss carry-forward and low noise in their stock prices are expected to experience a more significant price movement in reaction to SBC pronouncements. Consistent with Sloan and Matsunaga, we presume the market effect is beyond the managers' control hence represents noise in stock prices measuring the managers' performance. We thus measure noise in stock price performance as the proportion of variance in the

[2] We are assuming here that, on average, start-up and high-tech firms use more options; similarly, in hypothesis 3, we assume that high-growth companies make greater use of stock-option plans. These two hypotheses test whether the opposition to the ED on SBC by such firms was justified on economic grounds. We realize not all heavy users of stock option are start-up, high-tech, or high-growth firms. In hypothesis 6, therefore, we examine the effect of SBC pronouncements on stock prices of high option users.

daily stock return attributed to market movement, i.e., the systematic risk (beta) squared times the variance of the market return based on a two-parameter market model for each firm. Tax position is measured by a dummy variable taking a value of one if the firm has a tax loss carry-forward and zero otherwise. Our next two hypotheses therefore are:

H_4: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms with tax loss carry-forward benefits.

H_5: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms that have lower noise in their stock prices.

A direct measure of option usage is obtained by examining the percentage decrease in 1996 primary (basic) EPS resulting from the use of SBC. This information was only required to be disclosed in the footnotes to financial statements starting with the 1996 fiscal year. Following Dechow et al. (1996), we also use the proportion of common shares reserved for stock options to common shares outstanding as an alternative measure of option usage, although this is a noisy (see Dechow et al., p. 8) and indirect measure of the potential impact of expensing SBC costs on EPS. Our hypothesis is:

H_6: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms with higher option usage.

The debt hypothesis usually considered in the literature was not relevant for the proposed SBC accounting. Debt covenants based on leverage ratios would have actually loosened, i.e., debt to assets or debt to equity ratios would have decreased. Compared to accounting for SBC under APB Opinion No. 25, the exposure draft would have increased assets (prepaid compensation) and owners' equity (options outstanding), although the increase would not have been significant (e.g., Akresh and Fuersich,1994, show that the initial increase in assets and equity can be up to 2%) because no retroactive adjustments were to be required. The asset was to be amortized over the vesting period, i.e., gradually recognized as expense, reducing retained earnings. However, total assets and owners' equity would have been higher until the vesting period was over.

On the other hand, as retained earnings were to be reduced, debt covenants based on retained earnings would have tightened, possibly resulting in a decline in stock prices. Consistent with Dechow et al. (1996) and Healy and Palepu (1990), we use a dummy variable that takes a value of one if a firm is close to its retained-earnings related constraint (specifically if less than 2 years of dividends are available in retained earnings), and zero otherwise. We posit the following hypothesis:

H_7: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms that have a retained-earnings related debt constraint.

One of the claims for opposing the new rules on SBC was that, by reducing reported earnings, expensing SBC costs increases the cost of raising new capital. If that claim is true, then the stock price of firms needing new capital should be more negatively affected by pronouncements requiring expensing of SBC costs. Consistent with Dechow et al. (1996), we measure the need for additional financing by free cash flows (cash flows from operation plus that from investing activities) divided by total assets (although this variable is related to many other variables, including firm size and the investment opportunity set). The lower this variable, the higher is the need for additional financing. We thus pose the following hypothesis:

H_8: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms that have higher need for additional financing (or lower free cash flows over total assets).

Watts and Zimmerman (1978, 1990) suggest an accounting standard that reduces earnings reduces the political costs associated with regulatory pressures. Since larger firms are expected to have larger decreases in political costs, they will have a less negative stock price reaction to the pronouncements requiring expensing of SBC costs. Smaller companies also rely more heavily on options and, thus, will be significantly affected by accounting pronouncements on SBC while the impact on larger companies may be minimal (see, e.g., Ciccotello and Grant, 1995). There are, at least, two plausible explanations regarding this prediction for large companies. First, the stock price volatility of a large and well-established company is lower than that of a small company, and lower volatility will reduce the option value. Second, the relative magnitude of options as a percentage of the number of outstanding shares is more significant for a small compared to a larger firm. Using natural log of total assets to proxy for firm size, our last hypothesis is:

H_9: The stock price reactions to pronouncements that increased the probability of expensing SBC costs are more negative for firms with lower market values.

4. Events, sample and data, and methodology

4.1. Events considered

The events leading to the issuance of SFAS No. 123 indicate that participants (e.g., Congress, business community, accounting profession) in the lobbying process believed that recognition of SBC costs would adversely affect financial statements and place companies which rely heavily on SBC as an incentive plan at a competitive disadvantage. Although, according to Beresford (1996), no accounting pronouncements before SFAS No. 123 (except for oil and gas in 1970s) have been so highly publicized and criticized, pronouncements on accounting for SBC consisted of the normal chain of open and inclusive standard-setting process. During this promulgation process, various pieces of information were disseminated to the

market that may have formed or revised investors' expectations regarding the final provisions of the Statement and their possible financial impact.

Table 1 shows the chronology of important events leading to the issuance of SFAS No. 123 and their expected market reaction. Consistent with prior research, we used multiple information sources since the financial community receives news from a variety of sources. We obtained a list of events and dates from the project manager for SFAS No. 123. We also searched the New York Times and the Wall Street Journal (WSJ), as well as the WSJ index, to confirm and/or identify the event dates. In our analysis, however, we only included 12 events that we believed would form/revise investors' expectations regarding the likelihood of passage of accounting standards requiring recognition of SBC costs.[3]

Events 1, 2, 4, and 5, are considered "bad news" because they provided information indicating eventual recognition of SBC costs. The remaining events are considered "good news" because they either provided information indicating FASB was compromising its position, or they provided news regarding lobbying efforts opposing the expense recognition. In our regressions, each event is represented by a dummy variable. As suggested by Schipper and Thompson (1983), to give differential treatment to the events involving good news, each dummy variable is set equal to one if an unfavorable event occurred, minus one for a favorable event (a reversal), and zero otherwise.

To the extent that the SBC pronouncements provide new information not previously known to market participants and/or affect SBC plans, security prices of affected entities should change. Based on prior research (e.g., Espahbodi et al., 1991, 1995; Salatka, 1989), the change in security prices should be most significant around the issue of the exposure draft (event 5). Event 11 (a shift in FASB's policy from intending to require recognition of SBC cost to mere disclosure of such costs), on the other hand, should only be significant if the market participants value disclosure and recognition differently (as no new information was provided to the market at that time, and no change was made to the calculation of stock options value). This difference in valuation is consistent with the contracting and political cost hypotheses, as future earnings will be affected by recognition, but not by disclosure, of SBC costs.

4.2. Sample and data

The sample firms meet the following criteria: (1) they are listed on the CRSP daily returns and the COMPUSTAT Annual Industrial files; (2) they offer stock-based compensation plans to employees and disclose their impact on EPS in the footnotes to 1996 fiscal year financial statements in the DISCLOSURE data base; (3) data on the firm-specific variables are available on the COMPUSTAT data base; and (4) they are not financial institutions or utility companies. The first three criteria are designed

[3] We repeated our analysis, considering 23 other events reported in the same sources. None of these events, however, were significant and stock returns did not vary cross-sectionally on those dates with the firm characteristics.

