

# Causes and Consequences of Earnings Manipulation: An Analysis of Firms Subject to Enforcement Actions by the SEC\*

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*Abstract.* This study investigates firms subject to accounting enforcement actions by the Securities and Exchange Commission for alleged violations of Generally Accepted Accounting Principles. We investigate: (i) the extent to which the alleged earnings manipulations can be explained by extant earnings management hypotheses; (ii) the relation between earnings manipulations and weaknesses in firms' internal governance structures; and (iii) the capital market consequences experienced by firms when the alleged earnings manipulations are made public. We find that an important motivation for earnings manipulation is the desire to attract external financing at low cost. We show that this motivation remains significant after controlling for contracting motives proposed in the academic literature. We also find that firms manipulating earnings are: (i) more likely to have boards of directors dominated by management; (ii) more likely to have a Chief Executive Officer who simultaneously serves as Chairman of the Board; (iii) more likely to have a Chief Executive Officer who is also the firm's founder; (iv) less likely to have an audit committee; and (v) less likely to have an outside blockholder. Finally, we document that firms manipulating earnings experience significant increases in their costs of capital when the manipulations are made public.

*Résumé.* Les auteurs analysent les entreprises assujetties aux mesures d'exécution prises par la Securities and Exchange Commission dans les cas de présomption de transgression des principes comptables généralement reconnus. Ils s'intéressent aux aspects suivants de la question: i) la mesure dans laquelle les présomptions de manipulations des bénéfices peuvent être expliquées par les hypothèses existantes de gestion des bénéfices; ii) la

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relation entre les manipulations de bénéfices et les faiblesses des structures de régie interne des entreprises; et iii) la réaction du marché financier à l'endroit des entreprises au sujet desquelles les présomptions de manipulation des bénéfices sont rendues publiques. Les auteurs constatent qu'un incitatif majeur à la manipulation des bénéfices est le désir d'obtenir du financement externe à moindre coût. Ils démontrent que cet incitatif demeure important même après le contrôle des motifs contractuels que mettent de l'avant les travaux théoriques. Ils constatent également que les entreprises qui manipulent les bénéfices sont: i) davantage susceptibles d'avoir des conseils d'administration dominés par la direction; ii) davantage susceptibles d'avoir un chef de la direction qui joue simultanément le rôle de président du conseil; iii) davantage susceptibles d'avoir un chef de la direction qui est également le fondateur de l'entreprise; iv) moins susceptibles d'avoir un comité de vérification; et v) moins susceptibles d'avoir un bloc de titres détenus par un actionnaire extérieur. Enfin, les auteurs établissent le fait que le coût du capital, pour les entreprises qui manipulent les bénéfices, enregistre des hausses appréciables lorsque ces manipulations sont rendues publiques.

This study investigates the motives for, and consequences of, earnings manipulation in a sample of firms subject to accounting enforcement actions by the Securities and Exchange Commission (SEC).<sup>1</sup> These firms are alleged to have violated generally accepted accounting principles (GAAP) by overstating their reported earnings. We examine the ability of several previously suggested motivations for earnings manipulation to explain the behavior of this sample. We also test whether the incidence of earnings manipulation in this sample is systematically related to weaknesses in the firms' governance structures. Finally, we document the capital market consequences experienced by these firms after allegations of earnings manipulation are made.

Our research relies on the assumption that the SEC has (on average) correctly identified firms that intentionally overstate reported earnings. We believe this assumption is reasonable, since the SEC goes to great lengths to establish that earnings are manipulated knowingly and intentionally before taking an enforcement action.<sup>2</sup> Moreover, we verify that the firm-years investigated by the SEC display managed earnings using constructs developed in the academic literature. For example, these firms employ more income-increasing accounting procedures, have higher total accruals, and have higher estimated discretionary accruals. In fact, because our sample is subject to SEC enforcement actions, it is almost certainly biased toward the inclusion of the more obvious and spectacular cases of earnings manipulation. While this increases the power of our tests, it also potentially limits the generalizability of our results to more subtle cases of earnings manipulation, such as earnings management within the bounds of GAAP. Nevertheless, the sample provides a unique opportunity to assess both the relative importance of various hypotheses for earnings manipulation and the trade-offs involved in the earnings manipulation decision. Our results also provide testable implications for future research investigating more subtle cases of earnings management.

Our empirical analysis indicates that one important motivation for earnings manipulation is the desire to attract external financing at low cost. While this motivation for earnings manipulation is regularly cited by practitioners and in

the financial press, it has received relatively little attention in the academic literature. We find that this motivation is important even after controlling for contracting motives frequently discussed and tested in the academic literature.

Our analysis of governance structures indicates that the likelihood of earnings manipulation is systematically related to weaknesses in the oversight of management. For example, we find that our sample of earnings manipulators are less likely to have an audit committee, more likely to have a company founder as CEO, more likely to have a CEO who also serves as the Chairman of the Board, more likely to have a board of directors dominated by insiders, and less likely to have an external blockholder monitoring management.

Finally, we find that the capital market imposes substantial costs on firms revealed to be earnings manipulators. Consistent with Feroz, Park and Pastena (1991), we find an average stock price drop of approximately nine percent at the initial announcement of the alleged earnings manipulation. We also find that identification as an earnings manipulator is associated with an increase in the bid-ask spread, a drop in analyst following, an increase in short interest, and an increase in the dispersion of analysts' earnings forecasts. These findings are consistent with investors revising downward their beliefs about both the firms' future economic prospects and the credibility of the firms' financial disclosures. Thus, our results suggest that while unidentified earnings manipulators enjoy lower costs of capital, identification as an earnings manipulator is associated with substantial increases in the cost of capital.

The remainder of the paper is organized as follows. The next section motivates our empirical analysis. The third section discusses the SEC sample and describes our research design. The empirical results are presented in the fourth section. In the final section, we discuss our conclusions and implications for future research.

### **Motivation and hypotheses**

This section develops the framework for our empirical analysis. First, we identify the motivations for earnings manipulation that have received widespread attention in the extant academic research and the practitioner oriented literature. Second, we identify characteristics associated with weak governance structures, with particular emphasis on the oversight of financial disclosure decisions. Finally, we generate predictions concerning the costs and consequences experienced by firms revealed to be earnings manipulators.

#### *Motivations for earnings manipulation*

There is a large body of academic literature examining motivations for earnings management. While there is no clear consensus in the literature on a definition of earnings management, the term is generally restricted to reporting practices that are within the bounds of GAAP.<sup>3</sup> This study examines earnings manipulation, which we define to be both within and outside the bounds of GAAP. Since earnings manipulation outside of GAAP entails potential legal costs that can be avoided through earnings manipulation within GAAP, we expect that firms

resorting to manipulation outside of GAAP will also be managing earnings within GAAP. Thus, the academic literature on motivations for earnings management provides a potential source of motivations for earnings manipulation.

A vast number of motivations for earnings management have been proposed in the academic literature. Since it is not feasible to consider all proposed motivations, we confine our analysis to those that have been most extensively examined. Academic research has focused on various contracting theories of earnings manipulation, of which the 'bonus hypothesis' and the 'debt hypothesis' have received the most support (see, Watts and Zimmerman 1990). For example, Christie (1990) reexamines this research and concludes that variables relating to managerial compensation and debt contracts achieve the highest overall statistical significance in explaining accounting procedural choice. Thus, we examine the ability of the bonus hypothesis and the debt hypothesis to explain earnings manipulation in the SEC sample.

In contrast to academic researchers, practitioners emphasize the role of accounting information in investment and lending decisions by stockholders and creditors as a major motivation for earnings manipulation. For example, Kellogg and Kellogg (1991) state that the first two reasons for fraud, misrepresentation, and manipulation in financial statements are :

1. To encourage investors to buy an interest in a company's stock as owners, or in bonds as creditors; and
2. To increase the value of the stock of present shareholders of the company.

Similarly, the National Association of Certified Fraud Examiners (1993) states that the first reason why financial statement manipulation is committed is "to encourage investment through the sale of stock."

Thus, practitioners argue that influencing investor perceptions of firm value provides a primary motivation for earnings manipulation. Management and existing shareholders benefit from manipulating investors' perceptions of firm value if they can raise additional financing on more favorable terms or sell their stockholdings for a higher price. Recent empirical evidence is mixed (Aharony, Lin, and Loeb 1993; Friedlan 1995; Teoh, Wong, and Rao 1994; and Rangan 1995). We therefore consider external financing and insider sales of stock as additional motivations for earnings manipulation.

#### *Internal governance structures*

Internal governance processes are established to maintain the credibility of firms' financial statements and safeguard against such behavior as earnings manipulation. The sample of firms investigated in this study provides a unique opportunity to investigate whether firms that manipulate reported earnings are more likely to have weak governance structures. In this section we identify characteristics of weak governance structures suggested by the academic and practitioner literatures. These lead to predictions concerning the characteristics of the governance structures that facilitate earnings manipulation in the SEC sample.

Jensen (1993) argues that boards of directors are ineffectual monitors when the board is too large, when the board's equity ownership is small, and when the

CEO is also the Chairman of the Board. In addition, CEOs who are the company founders are likely to have greater influence over their firms' operations and be less accountable to the board of directors. A variety of studies also suggest that the composition of the board of directors determines its effectiveness. In particular, boards composed largely of outsiders are more effective than boards with few seats taken by outsiders (see, for example, Brickley and James 1987; Weisbach 1988; and Rosenstein and Wyatt 1990). Further, according to Jensen (1993) and Holthausen and Larcker (1993), an outside blockholder on the board of directors plays a significant monitoring role. In support of this prediction, DeFond and Jiambalvo (1991) find that outside blockholders are less prevalent in 41 firms with accounting errors.<sup>4</sup> In addition, DeFond and Jiambalvo find that firms with accounting errors are less likely to have audit committees. Practitioners, likewise suggest that audit committees play an important role in the oversight of the financial reporting process:

In a corporate-governance approach to financial reporting, audit committees are involved in oversight of the entire financial reporting process. Throughout the year they learn and inquire about significant matters affecting financial reporting—accounting principles, accounting estimates, information systems, internal controls, and risks and uncertainties are some examples. (Audit Committees – A Pivotal Role, Deloitte & Touche LLP, 1994, p. 7).