Table 1
Important events leading to the issuance of SFAS No. 123 and their expected market reaction[a]

Event number	Event date	Description	Expected market reaction
1	1/22/92	FASB is reviving a long-term project to require companies to deduct the cost of stock options from their income	Negative (bad news)
2	6/26/92	Urged by the SEC, FASB began an 8-year project on stock-option accounting to require companies to subtract the value of unexercised stock options from their profits	Negative (bad news)
3	4/6/93	In a letter to FASB the day before the Board is scheduled to vote on the issue, Treasury Secretary said he had reservations about forcing companies to expense the value of stock options.	Positive (good news)
4	4/7/93	FASB voted 6–1 to require companies to expense the estimated value of stock options by 1997, in the interim requiring disclosure of options' value in 1994 financial statements	Negative (bad news)
5	6/30/93	The Exposure Draft "Accounting for Stock-Based Compensation (SBC)" was issued, requiring recognition of SBC expense	Negative (bad news)
6	11/5/93	FASB may delay for a year (push to 1995 report) the requirement that companies disclose the cost of employee stock options, a step that many companies would favor	Positive (good news)
7	3/28/94	In the wake of many protests, FASB will look at many new proposals, among them a compromise plan that would reduce the damage to company earnings by considering some options as equity	Positive (good news)
8	4/22/94	FASB is likely to postpone until at least 1995 the expensing proposal to redeliberate and reconsider alternative ideas. In addition, FASB is expected to postpone the disclosure of the cost of options for at least a year (until 1995)	Positive (good news)
9	11/16/94	Following a storm of protest from industry, FASB is looking at several ways to ease corporate concerns. Although FASB hasn't yet changed its proposal, it is looking at several possible changes including disclosure only	Positive (good news)
10	12/14/94	FASB will consider softening its position on the SBC project. FASB would allow firms to choose disclosure alone or deduction of cost	Positive (good news)
11	12/15/94	FASB voted 5–2 to rescind the requirement to expense the estimated value of stock options, instead requiring disclosure while encouraging recognition of stock option costs (no effective date for disclosure yet)	Positive (good news)
12	10/23/95	FASB issued SFAS No. 123 requiring disclosure while encouraging recognition of SBC cost	Positive (good news)

[a] Events 4, 5, and 12, are from the FASB records. All other events were reported in the Wall Street Journal and/or the New York Times; for completeness, 23 other events reported in the same sources were considered, but none of them were significant.

to ensure data availability for a sample of firms offering SBC to test the nine hypotheses. The last criterion excludes financial institutions and utilities because: (a) these firms' equity prices react differently to SBC pronouncements and there is no control group to account for these differences; and (b) some of the required firm-specific data are not available on these companies.

Application of these selection criteria resulted in a sample of 595 firms. Specifically, a total of 1492 firms met criterion number 2, i.e., disclosed the impact of the SBC on their EPS. (About 17% of the 1492 firms, and 16% of the 595 firms, indicated no impact on their EPS.) There were 30 financial institutions and utility firms; 599 and 165 firms were not listed on the CRSP and COMPUSTAT, respectively (out of which 154 did not exist on either data base); and 257 firms had missing data on COMPUSTAT. A comparison of the 595 firms in the final sample with the 897 dropped from the analysis indicated that the latter firms were much smaller in size, but reported a higher mean (median) percentage decline in their 1996 EPS resulting from the use of SBC [24.79 (7.41) % versus 17.25 (5.40) % for the 595 firms]. Both of these facts suggest that the stock price reaction to the SBC pronouncements would have been more significant for the excluded firms.

Of the 595 firms, 117 are defined as high-tech, 297 as high-growth, and 187 as start-up companies. High-tech firms are those with four digit SIC codes of 3570–3579, 3670–3679, and 8730–8734; namely, computer, electronics, semi-conductors, biological research, and similar firms. High-growth firms as those with *lower* than median book to market ratio of common equity (i.e., *higher* market to book ratios). Start-up companies are those that have been in existence for less than 5 years, indicated by not being listed on the CRSP data base in 1987 (5 years before FASB indicated for the first time that the value of options is to be deducted from earnings). The SIC distribution of the full sample and those of the sub-samples (i.e., high-tech, high-growth, and start-up samples) are shown in Table 2. Note that entries in the full sample do not equal the sum of those in the sub-samples, as there are overlaps among the sub-samples and some firms are not in any sub-sample. Overall, 36 firms are in both the start-up and high-tech samples, 51 in both high-tech and high-growth samples, 112 in both high-growth and start-up samples, and 23 firms are in all the three sub-samples. One hundred and seventy firms in the full sample are not in any of the sub-samples.

To test the first hypothesis, daily return data are collected from the CRSP data base. For hypotheses 2 through 9, additional data are obtained from the COMPUSTAT and CRSP data bases to measure the following attributes of sample firms: (1) growth; (2) debt constraint; (3) size; (4) free cash flow divided by total assets; (5) option usage; (6) noise in stock price performance; (7) the tax loss carry-forward indicator; (8) the high-tech company indicator; and (9) the start-up company indicator. All these variables are measured as averages over the 4-year period of events (1992–1995), unless indicated below. A list of these variables, their definition, and the expected sign of their relation with abnormal security returns, are shown in Table 3.

Following Smith and Watts (1992), the book value of total assets (Compustat item 6) over total firm value, BKOV, is used as a base proxy for growth (investment

Table 2
Industry distribution of sample firms

Industry classification	SIC codes	Number of firms			
		Full sample	High-tech sample	High-growth sample	Start-up sample
Agriculture, forestry, and mining	0100–1499	53		19	16
Construction	1500–1999	1		1	
Manufacturing	2000–3999	448	106	213	131
Transportation and communication	4000–4899	3		1	1
Wholesale	5000–5199	11		6	4
Services	7000–8999	79	11	57	35
Total number of firms		595	117	297	187

The full sample is composed of all the firms in the sample. The other three samples are sub-samples of these 595 firms. Specifically, high-tech sample consists of firms with SIC codes of 3570–3579, 3670–3679, and 8730–8734; high-growth firms are defined as those with *lower* than median book to market ratio of common equity (i.e., *higher* market to book ratios); and start-up sample firms are those in existence for less than 5 years.

Note that entries in the full sample do not equal the sum of those in the sub-samples, as there are overlaps among the sub-samples and some firms are not in any sub-sample. Overall, 36 firms are in both the start-up and high-tech samples, 51 in both high-tech and high-growth samples, 112 in both high-growth and start-up samples, and 23 firms are in all the three sub-samples. One hundred and seventy firms in the full sample are not in any of the sub-samples.

opportunity set). Total firm value is defined as the market value of equity plus the book value of total assets minus the book value of equity (Compustat item 24 times item 25 plus item 6 minus item 60). To check the robustness of the results to the specific proxy used for growth, two alternative measures of growth are also considered: (1) the book over the market value of common equity (BKOM, calculated as Compustat item 60 divided by the product of items 24 and 25); and (2) research and development expense over the book value of total assets (RDOA, computed as Compustat item 46 divided by item 6).

Because the leverage ratio (long-term debt over total assets, LTDOA, Compustat item 9 divided by item 6) would have actually decreased based on the proposed standard, the base proxy for debt constraint used in this study is retained-earnings related. Consistent with Dechow et al. (1996), and Healy and Palepu (1990), we use a dummy variable (RECOV) that takes a value of one if retained earnings is less than 2 years of dividends, i.e., if the proportion of retained earnings at year-end plus dividends and purchase of treasury stock during the year (sum of Compustat items 36, 127, and 115) over the last year's dividends and purchase of treasury stock (sum of Compustat items 127 and 115) is less than two. For completeness, we do repeat the analysis, using the leverage ratio instead of the dummy variable.

Size (SIZE) is measured as the natural log of total assets, Compustat item 6. Free cash flows (FCFOA) is the cash flows from operations plus that from investing activities divided by the book value of total assets (sum of Compustat items 311 and

Table 3
List of variables

Variable[a]	Variable abbreviation	Expected sign	Annual compustat data items/other sources
Growth (investment opportunities)—use as alternatives			
Book value of total assets over total firm value	BKOV	–	6/(24 × 25 + 6–60)
Book over market value of common equity	BKOM	–	60/(24 × 25)
Research and development over total assets	RDOA	+	46/6
Debt constraint—use as alternatives			
Retained-earnings related—dummy variable based on (retained earnings + div. + purchase of treasury stock)/(last year's div. + purchase of treasury stock)[b]	RECOV	+	(36 + 127 + 115)/ last year's(127 + 115)
Leverage-related—long-term debt over total assets	LTDOA	–	9/6
Size—natural log of total assets	SIZE	–	6
Free cash flows over total assets—cash flows from operations and investments over total assets	FCFOA	–	(311 + 308)/6
Option usage—use as alternatives			
Pro-forma percentage decrease in earnings per share in 1996[c]	SOEFF	+	Footnotes from disclosure data base
Stock option usage—common shares reserved for conversion of stock options over common shares outstanding	SOUSE	+	215/25
Noise in stock price performance—the proportion of variance in the daily stock return attributed to market movement, i.e., the systematic risk (beta) squared times the variance of the market return based on a two-parameter market model for each firm over the 5-year period of mid-1991 through mid-1996 (Lambert, 1993)	NOISE	–	CRSP data base
Tax loss carry-forward dummy in fiscal year 1991[d]	TAX	+	52
High-tech dummy indicator in fiscal year 1991[e]	HT	+	SIC codes
Start-up dummy indicator[f]	START	+	CRSP data base

[a] All variables are measured as averages over the 4-year period of 1992–1995, unless otherwise indicated.

[b] Equals one if the fraction is less than two, zero otherwise.

[c] Percentage decrease in 1996 primary (basic) EPS obtained from the footnotes to financial statements. The year 1996 was the first year companies were required to disclose the pro forma effect of the options on income and EPS.

[d] Equals one if the firm has an operating tax loss carry-forward, zero otherwise.

[e] Equals one for high-tech firms, zero otherwise. High-tech firms are defined as those with four digit SIC codes of 3570–3579, 3670–3679, and 8730–8734; namely, computer, electronics, semi-conductors, biological research, and similar firms.

[f] Equals one if the company has been in existence for less than 5 years, indicated by not being listed on the CRSP data base in 1987 (5 years before FASB indicated for the first time that the value of options is to be deducted from earnings); zero otherwise.

308 divided by item 6). The extent of option usage by a firm is measured by the percentage decrease in pro forma (in two cases, actual) EPS in 1996, as that was the first year such data were available. We obtained this data item (SOEFF) through a search of the footnotes to the financial statements of fiscal year 1996 in the Disclosure data base. For completeness, however, we repeat the analysis using the number of common shares reserved for conversion of stock options over the total number of common shares outstanding (SOUSE, Compustat item 215 divided by item 25) as a proxy for stock option usage (see Dechow et al., 1996, p. 8, for the problems with this proxy). We measure noise in stock price performance (NOISE) for each firm as the proportion of variance in the daily stock return attributed to market movement, i.e., the systematic risk (beta) squared times the variance of the market return based on a two-parameter market model for each firm over the 5-year period of mid-1991 through mid-1996.[4]

The last three variables are all indicator variables. Tax loss carry-forward (TAX) takes a value of one if the firm has a tax loss carry-forward benefit as of the end of 1991, as indicated by Compustat item 52 (because the expectation of recognizing an expense first surfaced in early 1992). High-tech dummy (HT) takes a value of one for firms with primary SIC codes in fiscal year 1991 of 3570–3579, 3670–3679, and 8730–8734, i.e., for computer, electronics, semi-conductors, biological research, and similar firms. Start-up dummy (START) takes a value of one if the company has been in existence for less than 5 years, specifically if the company is not listed on the CRSP data base in 1987 (5 years before FASB indicated for the first time that the value of options is to be deducted from earnings).

Descriptive statistics on the 13 variables (nine firm characteristics and four alternative proxies) for the full sample (595 firms) are presented in Panel A of Table 4. Panel B of Table 4 presents the Pearson correlation coefficients between these firm characteristics. The high correlation among these variables underscores the need to use the Sefcik and Thompson (1986) methodology that considers such interrelations. This methodology will be described in the next section.

Table 5 reports the mean, the lower quartile, the middle quartile (median), and the upper quartile of eight selected variables for the full sample and seven sub-samples to provide a better understanding of the characteristics of these firms and why they could be potentially affected by the SBC pronouncements. The full sample is composed of all the firms in the sample. Other samples are a subset of these 595 firms. Specifically, high-tech sample consists of firms with SIC codes of 3570–3579, 3670–3679, and 8730–8734; start-up sample firms are those in existence for less than 5 years; high-growth firms are defined as those with *lower* than median book to market ratio of common equity (i.e., *higher* market to book ratios); high-EPS-impact sample firms are those with *higher* than median percentage decrease in their

[4] Specifically, a two parameter market model is estimated for each and every firm over the 5-year period of mid-1991 through mid-1996. The noise in the stock price of each firm is the estimated beta for that firm squared times the variance of the market return; equivalently, the noise for each firm is the sum of squares regression divided by the total degrees of freedom (number of observations minus one) in that regression (see Lambert, 1993, p. 117).

Table 4
Descriptive statistics of, and correlations between, firm characteristics for the full sample ($N = 595$)

Variable	BKOV	BKOM	RDOA	RECOV	LTDOA	SIZE	FCFOA	SOEFF	SOUSE	NOISE	TAX	HT	START
Panel A: Descriptive statistics of firm characteristics[a]													
Mean	0.577	0.436	0.133	0.199	0.125	4.588	−0.067	17.249	0.139	0.00005	0.442	0.197	0.314
Median	0.575	0.411	0.092	0	0.076	4.174	−0.017	5.399	0.118	0.00004	0	0	0
Std. Deviation	0.266	0.832	0.150	0.400	0.175	2.105	0.196	37.905	0.088	0.00005	0.497	0.398	0.465
Panel B: Pearson product-moment correlations between firm characteristics													
BKOV	1.000	**0.393**[b]	**−0.380**[b]	0.041	**0.102**[c]	**0.166**[b]	**0.353**[b]	**−0.129**[b]	−0.064	**−0.374**[b]	**−0.210**[b]	0.038	**−0.187**[b]
BKOM		1.000	**−0.111**[b]	0.028	−0.045	0.028	0.069	−0.011	0.024	**−0.190**[b]	**−0.103**[c]	0.037	−0.021
RDOA			1.000	0.032	**−0.203**[b]	**−0.322**[b]	**−0.588**[b]	**0.100**[c]	**0.210**[b]	**0.376**[b]	**0.292**[b]	0.044	**0.186**[b]
RECOV				1.000	0.052	**−0.168**[b]	−0.060	**0.127**[b]	0.026	0.003	**0.182**[b]	−0.012	**0.101**[c]
LTDOA					1.000	**0.221**[b]	0.032	**−0.093**[c]	**−0.164**[b]	**−0.169**[b]	−0.033	**−0.089**[c]	**−0.088**[c]
SIZE						1.000	**0.359**[b]	**−0.173**[b]	**−0.275**[b]	**−0.081**[c]	**−0.266**[b]	0.018	**−0.164**[b]
FCFOA							1.000	**−0.110**[c]	−0.063	**−0.277**[b]	**−0.302**[b]	0.021	**−0.209**[b]
SOEFF								1.000	**0.180**[b]	0.057	**0.129**[b]	0.057	**0.161**[b]
SOUSE									1.000	**0.173**[b]	**0.111**[b]	**0.164**[b]	0.077
NOISE										1.000	**0.192**[b]	**0.252**[b]	**0.299**[b]
TAX											1.000	0.011	**0.112**[b]
HT												1.000	−0.007
START													1.000