Finally, the independence and quality of the outside auditor will affect the likelihood that earnings manipulation is detected and precluded from the financial statements. DeAngelo (1981) suggests that auditor independence is correlated with firm size, while Palmrose (1988) suggests that the 'Big Eight' (now 'Big Six') audit firms are less frequently sued than other audit firms because they provide higher quality audits. Thus, we hypothesize that the use of a Big Six auditor will mitigate earnings manipulation.<sup>5</sup>

In summary, we predict that firms in the SEC sample are (i) more likely to have large boards of directors that are dominated by insiders; (ii) less likely to have outside directors with significant equity holdings; (iii) less likely to have an audit committee; (iv) less likely to have an external blockholder; (v) more likely to have a company founder as CEO; (vi) more likely to have a CEO who doubles as Chairman of the Board; and (vii) less likely to have a 'Big Six' auditor.

### *Consequences of revealed earnings manipulation*

Our sample consists of firms identified by the SEC as earnings manipulators. Once the earnings manipulation is detected, we expect these firms' costs of capital to increase because investors revise downward (i) their estimates of firm value; and (ii) their beliefs concerning the credibility of the firms' financial reporting system and the reputation of management.<sup>6</sup>

When the earnings overstatements are made public, investors will estimate the extent to which firm value has been overstated, and the stock price will decline accordingly. Lower firm value implies that more of the firm must be 'given away' to raise a fixed amount of capital. Thus, a lower share price directly affects the cost of capital. Further, since the extent of manipulation is unlikely to be known, there is greater uncertainty about firm value among investors.

Thus, informed traders have greater opportunities to profit at the market makers' expense.<sup>7</sup> This in turn, will cause market makers to widen bid-ask spreads in order to compensate for the increased risk of losing to informed traders. The resultant increase in the bid-ask spread raises the cost of capital (see, Amihud and Mendelson 1986).

We investigate whether there is more uncertainty and dispersion in investors' beliefs about firm value after earnings manipulations are made public by examining whether there are increases in (i) short interests and (ii) the dispersion of analysts' forecasts of earnings. Short sellers are more likely to be informed traders who are benefiting at the market makers expense (see, Asquith and Meulbroek 1993). Moreover, less agreement among analysts about future earnings is consistent with greater dispersion of beliefs about firm value.

To investigate whether the cost of capital increases for these firms, we examine whether (i) stock prices decline, (ii) bid-ask spreads increase, and (iii) analyst following declines. We investigate analyst following because Merton (1987, 490) argues that the degree of "investor recognition" affects the cost of capital when all investors do not hold the market portfolio. Analyst following is likely to be correlated with the degree of investor recognition and the quality and quantity of information available about the firm (e.g., Lang and Lundholm 1993). Thus, demonstrating that the number of analysts following the SEC firms declines, is consistent with these firms facing higher costs of capital.

### **Sample and variable definitions**

This section is composed of three subsections. The first section discusses the process leading to the publication of an SEC Accounting and Auditing Enforcement Release (AAER). The second section describes the sample composition and summarizes the AAERs' allegations of earnings overstatements. Finally, the third section develops empirical proxies for the motivational and governance constructs.

#### *Process leading to the publication of an AAER*

The SEC takes enforcement actions against firms that it identifies as having violated the financial reporting requirements of the Securities Exchange Act of 1934. Since April 1982, the SEC has published details of its enforcement actions in a series of Accounting and Auditing Enforcement Releases.<sup>8</sup> Pincus, Holder, and Mock (1988) report that the SEC obtains enforcement leads from several sources: (i) reviews of 1933 and 1934 Securities Acts filings; (ii) the market surveillance programs of the American and New York Stock Exchanges and the National Association of Securities Dealers; and (iii) public complaints, tips, referrals from other law enforcement agencies, and the financial press. SEC staff from the Division of Corporation Finance examine financial statements and other Securities Acts filings for violations of routine screening criteria and for suspicious subjective factors. If a case warrants further scrutiny, the agency initiates an informal investigation and invites persons with relevant information to cooperate by providing documents and testimony. If the informal investigation reveals

strong evidence of securities law violations, then the SEC may pursue a formal investigation. If the SEC informs the target of the formal investigation, then the 1934 Act Release No. 5092 requires the firm to disclose this to shareholders.

Feroz et al. (1991) point out that since the SEC has more targets than it can practically pursue, and since formal investigations are both costly and highly visible, the SEC ranks targets according to the probability of success. For example, the agency will not pursue cases where unforeseen circumstances result in understated loan loss provisions. The agency only pursues cases where it can demonstrate that management knew or should have known through better internal controls, that the loan loss provisions were understated at the time the financial statements were issued. Thus, it is reasonable to assume that firms facing enforcement actions by the SEC knowingly and intentionally engaged in earnings manipulation.

#### *Sample selection and description*

In order to identify firms that manipulated earnings, we restrict our analysis to AAERs where actions are brought against firms pursuant to Section 13(a) of the Securities Exchange Act of 1934. This section requires issuers whose securities are registered with the SEC, to file reports (including the quarterly financial statements on form 10-Q and the annual financial statements on form 10-K) as required by the SEC's rules and regulations. The financial statements contained in these filings are required to comply with Regulation S-X, which in turn requires conformity with GAAP.

The sample-selection procedure used to obtain firms for our empirical tests is summarized in Table 1. We begin with a total sample of 436 AAERs issued between April 1982 and December 1992. We eliminate 165 AAERs where actions are taken against auditors for violations of auditing standards rather than violations of GAAP (actions pursuant of section 2(e) rather than section 13(a) of the Securities Act). The sample size is reduced by a further 70, reflecting cases where the SEC released multiple AAERs in connection with a specific instance of alleged earnings manipulation. Another 76 releases (primarily smaller banks

TABLE 1

Sample selection of 92 firms subject to enforcement actions by the SEC between 1982 and 1992

Accounting and Auditing Enforcement Releases issued between 1982 and 1992		436
less releases involving violation of auditing standards;	165	
less multiple releases involving the same firms;	70	
less firms not listed on COMPUSTAT;	76	
less IPO firms;	29	
less firms with no defined manipulation period	4	
Final Sample		92

and financial institutions) are eliminated because they are not available on COMPUSTAT. We also exclude 29 cases involving initial public offerings (IPOs). These cases involve misrepresentations in the prospectus of the IPO (rather than form 10-Q or 10-K). We exclude IPOs because much of the data we need for our empirical tests is unavailable.<sup>9</sup> Four firms are eliminated because the manipulation period is not disclosed in the AAER. This results in a final sample of 92 firms.

Table 2 provides the industry classification of the 92 firms. The sample firms are clustered in high tech industries. The industry with the largest representation is computer equipment (SIC code 35) with 13 observations; followed by business services (SIC code 73) with 11 observations; and measuring instruments, photography and watches (SIC code 38) with seven observations.

Diagram 1 provides a general description of the chronology of events for the 92 firms. The *Manipulation period* is identified in each firm's AAER.<sup>10</sup> This is the period over which the SEC alleges that the firm overstated earnings. We also isolate the date where the firms are first publicly alleged to have manipulated earnings (*Announcement of alleged earnings manipulation*). We identify announcements through a *Nexis* search covering all news sources. We obtain the first announcement by searching from the beginning of the manipulation period (identified in the AAER) to the date when the AAER is finally publicly released.

For each of the 92 firms in the AAER sample, we identify a *control firm*.

TABLE 2

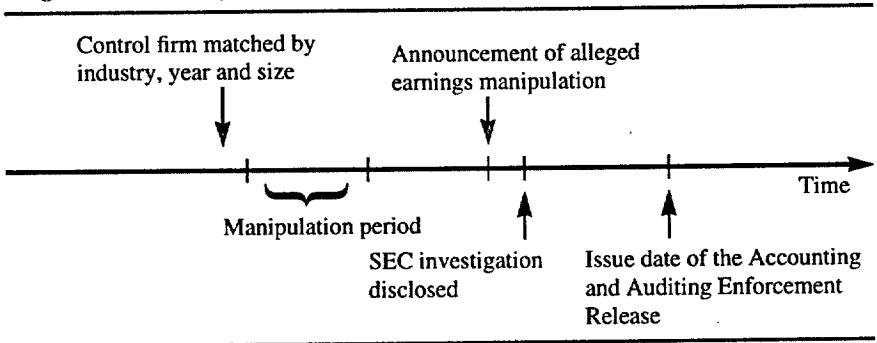
Industry classification of 92 firms subject to enforcement actions by the SEC between 1982 and 1992

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**Two-digit SIC industry classification**

SIC Name	obs	SIC Name	obs
10 metal mining	1	47 transportation services	1
15 bldg construction	1	48 electric and gas services	1
16 heavy construction	1	49 electric power	1
20 food and kindred products	3	50 durable goods wholesale	5
22 textile mill products	3	52 bldg matl, hardware	2
24 forest products	1	57 home furniture stores	2
26 paper & forest products	1	59 retail stores	1
27 printing, publishing	1	60 depository institutions	6
28 chemical & allied products	5	61 non depository credit instns	1
30 rubber & misc plastics	1	62 security brokers	3
33 primary metal industries	1	63 insurance carriers	2
34 fabric metal ex machinery	1	64 insurance agents	1
35 computer equip incl machy	13	67 holding, other invest offices	1
36 electrical equip ex computer	5	73 business services	11
37 automotives	1	78 motion pictures	2
38 meas inst., photo, watches	7	80 health services	1
39 misc. manufact industries	1	82 educational services	2
42 motor freight	1	87 engr, mgnt services	1
		<b>Total</b>	<b>92</b>

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**Diagram 1** Chronology of events for a typical firm subject to an AAER

The control firm is obtained by the following three-step process:

- (i) Determine the SEC firm's total assets for the year-end prior to the first year of the manipulation period.
- (ii) Search the annual industrial and full coverage COMPUSTAT files for firms in the same three-digit SIC industry that report assets in that year.
- (iii) Select a control firm that minimizes the absolute difference in assets.