[a] Variables are abbreviated according to Table 3.
[b] Correlation is significant at the 0.01 level (2-tailed).
[c] Correlation is significant at the 0.05 level (2-tailed).

pro-forma EPS; high option users are firms with *higher* than median proportion of common shares reserved for conversion of stock options; bio-technology firms are those with SIC codes of 2830–2836 and 8731; and comment-letter sample consists of firms submitting a written response to the exposure draft on option accounting. Six of the selected variables represent the firm characteristics that were discussed earlier and defined in Table 3, namely natural log of total assets (SIZE), book over market value of common equity (BKOM), long-term debt over total assets (LTDOA), pro-forma percentage decrease in earnings per share in 1996 (SOEFF), free cash flows over total assets (FCFOA), and noise in stock price performance (NOISE). The other two variables are market value of common equity (MVEQ) measured as an average over the 4-year period of 1992–1995, and actual earnings per share in 1996 (ACTEPS). MVEQ is an alternative measure of size and is calculated as Compustat item 24 times item 25, same as the denominator of BKOM. ACTEPS is Compustat item 58; in absolute terms, it is the denominator of the SOEFF.

The descriptive statistics in Table 5 show that the comment-letter sample has the highest mean and median size (both SIZE and MVEQ) and actual EPS (ACTEPS), but the lowest mean and median percentage decrease in EPS (SOEFF). The portfolio return for this sample, therefore, should be least affected by the SBC pronouncements. All samples (including the comment-letter sample), however, could be potentially affected to various degrees by the SBC pronouncements. The degree to which any of the sample (portfolio) returns are influenced by various SBC pronouncements depends on whether the equity prices of firms in the corresponding portfolio systematically reacted to the events under consideration (a test of hypothesis 1). It is worth however to note that, compared to other dummy variables, the correlations (not reported) between SOEFF and dummy variables identifying high option users, bio-tech, and comment-letter samples are the smallest (in fact, the correlation between SOEFF and comment-letter dummy variable is negative). The low (or negative) correlations for these three portfolios might thus explain the lack of equity price reaction to SBC pronouncements in Dechow et al. (1996).

4.3. Methodology

Hypothesis 1 in this study examines the average impact of each of the 12 events on stock prices of sample firms. While a mean effect may not be observed on a particular event date, stock returns may vary cross-sectionally on that date with the firm characteristics. Hypotheses 2–9, therefore, examine the effect of firm characteristics on the stock market reaction to these events. Hypothesis 1 is tested by employing a Multivariate Regression Model (MVRM) proposed by Schipper and Thompson (1983). The MVRM incorporates both the cross-sectional heteroscedasticity and the contemporaneous correlation of the residuals into the estimation process, allowing joint hypotheses to be tested utilizing the F-statistic defined by Rao (1973). The joint hypothesis tests are of special importance

Table 5
Mean and quartiles of selected variables for the full sample and sub-samples

Sample[a]	Variable[b]		SIZE	MVEQ	BKOM	LTDOA	ACTEPS	SOEFF	FCFOA	NOISE
Full Sample ($N = 595$)	Mean		4.588	1161.607	0.436	0.125	0.373	17.249	−0.067	0.00005
	Quartiles	Lower	3.082	29.122	0.248	0.012	−0.378	1.475	−0.100	0.00002
		Middle	4.174	106.432	0.411	0.076	0.240	5.399	−0.017	0.00004
		Upper	5.965	554.610	0.621	0.187	0.930	16.667	0.029	0.00008
High-tech sample ($N = 117$)	Mean		4.665	1136.416	0.499	0.093	0.478	21.760	−0.059	0.00008
	Quartiles	Lower	3.317	43.606	0.295	0.007	−0.410	2.985	−0.089	0.00004
		Middle	4.448	145.507	0.452	0.053	0.310	6.796	−0.026	0.00007
		Upper	6.069	559.696	0.682	0.153	1.120	16.667	0.021	0.00011
Start-up sample ($N = 187$)	Mean		4.079	344.049	0.410	0.102	0.049	26.263	−0.128	0.00007
	Quartiles	Lower	3.006	33.551	0.208	0.003	−0.593	2.705	−0.196	0.00003
		Middle	3.928	96.425	0.342	0.053	0.025	10.000	−0.065	0.00007
		Upper	5.111	342.877	0.549	0.147	0.723	28.116	0.006	0.00011
High-growth sample ($N = 297$)	Mean		4.412	1509.248	0.166	0.121	0.259	19.280	−0.111	0.00006
	Quartiles	Lower	2.800	43.317	0.164	0.003	−0.450	2.480	−0.201	0.00002
		Middle	4.057	140.140	0.248	0.069	0.120	6.667	−0.034	0.00005
		Upper	5.907	1101.199	0.327	0.169	0.890	20.612	0.030	0.00009
High-EPS−impact sample ($N = 297$)	Mean		3.980	614.803	0.430	0.091	0.076	32.717	−0.107	0.00006
	Quartiles	Lower	2.725	27.363	0.204	0.003	−0.365	9.784	−0.156	0.00002
		Middle	3.728	92.191	0.359	0.040	0.070	16.667	−0.034	0.00005
		Upper	4.982	289.334	0.585	0.140	0.495	34.423	0.016	0.00009

High-option-users sample	Mean		4.046	588.148	0.471	0.092	0.304	19.657	−0.086	0.00007
($N = 297$)	Quartiles	Lower	2.973	26.120	0.235	0.003	−0.468	3.313	−0.126	0.00002
		Middle	3.959	85.626	0.403	0.039	0.220	8.957	−0.033	0.00006
		Upper	4.896	227.967	0.632	0.133	0.918	20.581	0.016	0.00011
Bio-tech sample ($N = 88$)	Mean		3.999	1441.157	0.292	0.084	−0.063	21.360	−0.210	0.00008
	Quartiles	Lower	2.668	37.105	0.181	0.006	−0.755	2.449	−0.340	0.00003
		Middle	3.520	91.096	0.271	0.042	−0.060	6.667	−0.131	0.00006
		Upper	4.986	313.959	0.379	0.121	0.390	27.004	−0.018	0.00011
Comment-letter sample	Mean		6.608	4429.198	0.410	0.116	1.418	15.601	−0.018	0.00006
($N = 64$)	Quartiles	Lower	4.615	221.471	0.229	0.030	0.060	1.229	−0.035	0.00001
		Middle	6.896	1419.676	0.378	0.069	0.790	3.396	0.000	0.00005
		Upper	8.543	6132.810	0.537	0.212	2.960	14.772	0.035	0.00009

[a] The full sample is composed of all the firms in the sample. Other samples are a subset of these 595 firms. Specifically, high-tech sample consists of firms with SIC codes of 3570–3579, 3670–3679, and 8730–8734; start-up sample firms are those in existence for less than 5 years; high-growth firms are defined as those with *lower* than median book to market ratio of common equity (i.e., *higher* market to book ratios); high-EPS-impact sample firms are those with *higher* than median percentage decrease in their pro-forma EPS; high option users are firms with *higher* than median proportion of common shares reserved for conversion of stock options; bio-technology firms are those with SIC codes of 2830–2836 and 8731; and comment-letter sample consists of firms submitting a written response to the exposure draft on option accounting.

[b] Variables are abbreviated according to Table 3, except for the two new variables: (1) MVEQ is the market value of common equity, Compustat item 24 times item 25, measured as an average over the 4-year period of 1992–1995; and (2) ACTEPS is the actual Earnings Per Share in 1996, Compustat item 58.

in this study, as firms are expected to be differentially affected by the pronouncements on stock option.

The MVRM model conditions the return generating process on the occurrence or nonoccurrence of an event by adding a dummy variable for each event to the market model. Each dummy variable is set equal to one if an unfavorable event occurred, minus one for a favorable event (a reversal), and zero otherwise. Since the exact timing of the information release is unknown, a 3-day event period is used corresponding to trading days $t = 1, t = 0$, and $t = +1$ relative to the announcement date shown in Table 1. The coefficient of each dummy variable measures the corresponding event's impact on stock returns. The model is a system of eight portfolio return equations—the entire sample of firms offering stock options and the seven sub-samples: the high-tech, start-up, high-growth, high-EPS-impact, high option-users, bio-tech, and comment-letter sub-samples. The equation for each portfolio is:

$$\check{R}_{jt} = \alpha_j + \beta_j \check{R}_{mt} + \sum_{k=1}^{K} g_{jk} D_{kt} + \check{e}_{jt}, \tag{1}$$

where:

$\check{R}_{jt}$ = the return on portfolio j ($j = 1, 2, \ldots 8$) on day t ($t = 1, 2, \ldots T$). T is the total number of daily return observations from mid-1991 through mid-1996. Returns for each portfolio are weighted based on the full estimated variance-covariance matrix of residuals in order to increase the efficiency of parameter estimates. Specifically,

$\check{R}_{jt}$ = $P_j' R_{ijt}$, where

R_{ijt} = the vector of returns on all i firms in portfolio j on day t,

P_j' = the transpose of portfolio j weights, P_j,

$P_j = (1' S_j^{-1} 1)^{-1} S_j^{-1} 1$,

1 = a vector of ones, and

S_j = the full estimated variance–covariance matrix of residuals from first-pass OLS regressions similar to Eq. (1), but on each firm in portfolio j;

$\check{R}_{mt}$ = the return on the Standard and Poor's 500 Index on day t;

α_j = intercept coefficient for portfolio j;

β_j = risk coefficient for portfolio j;

g_{jk} = the effect of event k ($k = 1, 2, \ldots K$) on portfolio j's return. K is the total number of events examined, which is 12 in this study;

D_{kt} = dummy variable for the kth event which equals one during the 3-day period ($t = -1, t = 0$, and $t = +1$ relative to the announcement date) if event k is unfavorable, minus one if favorable, and zero otherwise; and

$\check{e}_{jt}$ = random disturbance which is assumed to be normal and independent of the return on the market and the event announcement variables.

The system of portfolio regressions in Eq. (1) can be generalized as:

$$\begin{bmatrix} \check{R}_1 \\ \check{R}_2 \\ \check{R}_3 \end{bmatrix} = \begin{bmatrix} \check{X} & 0 & 0 \\ 0 & \check{X} & 0 \\ 0 & 0 & \check{X} \end{bmatrix} * \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \end{bmatrix} + \begin{bmatrix} \check{e}_1 \\ \check{e}_2 \\ \check{e}_3 \end{bmatrix} \tag{2}$$

or

$$\check{R} = \check{X}\beta + \check{e}, \tag{3}$$

where:

$\check{R}_j =$ $T \times 1 =$ vector, (the elements of the vector are $\check{R}_{j1}, \check{R}_{j2}, \ldots, \check{R}_{jT}$);
$\check{X} =$ $T \times C$ matrix of independent variables which is the same for each equation in the system, $C = K + 2 = 14$. (The first column of this matrix is of 1's, the second column is of the daily returns on Standard and Poor's 500 index, $\check{R}_m$, and the last 12 columns are of dummy variables, D_k, for the 12 events);
$\beta_j =$ $C \times 1$ vector of coefficients; and
$\check{e}_j =$ $T \times 1$ vector of disturbances.

Estimation of the multivariate regression model in Eq. (3) assumes that the residuals are independently, identically distributed within each equation. As Smith et al. (1986) suggest, however, this is not likely to be true. The estimation of the system in Eq. (3), therefore, must be adjusted for possible time-series heteroscedasticity (see Smith et al., 1986, p. 477, for a detailed discussion of this situation). To correct for time-series heteroscedasticity a procedure developed by White (1980), in which the variance–covariance matrix of the residuals are allowed to vary across observations, is employed.

To test the effect of firm characteristics on stock market reaction to the events under consideration (i.e., to test Hypotheses 2–9), the portfolio weighting procedure proposed by Sefcik and Thompson (1986) is used. The procedure involves three steps. First, form a matrix F having a column of ones and (P-1) columns of firm characteristics, namely growth, debt constraint, size, free cash flows, option usage, noise in stock price performance, tax loss carry-forward status, high-tech status, and start-up status. This matrix is defined as follows:

$$F = \begin{bmatrix} 1 & X_2 & \ldots & X_p \end{bmatrix}, \tag{4}$$

where X_p is an $N \times 1$ vector of the pth firm characteristic ($P = 10$ and $N = 595$ firms used to test Hypotheses 2–9).

Second, create $P = 10$ sets of portfolio weights (W) and compute the portfolio returns ($\check{R}_{pt}$) for each set as follows:

$$W = \begin{bmatrix} W_1' \\ W_2' \\ \vdots \\ W_p' \end{bmatrix} = (F'F)^{-1}F', \tag{5}$$

$$\check{R}_{pt} = W_p' R_{it},\ p = 1, 2, \cdots, P,\ t = 1, 2, \ldots, T,\ i = 1, 2, \ldots, N, \tag{6}$$

where:

W = $P \times N$ matrix of portfolio weights ($P = 10$ and $N = 595$ firms);
W_p' = pth row of portfolio weights which are influenced by the pth firm characteristic (a single column of F);
F = $N \times P$ matrix defined in Eq. (4);
$\check{R}_{pt}$ = return on portfolio p on day t; and
R_{it} = $N \times 1$ vector of individual firms' security returns on day t.

Third, run p portfolio time-series OLS regressions ($p = 1, 2, \ldots, 10$) of the form:

$$\check{R}_{pt} = \alpha_p + \beta_p \check{R}_{mt} + \sum_{k=1}^{K} g_{pk} D_{kt} + \check{e}_{pt}, \tag{7}$$

where $\check{R}_{mt}$ = the return on the Standard and Poor's 500 Index on day t; α_p = the intercept coefficient for portfolio p; β_p = risk coefficient for portfolio p; g_{pk} = the parameter estimate for event k ($k = 1, 2, \ldots 12$); D_{kt} = dummy variable for the kth event which equals one during the 3-day period ($t = -1, t = 0$, and $t = +1$ relative to the announcement date) if event k is unfavorable, minus one if favorable, and zero otherwise; and $\check{e}_{pt}$ = random disturbance which is assumed to be normal and independent of the return on the market and the event announcement variables.

The event parameter estimates (g_{pk}) in each of the above regressions reflect the effect of one (and only one) firm characteristic on stock market reaction to the events under consideration. These estimates are the same as those in cross-sectional regression of abnormal returns (or dummy variable coefficients) on firm characteristics. However, "unlike cross-sectional regressions, the standard errors of these estimates account fully for the cross-correlation and (cross-sectional) heteroscedasticity in firm disturbances" (Sefcik and Thompson, 1986, p. 324). In addition, the weighting procedure takes into account potential collinearities among the firm characteristics, and provides an opportunity to evaluate the relative importance of different firm characteristics in explaining the market reaction to pronouncements related to stock options.