In three cases, low industry membership forces us to use two-digit SIC codes to identify control firms. Differences between the two groups are used to evaluate the importance of alternative motivations for earnings manipulation.

Table 3 lists the alleged earnings manipulation reported in the AAERs. Panel A indicates that the majority of the SEC firms overstate earnings by overstating revenues (37 firms). An additional 12 firms delay recognizing losses on either loan loss reserves (five firms) or various other write-downs (seven firms). In four cases, the problem is purely a disclosure issue. However, disclosure issues can affect investors' perceptions of a firm's profitability. For example, the SEC alleged in AAER 363 that Caterpillar did not disclose to investors that nearly 25 percent of its 1989 earnings came from a foreign subsidiary and that a large proportion of these profits were unlikely to recur in the following years.

Panel B of Table 3 summarizes the length of time over which the alleged GAAP violations persist. Most firms manipulate earnings for two years or less (72 firms). The distribution of the alleged manipulations over calendar years is provided in panel C. The small number of observations in the later years reflects the fact that it usually takes several years for a reporting violation to be published in an AAER. Panel D summarizes the alleged motivations for earnings manipulations that are reported in 39 of the AAERs. The most frequently cited motivation for earnings manipulation is to lower the cost of raising additional external financing (22 AAERs). In seven AAERs, increasing earnings-based bonuses are implicitly or explicitly cited as a motive for the earnings manipulation. However, in no cases did the AAERs discuss technical violations of debt covenants as a motivation for earnings manipulation. While panel D suggests a rank-ordering of the relative importance of alternative motivations, its external validity is questionable. The primary purpose of the AAERs is to publish the

TABLE 3

Type, incidence, and motivation for earnings manipulation discussed in the Accounting and Auditing Enforcement Releases (AAERs); 92 firms subject to enforcement actions by the SEC

**Panel A: Type of earnings manipulation discussed in the Accounting and Auditing Enforcement Releases**

	Number of Firms	Percentage
Income Overstatement		
Overstatement of revenues	37	40.2
Delayed recognition of a loss	7	7.6
Understatement of provisions for loan loss reserves	5	5.4
Overstatement of marketable securities	3	3.3
Overstatement inventory	8	8.7
Combination of overstating revenues and understating expenses	14	15.2
Other income increasing effects	9	9.8
Disclosure issue	4	4.3
Total	92	100%

**Panel B: Number of year-end financial statements with reporting violations**

	Quarterly reports only	Number of annual reports						
		1	2	3	4	5	6	7
Number of firms	9	33	30	10	6	1	2	1

**Panel C: Calendar years in which firms first manipulate earnings**

Year	78	79	80	81	82	83	84	85	86	87	88	89	90
	2	1	5	11	15	16	7	10	9	6	4	5	1

**Panel D: Motivations discussed in the Accounting and Auditing Enforcement Releases**

Number of firms with no motivation discussed in the AAERs:	53
Number of firms with motivations discussed:	39

Explanations discussed in the 39 AAERs:\*

Issue Securities	22
Upwardly Trending EPS	11
Earnings-based Bonuses	7
Insider Trading	6
Other	3
Total	49

\* In eight AAERs more than one explanation is discussed.

facts of the investigations and not to describe managers' motivations (Pincus et al. 1988). We supplement the results presented in panel D later in the paper when we provide an empirical examination of the various motivations.

Panel A of Table 4 describes the sources of the first public announcements of the alleged earnings manipulation. The most frequent announcement is when the firm voluntarily restates earnings (26 firms). For many of the smaller firms in our sample, with little news or analyst coverage, the disclosure of the SEC's

investigation is the first announcement concerning the firm's reporting policies (25 firms). In four cases, we could not obtain an announcement date and so we used the release date of the AAER. Table 4 also includes the average market adjusted stock return on the announcement day. Apart from instances where the AAER release dates are used, all categories show a significantly negative return. The average negative return of nine percent for the sample is significant at the one percent level. Thus, the announcement of an alleged earnings manipulation is bad news for these firms.

Panel B of Table 4 reports the calendar year of the first announcement that the firm managed earnings. The year with the most observations is 1984 with 21 announcements. We also investigate (but do not report in the table) the time it takes for the manipulated financial statements to be discovered. For 19 firms the announcement occurs within three months of the fiscal year-end, while for a further 50 (10) firms the announcement occurs within one year (two years). In ten cases the firms continue to manage earnings for up to one year after the announcement. These include cases where the announcement came via an article in the popular business press criticizing the firm's accounting or where the firm changed auditors in an attempt to continue with the disputed accounting procedure.

TABLE 4

Source of the first announcement that reveals to the market that the firm has engaged in earnings manipulation; 92 firms subject to enforcement actions by the SEC between 1982 and 1992

Panel A: Source of the first announcement		Stock return on announcement day	Number of firms									
Company restates earnings		-0.057	26									
SEC investigation disclosed		-0.043	25									
Auditor raises concerns or is fired		-0.250	13									
Shareholder law suit based on poor, false or insufficient disclosures		-0.031	8									
Article appears in the press that criticizes the firm's accounting		-0.084	7									
Firm reports numbers lower than predicted (by firm) or announces an unusual charge		-0.030	5									
Firm dismisses top executives due to disclosure issues		-0.029	2									
SEC or Stock Exchange suspends trading because of disclosures or lack thereof		-0.601	2									
No specific announcement date identified - date of AAER used as the announcement date		0.000	4									
Total		-0.088	92									
Panel B: Calendar year of first announcement												
Year	81	82	83	84	85	86	87	88	89	90	91	92
	2	3	9	21	7	7	10	13	10	3	4	3

*Variable measurement*

To examine the motivations for earnings manipulation and the governance structures of the SEC firms, we require measures of the various constructs identified in the previous section. The measures we use are summarized in Table 5 and described below.

*Ex Ante Measure of the Demand for External Financing*

To measure the demand for external financing we begin with the sources and uses of cash identity:

$$\text{Cash from Operations} + \text{Cash from Financing} = \text{Dividends} + \text{Investments} \quad (1)$$

Rearranging under the assumption that dividends are zero gives:<sup>11</sup>

$$\text{Cash from Operations} - \text{Investments} = -\text{Cash from Financing}. \quad (2)$$

Equation (2) equates 'flows' of cash. However the demand for external financing, not only depends on how much cash is generated from operating and investment activities but also on the 'stock' of funds already available within the firm (e.g., short-term investments or cash). We assume that current assets are readily convertible into cash and represent the stock of funds available to the firm. We use the average capital expenditures during the three years prior to the manipulation period as a measure of the desired investment level during the manipulation period.<sup>12</sup> Therefore, a measure of a firm's *ex ante* demand for financing in the first year of manipulation,  $t$ , is:

$$\text{FreeC}_t = \frac{\text{Cash from operations}_t - \text{Average capital expenditures}_{t-3 \text{ to } t-1}}{\text{Current Assets}_{t-1}} \quad (3)$$

When FreeC is negative, the absolute value of the ratio ( $1/\text{FreeC}$ ) provides an indication of the number of years that the firm can continue to internally fund its current level of operating and investment activities. For example, when FreeC is equal to  $-0.5$ , absent external financing, a firm will consume all of its available current assets within two years. We hypothesize that as FreeC becomes more negative (i.e., the firm is closer to exhausting its internal funds), the firm is more likely to manipulate earnings. However, we do not expect the relation to be linear. In particular, if a firm has enough internal funds to last several years, then managers are unlikely to resort to earnings manipulation today. Therefore, we create an indicator variable (*Ex ante-Finance*), which is coded 1 if the firm requires financing within two years and 0 otherwise. This cutoff assumes that if a firm requires external financing within the next two years, then it starts taking action now to raise the needed funds. This cutoff is somewhat arbitrary and potentially lowers the power of our tests. However, our results are insensitive to the particular functional form of FreeC used.<sup>13</sup>

*Ex Post Measure of the Demand for External Financing*

We also investigate the number of firms that obtained financing during the manipulation period. However, this *ex post* measure of the demand for external financing is potentially problematic. The time between the end of the manipulation period and the announcement of the alleged earnings manipulation is often very short

(i.e., for 69 firms it is less than one year). Therefore, the discovery of the alleged earnings overstatement can lead to the cancellation of the planned external financing.<sup>14</sup> Thus, our *ex post* measure is potentially biased against finding a demand for external financing. Alternatively, if the SEC pays special attention to the financial statements of firms registering securities, then the measure may be biased the opposite way. The variable, Actual-Issuances, is coded 1 if the firm issues securities during the manipulation period, and 0 otherwise. We also investigate the dollar value of the securities issued during the manipulation period (Finance-Raised).

### Insider Trading Activity

To determine the extent of insider trading in the sample we use the National Archives and Records Administration Ownership Report System (ORS) files from January, 1975 to March, 1991. These files are obtained from the SEC and provide records of security transactions and holdings by people with insider relations that file SEC Forms 3, 4, and 5. These files list whether the insider is a director and/or an officer of the firm. They also list the date and type of transaction. We focus on sales made during the manipulation period. For each firm listed on the file, we cumulate the value of all sales made by officers and directors during the manipulation period. We then scale the value of insider sales by the market value of the firm at the beginning of the manipulation period (Off&Dir\_salesM). This indicates the percent of firm value sold by insiders. The ORS files do not distinguish between inside and outside directors. Outside directors are less likely to sell their holding due to insider knowledge. Consequently, Off&Dir\_salesM is likely to be a noisy measure of insider trading. We therefore, also obtain the name of the Chief Executive Officer (CEO) from the proxy statements and create a second variable (CEO\_salesM). This variable indicates the total value of sales made by the CEO during the manipulation period scaled by the market value of the firm at the beginning of the manipulation period.