5. Results

Table 6 reports the portfolio abnormal returns and the t-statistics for the full sample as well as the seven sub-samples based on the Multivariate Regression Model (MVRM) for the 3-day period ($t = -1, t = 0$, and $t = 1$ relative to the announcement day) around each of the twelve events. The full sample is composed of all the firms in the sample (595 firms) and other samples are a subset of these firms, as discussed before in Table 5. The first four portfolios relate to our hypotheses, and the last four are added for comparison with Dechow et al. (1996). The estimates in Table

Table 6
Test of hypothesis 1 for the 12 events

Portfolio abnormal returns (in %) and *t*-statistics (in parentheses) for the full sample and seven sub-samples[a] around each of the 12 events. These estimates are the coefficients of the dummy variables in a regression of portfolio returns (weighted based on the full estimated covariance matrix of residuals) on the market return and dummy variables corresponding to the 12 events (represented by Eq. (3)). Each dummy variable equals "+1" during the 3-day period ($t = -1, t = 0$, and $t = 1$ relative to each announcement) of an unfavorable event, "−1" for a favorable event, and zero otherwise

Event number [b]	Event date[b]	Full sample ($N = 595$)	High-tech sample ($N = 117$)	Start-up sample ($N = 187$)	High-growth sample ($N = 297$)	High-EPS-impact sample ($N = 297$)	High-option-users sample ($N = 297$)	Bio-tech sample ($N = 88$)	Comment-letter sample ($N = 64$)
1	1/22/92	0.19	−0.29	−0.22	−0.40	−0.37	−0.54	0.45	−0.18
		(0.46)	(−0.67)	(−0.65)	(−1.07)	(−1.35)	(−1.23)	(1.16)	(−0.50)
2	6/26/92	−0.18	−0.32	−0.30	−0.21	−0.15	−0.11	0.20	−0.23
		(−0.55)	(−0.72)	(−0.71)	(−0.55)	(−0.41)	(−0.25)	(0.70)	(−0.61)
3	4/6/93	0.15	0.12	0.14	−0.08	0.13	0.14	0.33	0.10
		(0.49)	(0.30)	(0.32)	(−0.18)	(0.43)	(0.28)	(0.80)	(0.28)
4	4/7/93	−0.37	−0.53	−0.50	−0.37	−0.35	−0.29	−0.07	−0.17
		(−0.78)	(−1.31)	(−1.37)	(−0.90)	(−1.05)	(−0.35)	(−0.23)	(−0.43)
5	6/30/93	−0.85	−1.27	−1.14	−1.36	−1.23	−0.72	−0.52	0.08
		(−2.17)[d]	**(−3.15)**[c]	**(−2.85)**[c]	**(−3.47)**[c]	**(−2.91)**[c]	(−1.56)	(−1.40)	(0.20)
6	11/5/93	−0.65	−0.94	−0.94	−0.69	−0.82	−0.58	−0.50	−0.14
		(−1.85)[e]	**(−2.58)**[d]	**(−2.39)**[d]	**(−1.93)**[e]	**(−2.27)**[d]	(−1.31)	(−1.21)	(−0.38)
7	3/28/94	−0.21	−0.24	−0.31	0.31	0.29	0.26	0.41	−0.27
		(−0.50)	(−0.59)	(−0.81)	(0.84)	(0.83)	(0.56)	(0.83)	(−0.68)
8	4/22/94	−0.19	−0.25	−0.27	−0.11	−0.20	0.18	0.23	−0.16
		(−0.57)	(−0.65)	(−0.75)	(−0.30)	(−0.56)	(0.42)	(0.65)	(−0.44)
9	11/16/94	0.09	0.11	0.18	0.24	0.20	0.19	0.05	0.22
		(0.19)	(0.26)	(0.61)	(0.65)	(0.47)	(0.44)	(0.17)	(0.57)
10	12/14/94	−0.18	−0.36	−0.29	−0.19	−0.12	0.12	0.38	−0.17
		(−0.45)	(−0.80)	(−0.78)	(−0.51)	(−0.45)	(0.28)	(0.92)	(−0.49)
11	12/15/94	−0.89	−1.10	−1.03	−0.92	−0.97	−0.55	−0.54	−0.11
		(−2.15)[d]	**(−2.87)**[c]	**(−2.68)**[c]	**(−2.41)**[d]	**(−2.54)**[d]	(−1.27)	(−1.32)	(−0.47)
12	10/23/95	−0.30	−0.35	−0.38	−0.37	−0.27	−0.30	−0.09	−0.38
		(−0.80)	(−0.79)	(−0.94)	(−1.04)	(−1.12)	(−0.70)	(−0.17)	(−0.99)

[a] The full sample is composed of all the firms in the sample. Other samples are a subset of these 595 firms. Specifically, high-tech sample consists of firms with SIC codes of 3570–3579, 3670–3679, and 8730–8734; start-up sample firms are those in existence for less than 5 years; high-growth firms are defined as those with *lower* than median book to market ratio of common equity (i.e., *higher* market to book ratios); high-EPS-impact sample firms are those with *higher* than median percentage decrease in their pro-forma EPS; high option users are firms with *higher* than median proportion of common shares reserved for conversion of stock options; bio-technology firms are those with SIC codes of 2830–2836 and 8731; and comment-letter sample consists of firms submitting a written response to the exposure draft on option accounting. The last four portfolios are added for comparability with Dechow et al. (1996).

[b] Event numbers and dates are described in Table 1.

[c] Significant at the 0.01 level.

[d] Significant at the 0.05 level.

[e] Significant at the 0.10 level.

6 are the coefficients of the dummy variables in a regression of portfolio returns (weighted based on the full estimated covariance matrix of residuals) on the market return and dummy variables corresponding to the twelve events (represented by Eq. (3)). Each dummy variable equals "+1" during the 3-day period ($t=-1, t=0$, and $t=1$ relative to each announcement) of an unfavorable event, "−1" for a favorable event, and zero otherwise. Thus, all the dummy variables should have a negative coefficient.

The results for the first four portfolios indicate that events 5, 6, and 11, are associated with significant abnormal returns.[5] These events represent the exposure draft proposing to require recognition of SBC costs (bad news), a pronouncement that the FASB may delay disclosure of employee stock options cost (the first sign of backing up by FASB, good news), and the vote to rescind the requirement to expense the cost of employee options and require disclosure only while encouraging expense recognition (also good news). None of the other dummy variables' coefficients are significant at any meaningful level, and all significant coefficients have the expected sign. Overall, the results support Hypothesis 1.

The significance of the abnormal return around event 11 is consistent with the contracting theory, and shows that disclosure is not a substitute for recognition. Requiring companies to only disclose the cost of SBC rather than forcing recognition as was proposed earlier would involve no new information and should not affect security prices, except through the contracting and political cost hypotheses (as future earnings will be affected by recognition, but not by disclosure, of SBC costs). Thus, there must be some truth in FASB's claim in general that disclosure is not a substitute for recognition, and in the exposure draft that (even with improved disclosure) only the most sophisticated users could reasonably estimate the impact on financial statements of SBC costs. An anecdotal evidence of this claim is that only two companies, out of over 1400 firms we considered before screening them for data availability, indicated in the footnote to their 1996 annual report that they elected to recognize the SBC costs.

The estimated coefficients of event dummy variables for the high-tech, start-up, and the high-growth sub-samples are always larger (in absolute values because, as discussed earlier in this section, all the dummy variables should have a negative coefficient) than those for the full sample. The estimated coefficients associated with the full sample are −0.85, −0.65, and −0.89 for events 5, 6, and 11, respectively; the corresponding values are −1.27, −0.94, and −1.10 for the high-tech, −1.14, −0.94, and −1.03 for the start-up, and −1.36, −0.69, and −0.92 for the high-growth companies. Furthermore, for each of these three sub-samples, the three F-statistics for events 5, 6, and 11 (not reported in Table 6) show that differences between the coefficients for firms in the sub-sample and those for the remaining firms combined

[5] The significant abnormal returns reported in Table 6 could have been driven by a few outliers. To rule out this possibility, the number of significant 3-day abnormal returns around each of the events 5, 6, and 11 for the full sample and each of the next four sub-samples was determined. Except for the numbers corresponding to events 6 and 11 for the full sample that were significant at 0.05 level, these numbers were significant at the 0.01 level based on binomial tests, suggesting that results reported in Table 6 are not driven by outliers.

(e.g., for the 595–117 = 478 firms in the case of high-tech sample) are significant at 0.01 level; exception is for event 6 in the case of high-growth sample, where the significance level is 0.05. These results indicate that high-tech, high-growth, and start-up companies would have been generally more adversely affected by expensing the SBC costs, as claimed.

The last four portfolios in Table 6 are designed to explore the differences between our results and those of Dechow et al. (1996) in terms of equity price reaction to SBC pronouncements. Dechow et al. used three samples: companies writing a comment letter; bio-technology firms; and all firms in industries with high median option usage, as measured by the proportion of common shares reserved for conversion of stock options to common shares outstanding. They observed a significant mean abnormal return on 4/8/93, the date the WSJ and NYT announced the FASB's formal vote to require expensing of SBC costs, for the comment- letter sample but not the other two samples. They did not, however, find any equity price reaction to the ED announcement or the decision to rescind its requirements (our event numbers 5 and 11).

The results for the high-EPS-impact sample (fifth portfolio) show significant abnormal returns around events 5, 6, and 11, for half of the sample firms with higher than median percentage decline in their pro-forma EPS (SOEFF). However, no significant abnormal return is observed for high option users, defined as half of the sample firms with higher than median fraction of shares reserved for conversion of stock options (SOUSE). This difference in results shows that the fraction of shares reserved for conversion of stock options is a noisy proxy for option usage.[6] Dechow et al. (1996) acknowledged this problem but could not have used our measure, as 1996 was the first year companies were required to disclose the pro forma effect of the options on income and EPS.

The last two portfolios in Table 6 show that, consistent with the results in Dechow et al., no significant abnormal returns are observed around any of the 12 events for bio-tech firms and those writing comment letters to FASB. One might think that these firms are high option users (as confirmed in Table 5 for the bio-tech firms). However, the correlations (not reported in Table 4 because of space limitation) among dummy variables identifying these firms and the two measures of stock option usage are very insignificant (the highest correlation is 0.046, which is significant at 0.29). It is possible, therefore, that companies in the comment-letter sample (those most concerned) took steps to mitigate the negative effects of recognizing the SBC costs. For example, The WSJ (11/23/93) reported that some banks were devising ways for firms to hedge against the proposed stock option rule. Alternatively, firms strongly opposing the Exposure Draft (as evidenced by writing comment letters) may have somewhat curtailed the use of stock options. Finally, as Dechow et al. suggest, these managers' lobbying behavior may have been driven by concern over compensation rather than concern over investors misunderstanding the

[6] Although our high-option-users sample has a higher mean (also median) percentage decrease in EPS (SOEFF) than the full sample, as indicated in Table 5, the correlation between SOEFF and a dummy variable identifying high-option-users is only 0.053, which is significant at 0.22 level.

information about stock option expense. The fact that the comment-letter writers have lower mean and median percentage decline in their EPS (mean and median of 15.6% and 3.4% versus 17.5% and 5.8% for the remaining firms in our sample) is consistent with the managers' lobbying motive proposed by Dechow et al. and with the absence of a significant market reaction to SBC events for the comment-letter sample.

Table 7 presents the results for Hypotheses 2–9. This table reports the results for the full sample only because the growth opportunities, as well as high-tech and start-up status, are captured by book value of assets over total firm value (BKOV) and the dummy variables, and because many of the other variables account for the extent of option usage. Each column in Table 7 reports the coefficients of dummy variables in one of the ten portfolio regressions described by Eq. (7). The dummy variable coefficients (g_{pk}) for each portfolio measure the effect of the corresponding firm characteristic (and only that characteristic, as the potential collinearities among different firm characteristics are taken into account by employing the Sefcik and Thompson (1986) methodology) on stock market reaction to each of the twelve events.

The estimated coefficients of dummy variables reported in the second through tenth columns are all significant for events 5 and 11 (except for retained-earnings related constraint for event 11). For event 6, which had a smaller impact on the overall mean return, only the coefficients of dummy variables in option usage, noise in stock price performance, tax loss carry-forward, high-tech, and start-up portfolios are significant. None of the other coefficients were significant at any meaningful level, and all significant coefficients had the expected sign.[7]

In general, the results support Hypothesis 2–9 that the negative stock price impact of the proposed standard on SBC (the exposure draft) was more pronounced for high-tech, high-growth (represented by a low book value of total assets over total firm value), and start-up firms. The stock price impact was also positively related to the existence of tax loss carry-forward, the extent of stock option usage (as reflected by its effect on EPS), and retained-earnings related debt constraint; and negatively related to the noise in stock price performance, free cash flows over total assets, and firm size.

Based on the relative size of the *t*-statistics reported in Table 7, growth, high-tech and start-up dummies, and option usage are the firm characteristics that have the most significant relation with stock price reaction to the Exposure Draft (event 5). Stock price reaction to event 11 (the vote not to require recognition of SBC costs) is

[7] Alternative specifications of growth, stock option usage, and debt constraints did not influence our findings. Growth defined as book over market value of common equity, and research and development over total assets, produced almost identical results except the signs for the latter measure were different, as expected. With stock option usage defined as the common shares reserved for conversion of stock options over common shares outstanding, the coefficients were insignificant at the 0.10 level (perhaps due to the noise in that measure); the highest *t*-statistic was 1.49 for event 11. Finally, the leverage-related debt constraint coefficients were all insignificant at the 0.10 level. We expected the coefficients of long-term debt over total assets to be insignificant, as the loosening effect of the proposed standard on the leverage ratio was small.

most significantly related to the same variables, except noise in stock price performance becomes the second (and size the fourth) most significant variable. Size has a strong relation with the stock price reaction and supports the political cost hypotheses. Retained-earnings related debt constraint has the least pronounced relation with stock price reaction to event 5, and is not related to events 6 and 11 at 0.10 significance level. This result is intuitive because no retroactive adjustments to retained earnings were to be required, i.e., the proposed standard was to apply to options issued after 1996 only.

Overall, the results in Table 7 are in contrast with the findings of Dechow et al. (1996). Dechow et al. used four firm-specific variables to explain cross-sectional differences in abnormal returns across firms: free cash flows divided by total assets, retained-earnings related constraint, leverage-related constraint (total debt divided by total assets), and size. They did not, however, find any of these four variables to be related to equity price reaction to the SBC pronouncements. We attribute these differences once again to the sample and the variable set. Specifically, of the four variables, as Dechow et al. (1996) explain, the one measuring stock option usage is a noisy proxy (p. 8) and the leverage-related constraint should not be significant as the ED requirements would have actually reduced leverage (p. 6). The other two variables' insignificance may only be explained by the sample. We examine this issue by testing the effect of these four variables on the stock market reaction to the twelve events, using the Sefcik and Thompson (1986) methodology and our comment-letter sub-sample. Consistent with Dechow et al. (1996), none of the estimated coefficients of the event dummy variables in these four portfolio regressions are found to be significant at the 0.10 level (the highest t-value is -1.15 for event 5 in the free cash flow portfolio).