### The Bonus and Debt Motivations

To measure the extent to which earnings-based bonus plans motivate managers to manipulate earnings, we ascertain whether an earnings-based bonus plan is in *existence* during the manipulation period. The variable (Earnings Plan) is coded 1 if the firm had an earnings-based plan, 0 otherwise. The existence of an earnings-based bonus plan can provide management with incentives to either increase or reduce earnings (see, Healy 1985). Since the firms in the SEC sample are alleged to have been overstating earnings, we assume that if they are responding to an earnings-based bonus plan, then that plan must have been providing incentives to increase earnings. In this respect, it is useful to note that obtaining further details concerning the bonus plans (i.e., magnitude of nondiscretionary earnings relative to the upper and lower bounds specified in the plan) will not necessarily increase the power of our tests. Since we start with a sample where earnings are allegedly manipulated upward, it must be the case that earnings are between the upper and lower bounds of the plan if earnings are being managed in response to the plan. Furthermore, as a practical matter very few of our sample firms provide bonus plan parameters in their proxy statements.

We use two approaches to determine whether closeness to debt covenants motivates the earnings manipulation in the SEC firms. The first measure is leverage (total debt to total assets). This measure is frequently employed in the extant literature as a proxy for closeness to covenants and is associated with the existence and tightness of covenants (see Duke and Hunt 1990; and Press and Weintrop 1990). However, the use of leverage suffers from two shortcomings. First, it is a noisy measure of closeness to covenants, since optimal leverage ratios and the corresponding ratios used in debt covenants are likely to vary as a function of firm characteristics such as the investment opportunity set (e.g., Smith and Watts 1992). Second, leverage ratios are positively related to the demand for external equity financing. In particular, Opler and Titman (1994) show that firms that have high leverage ratios due to large accumulated losses are more likely to issue equity. As a result, leverage ratios are also likely to proxy for the demand for external financing motivation. Thus, leverage ratios may explain earnings manipulation even in the absence of binding debt covenants.

In an attempt to circumvent the above problems, we also directly investigate covenant violations. This approach takes advantage of the fact that the earnings manipulation in our sample is identified by the SEC and typically reversed by the time the AAERs are published. Thus, we expect that if earnings are manipulated to avoid debt covenant violations, then reversals of the earnings manipulations will result in debt covenant violations. Technical violations of accounting-based debt covenants are identified using a keyword search on the National Automated Accounting Research System (NAARS) as in Sweeney (1994).<sup>15</sup> Annual reports for 27 firms not covered on NAARs are obtained from the Baker Library at Harvard University and manually searched. For each SEC firm, we search for technical violations from the beginning of the manipulation period until two years after the end of manipulation period or the announcement date (whichever date is later in time). We investigate the entire manipulation period since firms in violation of debt covenants continue to have incentives to boost earnings to resolve the default (Sweeney 1994). We go out beyond the manipulation period because we want to capture cases where restatements cause technical violations. Each control firm is investigated over the identical period as its matched SEC firm. If a greater proportion of the SEC firms violate debt covenants during and after the manipulation period, then these firms potentially manage earnings to loosen or avoid debt covenant constraints.

#### Measures of Governance Structure

We obtain information concerning firms' governance structures from proxy statements and annual reports. We use the proxy statement in the year prior to the first year of the manipulation period. To investigate the governance hypotheses, we collect data on the following variables: Audit Committee, %Insiders on Board, %Board Holdings held by Insiders, Outside Block, CEO = COB, CEO = Founder, Number of Directors, and Big Six Auditor. These variables are described in detail in Table 5.

TABLE 5

Definitions of variables used in the analysis and data sources. Year  $t$  is the first year of the manipulation period. For stock variables end of year values are reported

Variable	Predicted sign	Definition and Data Source
<i>Motivation</i>		
Ex ante-Finance	+	An <i>ex ante</i> measure of a firm's demand for financing. It is a dummy variable coded 1 if the firm's FreeC is less than $-0.5$ , and 0 otherwise. Where FreeC is defined as $\frac{\text{Cash from operations}_t - \text{average capital expenditures}_{t-1 \text{ to } t-1}}{\text{Current Assets}_{t-1}}$
Actual-Issuance	+	A dummy variable coded 1 if the firm issued securities during the manipulation period, 0 otherwise. Securities Data Corp.
Finance-Raised	+	The average dollar value of issued securities during the manipulation period scaled by the market value at the beginning of the manipulation period. Securities Data Corp. and COMPUSTAT.
Off&Dir_salesM	+	Total dollar value of sales made by officers and directors during the manipulation period scaled by the market value of the firm at the beginning of the manipulation period. Ownership Report System Files, Proxy Statements and COMPUSTAT .
CEO_salesM	+	Total dollar value of sales made by the Chief Executive Officer (CEO) during the manipulation period scaled by the market value of the firm at the beginning of the manipulation period. Ownership Report System Files, Proxy Statements and COMPUSTAT.
Leverage	+	Total Debt scaled by Total Assets. COMPUSTAT.
Technical Default	+	A dummy variable coded 1 if the firm reports a technical default during the manipulation period or up to two years after the end of the manipulation period or the announcement date (which ever is later in time), 0 otherwise. NAARS.
Bonus Plan	+	A dummy variable coded 1 if the firm has an earnings-based bonus plan, 0 otherwise. Proxy Statement.
<i>Governance</i>		
Audit Committee	-	A dummy variable coded 1 if the board of directors has an audit committee, 0 otherwise. Proxy Statement.
%Insiders on Board	+	Total number of officers that are on the board scaled by the total number of directors. Proxy Statement.
%Board Holdings held by Insiders	+	Total number of shares owned by officers on the board scaled by total number of shares held by directors. Proxy Statement.
Outside Block	-	A dummy variable coded one if the firm has a 13D filer who is not management, 0 otherwise. Proxy Statement.
Insider > 50 %	+	A dummy variable coded one if over 50 percent of the board of directors are officers, 0 otherwise. Proxy Statement.

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TABLE 5 *continued*

CEO = COB	+	A dummy variable coded 1 if the Chief Executive Officer is also the Chairman of the Board of Directors, 0 otherwise. Proxy Statement.
Big Six Auditor	-	A dummy variable coded 1 if the auditor is from a Big Six accounting firm, 0 otherwise. COMPUSTAT.
Number of Directors	+	The number of directors on the firm's Board.
CEO = Founder	+	A dummy variable coded 1 if the Chief Executive Officer is also the Founder of the company, 0 otherwise. Proxy Statement.
<i>Financial Statement Variables</i>		
Earnings		COMPUSTAT item 18
Accruals		$\Delta CA - \Delta CL - \Delta Cash + \Delta STD - Dep$ where $\Delta CA$ = change in current assets (COMPUSTAT item 4); $\Delta CL$ = change in current liabilities (COMPUSTAT item 5); $\Delta Cash$ = change in cash/cash equivalents (COMPUSTAT item 1); $\Delta STD$ = change in debt included in current liabilities (COMPUSTAT item 34); Dep = depreciation and amortization expense (COMPUSTAT item 14). (see Healy (1985) and Jones (1991))
Cash from Operations		Earnings - Accruals
Capital Expenditures		COMPUSTAT item 128

### Results of empirical tests

The discussion of the results is presented in three sections. The first section provides a comparison of selected characteristics of the SEC and control firms. The second section presents evidence concerning the motivations for earnings manipulation and the impact of governance structures on earnings manipulation. The last section presents the results on the consequences of being identified as an earnings manipulator.

#### *Comparison of SEC and control firms' financial statement information*

Table 6 provides descriptive statistics on the SEC and control firms. The SEC and control firms are of similar size (total assets) in the year prior to the manipulation period, suggesting that the matching procedure is successful. The level of current assets prior to the manipulation period is also similar across the two groups, as is the average level of capital expenditures over the previous three years. Table 6 reports several financial ratios at the end of the first manipulation year (where all accounting numbers include the alleged manipulations). Cash from operations to assets tends to be lower for the SEC firms than the control firms, although the difference in means is only marginally significant. The two groups have similar earnings to assets ratios, earnings to price ratios and market values, but the SEC firms have high market to book ratios relative to the control group. This suggests that investors expect the SEC firms to have higher growth opportunities than the control firms.

Figure 1 provides an analysis of earnings management behavior in the SEC and control samples. If the SEC firms are attempting to increase reported earnings, then they are likely to utilize the flexibility provided within GAAP in addition to violating GAAP. Our analysis covers three traditional measures of earnings management: (i) accounting procedure choice; (ii) total accrual behavior; and (iii) estimated discretionary accrual behavior. Three accounting choices are examined: inventory, depreciation and investment tax credits. Consistent with prior research (e.g., Zmijewski and Hagerman 1981; Sweeney 1994) we assume FIFO, straight-line depreciation, and flow-through treatment of the investment tax credit increase income. A dummy variable is coded 1 if the firm uses all three income-increasing choices, 0 otherwise. The first plot in Figure 1 reveals