We also explore the differences between our results and those of Dechow et al. (1996) by adding three portfolios (representing comment-letter and bio-tech dummy variables and SOUSE, fraction of shares reserved for conversion of stock options) to our existing ten portfolios in Table 7. None of the event dummy variables for these three portfolios are found to be significant at 0.10 level (the largest t-value is 1.39 for event 11 in SOUSE portfolio); in addition, except for event 6 in the tax loss carry-forward portfolio that becomes insignificant at 0.10 level, there are no changes in the significance of the events in the existing portfolios.[8] These results are consistent with the lack of significant correlations among the dummy variables identifying the bio-tech and comment-letter firms and the option usage (SOEFF), and the noise in the stock option usage measure utilized by Dechow et al. (1996). As mentioned earlier, it is also possible that companies writing comment letters were motivated by compensation (as suggested by Dechow et al.) or took steps to mitigate the negative effects of recognizing the SBC costs. Alternatively, firms strongly opposing the Exposure Draft (as evidenced by writing comment letters) may have somewhat curtailed the use of stock options.

[8] The t-values increase for two events and their significance level changes from 0.05 to 0.01. Specifically, the t-values increase as follows: (1) from 2.50 to 2.71 for event 11 in the option usage portfolio; and (2) from 2.56 to 2.61 for event 5 in the start-up portfolio.

Table 7
Test of hypotheses 2–9 for the 12 events

Coefficient estimates (g_{pk}) of event dummy variables in p (10) portfolio regressions (represented by Eq. (7)) of the form K.

$$\check{R}_{pt} = \alpha_p + \beta_p \check{R}_{mt} + \sum_{k=1}^{K} g_{pk} D_{kt} + \check{e}_{pt},$$

where g_{pk} for each portfolio measures the effect of the corresponding characteristic on stock price reaction to event k. Each dummy variable equals "+1" during the 3−day period ($t = -1, t = 0$, and $t = 1$ relative to each announcement) of an unfavorable event, "−1" for a favorable event, and zero otherwise. T-statistics are in parentheses

	Alternative portfolios[a]									
Event number[b] (k)	Constant term portfolio	Growth portfolio BKOV	Debt constraint portfolio RECOV	Size portfolio SIZE	Free cash flow portfolio FCFOA	Option usage portfolio SOEFF	Stock price noise portfolio NOISE	Tax loss dummy portfolio TAX	High-tech dummy portfolio HT	Start-up dummy portfolio START
1	−0.54	−1.01	0.62	−0.02	−0.77	−0.90	−0.41	0.17	0.89	1.01
	(−0.72)	(−1.18)	(0.70)	(−0.06)	(−1.35)	(−0.96)	(−0.96)	(0.43)	(0.97)	(1.15)
2	0.19	0.18	−0.35	−0.14	−0.25	−0.41	0.35	0.25	0.73	0.65
	(0.26)	(0.21)	(−0.39)	(−0.45)	(−0.44)	(−0.44)	(0.82)	(0.63)	(0.80)	(0.74)
3	−0.29	−0.73	0.98	−0.29	−0.69	−0.74	−0.55	0.10	1.02	0.90
	(−0.39)	(−0.86)	(1.10)	(−0.93)	(−1.21)	(−0.80)	(−1.28)	(0.20)	(1.09)	(1.03)
4	0.51	−0.58	−0.55	−0.48	−0.64	1.10	−0.50	0.43	1.15	0.92
	(0.69)	(−0.68)	(−0.62)	(−1.50)	(−1.13)	(1.18)	(−1.17)	(0.99)	(1.25)	(1.07)
5	0.24	−2.62	1.75	−0.75	−1.40	2.47	−1.01	0.89	2.68	2.20
	(0.33)	**(−3.05)**[c]	**(1.96)**[e]	**(−2.39)**[d]	**(−2.46)**[d]	**(2.65)**[c]	**(−2.37)**[d]	**(2.04)**[d]	**(3.07)**[c]	**(2.56)**[d]
6	0.78	−1.37	1.22	−0.52	−0.77	2.11	−0.87	0.77	2.04	1.76
	(1.05)	(−1.59)	(1.37)	(−1.60)	(−1.36)	**(2.26)**[d]	**(−2.04)**[d]	**(1.76)**[e]	**(2.35)**[d]	**(2.04)**[d]

7	−0.56	−0.78	0.72	−0.50	0.11	−0.35	0.40	0.53	1.26	0.85
	(−0.76)	(−0.91)	(0.80)	(−1.53)	(0.20)	(−0.38)	(0.95)	(1.19)	(1.45)	(0.99)
8	0.83	−0.84	0.54	0.31	−0.23	−0.15	−0.51	0.35	0.65	0.63
	(1.12)	(−0.99)	(0.61)	(0.95)	(−0.41)	(−0.17)	(−1.20)	(0.78)	(0.75)	(0.76)
9	−0.62	−0.90	0.80	−0.32	−0.51	0.37	0.25	0.52	1.18	0.84
	(−0.84)	(−1.05)	(0.91)	(−0.99)	(−0.89)	(0.40)	(0.58)	(1.15)	(1.36)	(0.99)
10	−0.34	0.68	−0.47	−0.51	0.22	−0.88	0.48	0.19	0.90	0.90
	(−0.46)	(0.80)	(−0.50)	(−1.57)	(0.39)	(−0.94)	(1.12)	(0.39)	(1.03)	(1.06)
11	0.40	−2.52	1.41	−0.82	−1.31	2.38	−1.21	1.04	2.40	2.06
	(0.54)	**(−2.94)**[c]	(1.58)	**(−2.51)**[d]	**(−2.31)**[d]	**(2.50)**[d]	**(−2.85)**[c]	**(2.15)**[d]	**(2.71)**[c]	**(2.42)**[d]
12	0.39	0.49	0.88	−0.18	−0.18	0.12	0.15	0.33	0.85	0.58
	(0.54)	(0.57)	(0.97)	(−0.55)	(−0.33)	(0.13)	(0.37)	(0.68)	(0.99)	(0.69)

[a] Portfolios are based on the nine base variables described in Table 3.
[b] Events are described in Table 1.
[c] Significant at the 0.01 level.
[d] Significant at the 0.05 level.
[e] Significant at the 0.10 level.

6. Summary and conclusions

The proposed standard to recognize SBC costs was the subject of criticism by Congress, the business community, and the accounting profession primarily because it was predicted that recognition of SBC costs could lower the reported earnings by as much as 50% and would adversely affect stock prices (Berton, 1993). This study examined the equity price reaction to the SBC pronouncements, the cross-sectional variation of abnormal returns with firm-specific variables, and the value relevance of recognition versus disclosure in financial reporting. Examining the capital market reaction to the SBC pronouncements not only provided insight into the market's assessment of the relative importance of each event, it showed the rationale for lobbying efforts and concerns by various groups. More importantly, the unique feature of SBC pronouncements not only allowed us to test the significance of the contracting theory, but also to assess the value relevance of disclosure versus recognition.

Our results indicate that firms exhibited significant abnormal returns around the issuance of the Exposure Drafts proposing to require recognition of stock-based compensation costs, and also around the event reversing that decision to require disclosure only (while encouraging recognition). We show that the abnormal returns were most pronounced for high-tech, high-growth, and start-up firms. We also document that the stock price impact was positively related to the existence of tax loss carry-forward, the extent of stock option usage (as reflected by its effect on EPS), and retained-earnings related debt constraint; and negatively related to the noise in stock price performance, free cash flows over total assets, and firm size. These results are consistent with the contracting theory, and show that disclosure is not a substitute for recognition.

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