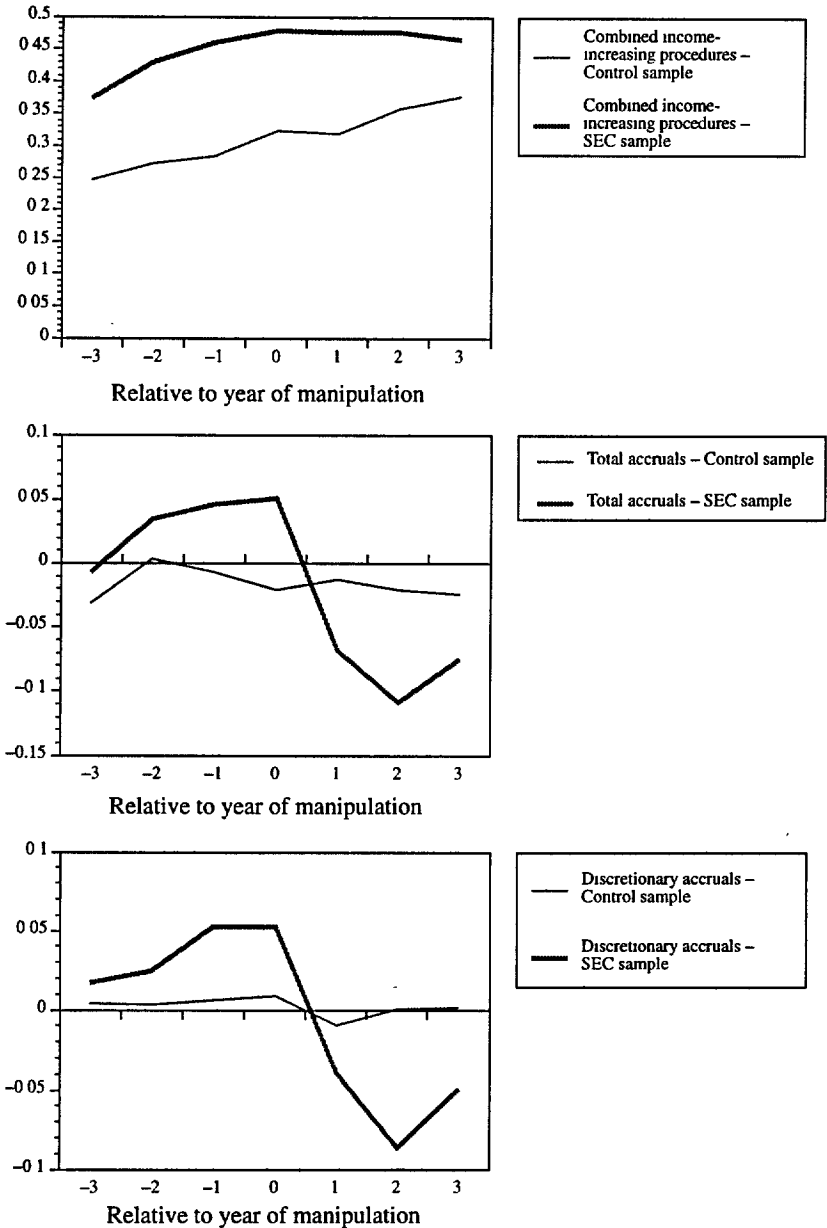
TABLE 6

Descriptive statistics on financial statement variables and market based measures for firms subject to enforcement actions by the SEC between 1982 and 1992 and control firms matched by industry, size and time period (probabilities reported in parentheses)

	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile	Number of Obs.	Tests of Differences in	
							Mean	Median
<b>Variables measured in the year prior to the first manipulation</b>								
Total assets (millions)								
SEC	2285.53	7089.29	6.89	39.43	623.85	92	0.16	0.10
Control	2110.66	7007.34	8.38	29.17	347.36	92	(0.88)	(0.92)
Current assets (millions)								
SEC	194.84	617.87	3.60	11.56	57.50	80	-0.20	0.09
Control	218.36	821.50	4.38	10.60	39.19	76	(0.84)	(0.92)
Average three year capital expenditure to assets								
SEC	0.106	0.138	0.022	0.063	0.146	79	1.55	1.15
Control	0.076	0.104	0.024	0.053	0.093	82	(0.12)	(0.25)
<b>Variables measured in the year of the first manipulation</b>								
Earnings to lagged assets								
SEC	-0.013	0.291	0.006	0.043	0.108	92	-0.72	0.22
Control	0.014	0.201	0.006	0.043	0.088	92	(0.47)	(0.83)
Cash from operations to lagged assets								
SEC	-0.090	0.372	-0.187	0.002	0.112	66	-1.59	-1.15
Control	-0.006	0.217	-0.042	0.037	0.117	69	(0.11)	(0.25)
Earning to price ratio								
SEC	0.034	0.165	0.022	0.058	0.111	76	0.91	0.53
Control	-0.003	0.326	0.022	0.068	0.126	84	(0.37)	(0.59)
Market to book ratio								
SEC	4.379	6.608	1.094	1.996	4.282	76	2.37	3.53
Control	2.291	4.145	0.757	1.254	2.413	84	(0.02)	(0.01)
Market value of equity								
SEC	447.66	931.48	19.70	65.65	484.46	76	0.10	2.10
Control	427.46	1653.37	8.72	40.12	191.48	84	(0.92)	(0.04)

Note: *t*-tests are used to evaluate differences in means; Wilcoxon rank-sum tests are used to evaluate differences in medians.

**Figure 1** The proportion of firms using income-increasing accounting procedures (the combined choice of FIFO, straight-line depreciation, and the flow-through method for investment tax credits), median total accruals, and median discretionary accruals both scaled by lagged assets, surrounding the first year that the firm engaged in earnings manipulation. A comparison of 66 firms subject to enforcement actions by the SEC between 1982 and 1992 to 69 control firms matched by industry, size, and time period.



that the proportion of SEC firms using all three income-increasing procedural choices gradually increases as the manipulation year approaches. The difference between the control and SEC firms' combined use of income-increasing procedures in the first year of manipulation is significant at the five percent level. This is consistent with the managers of the SEC firms using their discretion within GAAP to increase reported income.<sup>16</sup>

The second and third plots in Figure 1 illustrate the behavior of total accruals and estimated discretionary accruals respectively. Estimated discretionary accruals are measured via the modified Jones (1991) Model, following the procedure described in Dechow, Sloan, and Sweeney (1995). The two plots tell a consistent story. Accruals gradually increase as the alleged year of earnings manipulation approaches, and then experience a sharp decline. The difference in accruals between the SEC and control firms is statistically significant in the first year of manipulation. The increase in accruals is consistent with earnings manipulation. The subsequent accrual reduction is consistent with the reversal of prior accrual overstatements. This evidence provides external validity that the SEC has identified a sample of firms attempting to overstate earnings.

#### *Motivations and governance structures*

Table 7 provides tests of differences in means and medians for the motivation variables. Panel A covers the continuous variables and panel B covers the discrete variables. The means, medians, standard deviations and upper and lower quartiles are provided for the continuous variables. Tests for both difference in means (*t*-tests) and difference in medians (Wilcoxon rank-sum tests) are conducted. In panel B the proportion of each sample with the particular characteristic is indicated. Chi-square statistics are calculated to test whether there is a systematic relation between the existence of the characteristic and sample membership.<sup>17</sup>

Table 7 indicates that all three proxies for the demand for external financing are significantly different across the two samples. In panel B, Ex ante-Finance indicates that 39 percent of the SEC firms require external funding within the next two years, while only 16 percent of the control firms are in such a position. The percent of SEC firms that actually issue securities during the manipulation period is 36 percent, while only 20 percent of the control group issue new securities (Actual-Issuances). Chi-square statistics indicate that our proxies for ex ante and ex post demand for financing are systematically related to sample membership (*p*-values are less than five percent). In addition, the Wilcoxon test indicates that the dollar value of securities issued by the SEC firms is greater than the dollar value of securities issued for the control firms (Finance-Raised in panel A, *p*-value = 0.03). Although the difference in means is also in the predicted direction, it is not significant. These results are consistent with managers of the SEC firms manipulating earnings to lower the cost of external financing.

Panel A of Table 7 also presents evidence on the extent of insider sales during the manipulation period. The results suggest that relative to officers and directors of the control firms, officers and directors of the SEC firms are not selling a significantly greater proportion of their firm (Off&Dir\_salesM). While 27

CEOs of the SEC firms sell stock during the manipulation period, the relative value of their sales, (CEO\_salesM) does not differ from that of the 17 CEOs of the control firms selling stock. Potential explanations for the weak results are that (i) insiders failed to file their sales with the SEC or are discreet in their sales (e.g., sold through a third party); or (ii) insiders did not manage earnings to manipulate investors' perceptions with the intention of selling their holdings. It is also important to note that insiders are typically required to sign 'lock-up' agreements in connection with public equity offerings. These agreements prevent managers from selling their holdings for up to one year after the offering. Table 7 indicates that 36 (20) percent of the SEC (control) firms are likely to have 'lock-up' agreements at some point during the manipulation period.

TABLE 7

Statistics on motivation variables for firms subject to enforcement actions by the SEC between 1982 and 1992 and the control firms matched by industry, size and time period (probabilities reported in parentheses)

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**Panel A: Continuous variables**

	Pred Sign	Mean	Std Dev	Lower Quartile	Median	Upper Quartile	Tests of Differences in	
							Mean	Median
Finance-Raised								
SEC	+	0.19	0.42	0.00	0.00	0.26	1.50	2.24
Control		0.11	0.29	0.00	0.00	0.00	(0.14)	(0.03)
Off&Dir_salesM								
SEC	+	0.039	0.128	0.00	0.001	0.018	1.05	1.80
Control		0.020	0.067	0.00	0.000	0.005	(0.29)	(0.07)
CEO_salesM								
SEC	+	0.009	0.025	0.00	0.00	0.003	1.60	1.19
Control		0.004	0.125	0.00	0.00	0.000	(0.11)	(0.24)
Leverage								
SEC	+	0.29	0.22	0.14	0.26	0.37	3.44	3.53
Control		0.19	0.18	0.029	0.16	0.28	(0.01)	(0.01)

**Panel B: Discrete variables**

	Pred Sign	SEC Sample	Control Sample	Chi-Square Statistic (probability)
Ex ante-Finance	+	0.390	0.162	9.72 (0.00)
Actual-Issuances	+	0.359	0.196	6.10 (0.01)
Technical Default	+	0.196	0.098	3.51 (0.06)
Earnings Plan	+	0.372	0.422	0.46 (0.50)

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Note: *t*-tests are used to evaluate differences in means, Wilcoxon rank-sum tests are used to evaluate differences in medians. The number of observations for Ex ante-Finance is 66 (69); Earnings Plan is 86 (90); Off&Dir\_salesM is 70 (71); and CEO-SalesM is 70 (71) for the SEC firms (control firms). For other variables both groups have 92 observations.

The existence of an earnings-based bonus plan does not differ significantly across the SEC and the control samples. In both samples approximately 40 percent of the firms have earnings-based compensation plans. The use of earnings-based plans in both groups is low relative to an average cross-section of firms (e.g., Sibson and Company 1989 indicate that 93 percent of firms in general industry have annual incentive plans). The firms examined are predominantly from high growth industries (e.g., computer software and hardware). Smith and Watts (1992) suggest that firms in high growth industries are more likely to employ stock-based rather than earnings-based incentive plans. We find that 94.2 percent of the SEC firms, versus only 80 percent of the control firms have stock-based compensation (not reported in the table). These proportions are significantly different at the one percent level. This is consistent with the SEC firms placing a relatively greater weight on stock price-based incentives versus earnings-based incentives in compensating management, but provides no support for the bonus hypothesis.

Table 7 indicates that the SEC firms are more highly levered than the control group. The median leverage for the SEC firms is 26 percent, which is significantly greater than the median leverage for the control firms of 16 percent. The results in panel B indicate that 18 SEC firms (19.6 percent) have technical violations of debt covenants. The corresponding level of defaults for the control group is 9.8 percent. This difference is significant at the six percent level. Thus, although none of the AAERs mention avoidance of debt covenants as a motivation for earnings manipulation, our evidence is consistent with the existence of such a motivation.

Analysis of the governance variables is provided in Table 8. Results provide strong evidence that the SEC firms have weak governance structures. Starting with panel A, while the SEC and control samples have on average, the same size boards (nine members), the SEC sample has a significantly greater proportion of insiders on the Board of Directors relative to the control sample (53 percent versus 40 percent). Further, insiders on the SEC firms' boards hold a significantly greater proportion of total board stockholdings (90 percent versus 77 percent).

The results in panel B indicate that relative to the control firms, the SEC firms are less likely to have audit committees (58 percent versus 76 percent) and are less likely to have outside blockholders (42 percent versus 57 percent). Further, 54 percent (34 percent) of the SEC (control) firms' insiders have a majority of the board seats (Insiders > 50 percent). Moreover, we find that the CEO appears to have more power over the board in the SEC sample. The CEO is also the Chairman of the Board in 86 percent of the SEC firms versus 74 percent of the control firms. The CEO is also the original founder of the company in 49 percent of the SEC firms versus only 30 percent of the control firms. Finally, there is no significant difference between the SEC and control firms' use of a Big Six auditor.

The results in Table 7 suggest that the two most important motives for explaining managers' decisions to manipulate earnings are: the need for external financing and the closeness to debt covenant constraints. Insider trading and

TABLE 8

Statistics on governance variables for firms subject to enforcement actions by the SEC between 1982 and 1992 and the control firms matched by industry, size and time period (probabilities in parentheses)

<b>Panel A: Continuous variables</b>							
	Pred Sign	Mean	Std Dev	Lower Quartile	Median	Upper Quartile	Tests of Differences in Mean Median
<b>%Insiders on Board</b>							
SEC	+	0.53	0.21	0.33	0.54	0.67	4.18 4.01
Control		0.40	0.20	0.25	0.38	0.50	(0.01) (0.01)
<b>%Board Holdings held by Insiders</b>							
SEC	+	0.90	0.18	0.91	0.96	1.00	3.75 3.72
Control		0.77	0.27	0.68	0.86	0.98	(0.01) (0.01)
<b>Number of Directors</b>							
SEC	+	9.0	5.7	5.0	7.0	11.0	0.50 0.33
Control		8.6	4.5	6.0	7.0	10.0	(0.62) (0.74)
<b>Panel B: Discrete variables</b>							
	Pred Sign	SEC Sample	Control Sample	Chi-Square Statistic (probability)			
Audit Committee	-	0.581	0.756	6.03 (0.01)			
Outside Block	-	0.424	0.565	3.67 (0.06)			
Insider > 50%	+	0.544	0.337	7.96 (0.01)			
CEO = COB	+	0.859	0.744	3.57 (0.06)			
Founder = CEO	+	0.488	0.300	6.54 (0.01)			
Big Six Auditor	-	0.587	0.630	0.37 (0.55)			

Note: *t*-tests are used to evaluate differences in means, Wilcoxon rank-sum tests are used to evaluate differences in medians. The number of observations with proxy statement information is 86 for the SEC firms and 90 for the control firms.

bonus-based motivations appear less important. Table 8 suggests that a firm's governance structure also plays a role in the decision to manipulate earnings. Firms with weak governance structures are more likely to manipulate earnings. In Table 9 we investigate whether there is an interactive relation between governance-related variables and the need for external financing or the closeness to debt covenant constraints. That is, when managers have both the incentive and the opportunity to overstate earnings, are they more likely to engage in earnings manipulation? We apply factor analysis to the governance variables to obtain summary measures of the effectiveness of firms' governance structures. We adopt this approach because the governance variables are highly correlated and

appear to be measuring similar underlying constructs. The results from the factor analysis indicate that there are two underlying factors. The first we name "Low Oversight of Management" which is negatively correlated with Audit Committee and positively correlated with %Insider on Board, %Board Holdings held by Insiders, and CEO = Founder. The second we call "Power of CEO over Board" which is positively correlated with CEO = COB and negatively correlated with Outside Block.<sup>18</sup>

Table 9 provides the results of three logit regressions. To reduce the number of regressions reported we focus on Actual-Issuance and Technical Default as measures for need for financing and closeness to covenants. Similar results are reported when *Ex ante*-Finance and Leverage are used. The table reports marginal changes in the probability of a firm being subject to enforcement actions

TABLE 9

Logistic regressions investigating the motivation for earnings manipulation and the interactive effects of governance variables. A comparison of 90 firms subject to enforcement actions by the SEC between 1982 and 1992 to 85 control firms matched by industry, size, and time period.

Variable	Pred sign	Delta Prob.*	Coefficient	Std. Error of Coefficient	t-ratio	Prob.
<b>Panel A</b>						
Intercept	?	-0.07	0.29	0.18	-1.60	0.11
Actual-Issuances	+	0.26	1.03	0.41	2.54	0.01
Actual-Issuance × Low Oversight of Mgt.	+	0.22	0.88	0.41	2.14	0.03
Actual-Issuance × Power of CEO Over Board	+	0.07	0.27	0.40	0.67	0.50
Log-Likelihood		-114.88				
Restricted (Slopes=0) Log-L.		-121.23				
-2×(Log-Likelihood ratio)			12.71			
Significance Level			0.005			
<b>Panel B</b>						
Intercept	?	-0.04	-0.17	0.16	-1.06	0.29
Default	+	0.20	0.82	0.56	1.46	0.14
Default × Low Oversight of Management	+	0.47	1.89	0.88	2.15	0.03
Default × Power of CEO Over Board	+	0.16	0.63	0.73	0.86	0.39
Log-Likelihood		-114.52				
Restricted (Slopes=0) Log-L.		-121.23				
-2×(Log-Likelihood ratio)			13.42			
Significance Level			0.004			

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TABLE 9 *continued*

Panel C						
Intercept	?	-0.11	-0.45	0.20	-2.296	0.02
Actual-Issuance	+	0.28	1.10	0.43	2.568	0.01
Default	+	0.22	0.86	0.58	1.476	0.14
Actual-Issuance × Low Oversight of Mgt.	+	0.16	0.64	0.43	1.47	0.14
Default × Low Oversight of Management	+	0.43	1.71	0.89	1.92	0.06
Actual-Issuance × Power of CEO Over Board	+	0.04	0.17	0.47	0.37	0.71
Default × Power of CEO Over Board	+	0.16	0.64	0.80	0.80	0.43
Log-Likelihood			-109.27			
Restricted (Slopes=0) Log-L.			-121.23			
-2×(Log-Likelihood ratio)			23.92			
Significance Level			0.005			

\* The marginal effects of the regressors on the probabilities are calculated as follows:

$$\frac{\partial Y}{\partial x_i} = \Lambda(z'\chi)(1-\Lambda(z'\chi))z$$

Where

$Y$  = dichotomous dependent variable equal to 1 for firms subject to enforcement actions by the SEC, 0 for control firms;

$x_i$  =  $i^{\text{th}}$  independent variable;

$\chi$  = vector of independent variables;

$\Lambda$  = logistic cumulative distribution function; and

$z$  = vector of coefficient estimates.  $\frac{\partial Y}{\partial x_i}$  is calculated at the means of the regressors.

by the SEC implied by the logit coefficient estimates, resulting from a unit change in the explanatory variables. These marginal sensitivities, labeled "Delta Prob." are economically equivalent to coefficient estimates from ordinary least squares estimation (see Greene 1993). Panel A of Table 9 interacts Actual-Issuance with the two governance variables, while panel B interacts Technical Default with the two governance variables. Panel C includes both motivation variables and their interactions with the governance variables. Since similar findings are reported across all three panels, only Panel C will be discussed. The results indicate that independently both Actual Issuance and Technical Default have explanatory power, (significant at the 1 percent and 14 percent level, respectively). The interaction terms (Actual Issuance × Low Oversight of Management) and (Technical-Default × Low Oversight of Management) are significant at the 14 percent and 6 percent levels respectively. This suggests that low managerial oversight is an important catalyst for earnings manipulation. The interactive variables including Power of CEO over Board are not significant, suggesting that this governance construct is a less important catalyst.

### Consequences

This section investigates the consequences realized by firms when the stock market discovers that they have manipulated earnings. We first present evidence on the disparity of beliefs among investors concerning firm value, followed by evidence on changes in the firms' costs of capital.

#### Disparity of Beliefs

We investigate two proxies for the extent of uncertainty and disparity of beliefs among investors: short interests and the dispersion of analysts' forecasts of annual earnings. Information on short interests is obtained from Paul Asquith and Lisa Meulbroek, who created a short interests database that includes all NYSE and AMEX firms and covers the time period 1976–1992.<sup>19</sup> Their short interest database is created from two public sources: the Standard and Poor's Daily Stock Price Record and the Interactive Data Corporation Quarterly History Tape. Information on short interests is available for 28 SEC and 33 control firms. Information on the dispersion of analysts' forecasts is obtained for 43 SEC firms and 40 control firms from I/B/E/S.

Table 10 presents the percent of outstanding shares shorted for the SEC and control firms for six months on either side of the earnings manipulation announcement. In months where no short positions are reported, the short interests are assumed to be zero. Table 10 indicates that around the announcement month, short interest in the SEC firms increases while short interest in the control firms remains fairly constant. The mean and median percent of shares shorted

TABLE 10

Percent of outstanding shares shorted surrounding the first announcement of earnings manipulation. A comparison of firms subject to enforcement actions by the SEC between 1982 and 1992 to control firms matched by industry, size, and time period

Relative Month	SEC Sample		Number of Observations	Control Sample		Number of Observations	Probability values of Tests of Differences in	
	Mean	Median		Mean	Median		Mean	Median
-6	0.598	0.223	27	0.567	0.197	33	0.89	0.34
-5	0.713	0.392	27	0.526	0.165	33	0.39	0.19
-4	1.044	0.300	28	0.622	0.239	33	0.29	0.40
-3	1.059	0.186	28	0.578	0.112	33	0.20	0.15
-2	1.442	0.473	28	0.505	0.162	33	0.04	0.03
-1	1.652	0.356	28	0.520	0.122	33	0.03	0.04
0	2.005	0.325	28	0.495	0.200	33	0.02	0.02
1	2.174	0.347	27	0.447	0.208	33	0.02	0.01
2	1.795	0.384	27	0.446	0.134	33	0.03	0.01
3	1.734	0.455	27	0.355	0.084	33	0.03	0.01
4	2.004	0.361	27	0.346	0.068	33	0.02	0.00
5	2.329	0.507	27	0.447	0.108	33	0.01	0.00
6	2.232	0.574	27	0.556	0.090	33	0.04	0.00

Note: *t*-tests are used to evaluate differences in means, Wilcoxon rank-sum tests are used to evaluate differences in medians.

differs significantly (at the five percent level) across the two samples in months -2 to +6. These results suggest that the disparity of beliefs concerning the value of SEC firms increases at the time of and following the announcements of the alleged earnings manipulation. The fact that short interests start increasing two months before the first public announcement of the earnings manipulation is consistent with short sellers preempting this announcement and gaining from the price decline. This finding is consistent with Asquith and Meulbroek's (1993) evidence that short-sellers are sophisticated investors able to outperform the market.

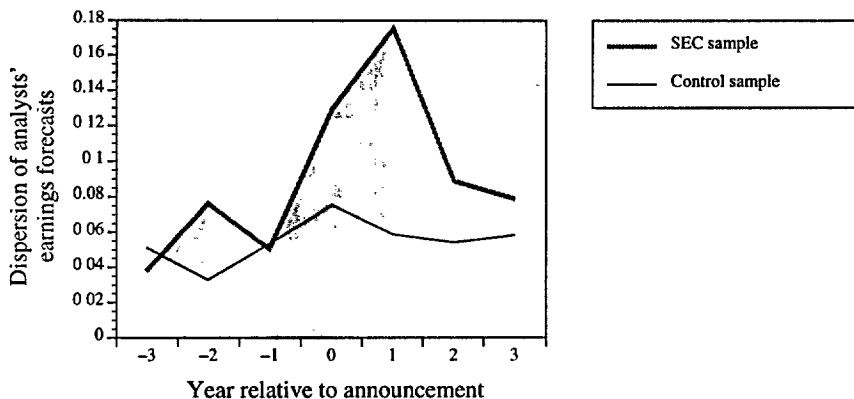
Figure 2 presents the median dispersion of analysts' forecasts for years -3 to +3 relative to the announcement year for both the SEC and control firms. Following Atiase and Bamber (1994), we measure the dispersion of analysts' forecasts as follows:

$$\text{DISP} = \frac{\text{Standard deviation of analysts' forecasts}}{|\text{Mean forecast}|}$$

We present the dispersion of analysts' forecasts of current-year earnings in the month of the firms' fiscal year-ends in each of the seven years.<sup>20</sup> We present the month of the fiscal year-end since it is likely to be the month with the least dispersion in analysts' forecasts (see Brown and Han 1992).

To test whether there is a significant increase in the dispersion of analysts' forecasts following the announcement of the alleged earnings manipulation we compare the median dispersion of analysts' forecasts in the three years prior to the median dispersion of analysts' forecasts in the three years following the announcement year. Wilcoxon tests indicate that the dispersion of analysts' forecasts increases for the SEC firms (pre-announcement median = 0.069; post-announcement median = 0.179;  $p$ -value = 0.01). However, the dispersion of analysts' forecasts does not increase for the control firms (pre-announcement median = 0.056; post-announcement median = 0.064;  $p$ -value = 0.27).

**Figure 2** Median dispersion of analysts' forecasts surrounding the first announcement that the firm has engaged in earnings manipulation. A comparison of 43 firms subject to enforcement actions by the SEC between 1982 and 1992 to 40 control firms matched by industry, size, and time period



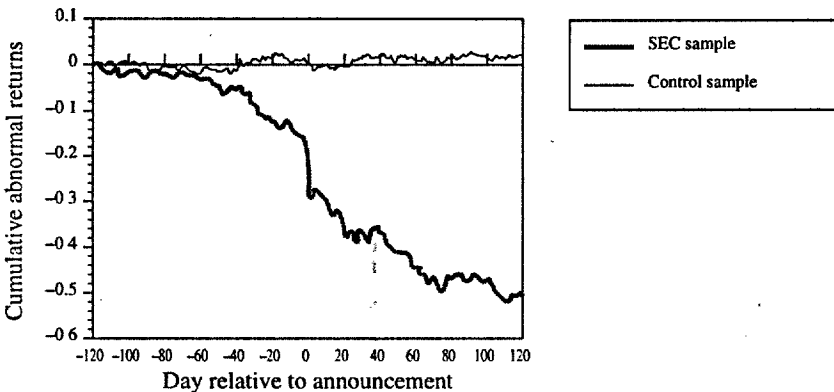
Increases in short interests and in the dispersion of analysts' forecasts suggest that the disparity of beliefs among investors increases following the initial announcement of the alleged earnings manipulation. This is indirect evidence that the SEC firms face higher costs of capital (see, Kim and Verrecchia 1994; Baiman and Verrecchia 1993). Below, we provide more direct evidence that allegations of earnings manipulation are associated with increases in the cost of capital.

### Cost of Capital

We employ three measures to investigate whether cost of capital increases for SEC firms following the announcements of their alleged earnings manipulation. We investigate whether (i) stock prices decline; (ii) bid-ask spreads increase; and (iii) number of analysts following the firms decline. Each of these are discussed below.

**Stock Prices:** Returns data is obtained from CRSP. Of the sample firms, 46 (41) SEC firms (control firms) are listed on NASDAQ and 32 (34) are listed on NYSE or AMEX. The remaining firms trade on either pink-sheets, regional exchanges or their stock returns are not available on CRSP. Figure 3 presents the cumulative abnormal stock returns around the time of the initial announcement of the alleged earnings manipulation. Stock returns are adjusted using the CRSP value-weighted-with-dividends index. The figure indicates that on day 0, stock prices decline on average by nine percent. This decline is similar to that reported by Feroz et al. (1991), who find a ten percent decline at the first announcement of the alleged violations for their sample of AAERs. The decline in stock returns suggests that firm value is significantly impacted by announcements of earnings manipulation. The large, negative stock price reaction suggests that managers are initially successful at increasing their firms' perceived values through the use of earnings manipulation.<sup>21</sup>

**Figure 3** Stock returns adjusted for the value-weighted with dividend index. A comparison of 78 firms subject to enforcement actions by the SEC between 1982 and 1992 to 75 control firms matched by industry, size, and time period



**Bid-ask Spreads:** We obtain bid-ask spread data for 32 firms listed on the NASDAQ National Market (NNM) system directly from the CRSP tapes. We also obtain bid-ask spread data for a further twelve NASDAQ firms (not listed on NNM) for forty days surrounding the announcement directly from the NASDAQ Historical Research Group. We did not collect bid-ask spread data for NYSE and AMEX firms. Previous research on the determinants of bid-ask spreads (e.g., Benston and Hagerman 1974; Cowan, Carter, Dark, and Singh 1992; Jegadeesh and Subrahmanyam 1983) indicates that both price and volume are important in explaining the magnitude of bid-ask spreads. In addition, Cowan et al. (1992) also indicate that the number of market makers is important in explaining bid-ask spreads. Therefore, in order to determine if bid-ask spreads are relatively larger after the announcement it is necessary to control for these determinants of the spread.

We adopt the following procedure to obtain a predicted bid-ask spread for our firms (this procedure is similar to that adopted by Cowan et al. 1992).

- (i) For each year (1983 to 1992) we obtain all NNM firms with at least 200 trading days;
- (ii) For each firm that qualifies, we calculate the average (over at least 200 trading days), bid-ask spread; bid price, volume, and number of market makers;
- (iii) Perform the following regression for each year:

$$\text{Bid-ask spread}_i = \alpha_0 + \beta_1 \text{Volume}_i + \beta_2 \text{Price}_i + \beta_3 (\text{Mkt makers})_i \quad (4)$$

where for firm  $i$ :

$$\text{Bid-ask spread}_i = \log \text{ of the average } \frac{\text{ask} - \text{bid}}{(\text{bid} + \text{ask})/2}$$

$$\text{Volume}_i = \log \text{ of the average number of shares traded,}$$

$$\text{Price}_i = \log \text{ of the average bid price,}$$

$$\text{Mkt makers}_i = \log \text{ of the average number of market makers.}$$

From each regression we obtain the predicted values of  $\alpha_0$ ,  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$ . Yearly regression are performed since the intercept from these regressions varies considerably from year to year. The other coefficients, however, exhibited little variation across time.<sup>22</sup> The number of firms in these regressions ranged from 176 in 1983 to a high of 2092 in 1987. The median number of firms is 1627 in 1986. The explanatory power (adjusted  $R^2$ ) is 66 percent in 1983 but in all other years (1984 to 1992) is over 83 percent.

- (iv) The estimated values of the coefficients in the calendar year corresponding to the announcement year are used in the following equation to calculate predicted bid-ask spreads for each firm  $i$  on day  $t$  relative to the announcement date:

$$\text{Predicted bid-ask spread}_{i,t} = \hat{\alpha}_2 + \hat{\beta}_1 \text{Volume}_{i,t} + \hat{\beta}_2 \text{Price}_{i,t} + \hat{\beta}_3 (\text{Mkt makers})_{i,t} \quad (5)$$

The residual bid-ask spread is then calculated as the actual bid-ask spread for firm  $i$  on day  $t$  minus the predicted bid-ask spread for firm  $i$  on day  $t$ .

**Figure 4** Residual bid-ask spreads for 44 firms surrounding the first announcement that the firm has engaged in earnings manipulation. The straight lines are the mean residual bid-ask spread before and after the announcement (excluding day zero) for the firms

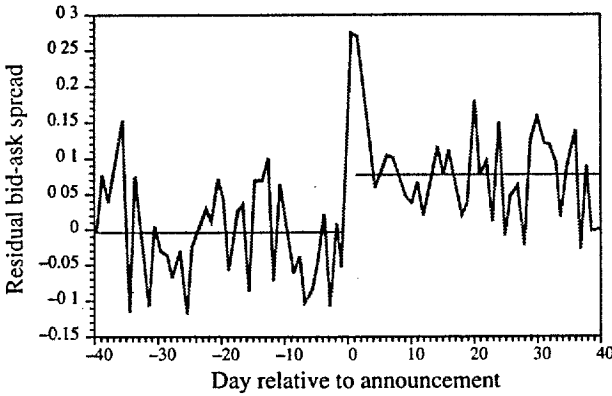
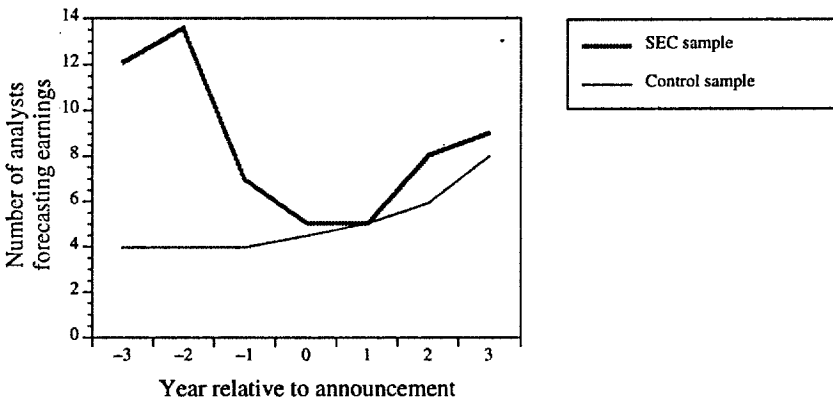


Figure 4 presents a plot of the residual bid-ask spreads for the sample. The plot indicates that prior to the announcement date, the average residual bid-ask spread for days -40 to -1 is negative (-0.01). However, after the announcement date, the average residual bid-ask spread for days +1 to +40 is equal to 0.07. The difference in means is significant at the one percent level. In addition, the number of positive residuals is also significantly different from zero in days +1 to +40. For our sample of firms, this residual increase translates into an average increase of around 0.7 percent of the stock price.<sup>23</sup> Thus, the residual increase in bid-ask spreads is of economic significance. This evidence suggests that bid-ask spreads increase for our sample of firms after taking into account the decline in price observed in Figure 3. This increase in bid-ask spreads implies that

**Figure 5** Median number of analysts forecasting annual earnings surrounding the first announcement that the firm has engaged in earnings manipulation. A comparison of 43 firms subject to enforcement actions by the SEC between 1982 and 1992 to 40 control firms matched by industry, size, and time period



investors will demand a higher rate of return on these firms' securities (Amihud and Mendelson 1986).<sup>24</sup>

**Analyst Followings:** Information on analysts followings is obtained for 43 SEC firms and 40 control firms from I/B/E/S. Figure 5 provides evidence on the number of analysts following the SEC and control firms in years surrounding the announcement year. As the plot indicates, there is a significant decline in the median number of analysts following the SEC firms from year -1 to year +1 (the Wilcoxon test is significant at the six percent level). In comparison, the median number of analysts following the control firms increases over this time period (the Wilcoxon test is significant at the one percent level). It is interesting to note from Figure 5 that relative to the control firms, the SEC firms have higher analyst followings in years prior to the discovery of the earnings manipulation. This fact, in conjunction with their higher market-to-book ratios (see Table 6) suggests that investors are relatively optimistic about the prospects for these firms prior to the discovery of the earnings manipulation.

Overall, the evidence presented in this section suggests that firms in the SEC sample are initially successful in influencing investors' perceptions of firm value through earnings manipulation. However, they are penalized with significant increases in their costs of capital once the earnings manipulation is revealed.

We end this section by noting a potential limitation of our interpretation of the results. Our sample is biased towards firms experiencing declining underlying economic performance. Therefore, we cannot rule out the possibility that some of the increase in costs of capital documented in this section is attributable to declining underlying economic performance that would have arisen in the absence of earnings manipulation. Nevertheless, the evidence does suggest that *ex ante*, these firms benefited from their earnings manipulation by delaying the documented consequences.

### **Conclusions and implications for future research**

This study investigates the motives for and consequences of earnings manipulation in a sample of firms targeted by the SEC for allegedly overstating earnings. The results indicate that important motivations for earnings manipulation are the desire to raise external financing at low cost and to avoid debt covenant restrictions. We do not, however, find systematic evidence that managers are manipulating earnings to obtain a larger earnings-based bonus, nor do managers appear to be manipulating in order to sell their stockholdings at inflated prices. In addition, we find that poor oversight of management through weak governance structures is an important catalyst for earnings manipulation. Finally, our results are consistent with the firms experiencing a significant increase in their costs of capital following the revelation that their earnings have been overstated. This suggests that manipulating earnings initially enables the firms to enjoy lower costs of capital, but that once the earnings manipulation is revealed, the firms experience significant increases in their costs of capital.

We emphasize that the instances of earnings manipulation examined in this study are among the most spectacular and fraudulent. Thus, our results cannot be

readily generalized to more subtle cases of earnings management. Nevertheless, we conclude that the desire to raise external financing at low cost represents an economically significant motivation for earnings manipulation that has received relatively little attention in previous academic research.

One potential avenue for future research is to understand the factors managers trade-off in deciding whether (and by how much) to manage earnings when raising external financing. We recognize that not all firms raising external financing manage earnings to the same extent as the firms in the SEC sample. We also identify governance structure as one important determinant of earnings manipulation. However, it is likely that other countervailing forces reduce incentives for earnings manipulation. For example, firms expecting to return to the capital markets frequently in the future may benefit from developing a reputation for high quality financial disclosures, negating the incentive to manage earnings in the short term.

It is also possible that the relation between earnings manipulation and the decision to raise external financing is linked to some well known puzzles in corporate finance. For example, it is well established that equity issues coincide with periods of temporarily high earnings performance (Brous 1992; Loughran and Ritter 1994; Rangan 1995; and Teoh, Welch, and Wong 1995) and that stock price performance is abnormally low in the three years following equity issues (Ritter 1991; Loughran and Ritter 1995; and Spiess and Affleck-Graves 1995). These regularities may be attributable to systematic earnings manipulation around the time of the issues. We think these possibilities are worthy of future research.

Finally, our results have implications for research into firms' disclosure policies. Existing research argues that there are long-term benefits to building reputations for providing reliable and timely disclosures (Lev 1992; Healy and Palepu 1993; Lang and Lundholm 1993; Botosan 1995; Frankel, McNichols, and Wilson 1995; and Healy, Palepu and Sweeney 1995). Yet the sample of firms investigated in this study chose to risk (and ultimately lose) these benefits for the prospect of short-term gain. Thus, our study highlights the trade-offs that are made in choosing a firm's disclosure policy. Related issues that are worthy of future research include: what factors influence the disclosure policy decision between long-term reputation building and short-term earnings manipulation? do firms take actions after their reporting policies are criticized to improve or salvage their reputations (e.g., firing management)? and are these actions successful in reducing the firms' costs of capital? By better understanding the determinants of disclosure policy, investors, analysts, and other parties evaluating firms' accounting information will be more prepared to anticipate earnings manipulations.

### Endnotes

- 1 See Feroz, Park, and Pastena (1991) for a detailed description of the Accounting and Auditing Enforcement Releases issued by the SEC.
- 2 See Pincus, Holder, and Mock (1988) and Section 3.1.

- 3 See Schipper (1989) for a definition of earnings management and a commentary on earnings management research.
- 4 DeFond and Jiambalvo (1991) report that the SEC subsequently took enforcement action against seven of the 41 firms.
- 5 Previous research has also used the Big Six as an indicator of audit quality (e.g., DeFond and Jiambalvo 1993; Feltham, Hughes and Simunic 1991).
- 6 For example, *The Wall Street Journal* (June 10, 1987), states: "The settlement (of the SEC enforcement action) has no effect on the financial condition of First Chicago, *but undermines the credibility of its chairman and chief executive officer, Barry Sullivan, who vehemently insisted in 1984 that a huge batch of loans had all gone sour at once. The SEC contended that the loans went bad over a period of time and that loss provisions should have been taken earlier*" [italics added].
- 7 Kim and Verrecchia (1994) argue that less precise disclosures provides greater opportunity for experts to process public information into private information, which in turn increases information asymmetry among market participants and thereby decreases liquidity. Thus, the consequence of less precise disclosures is greater information asymmetry between the firm and investors as well as greater disparity of beliefs among investors. It is the disparity of beliefs among investors that leads to a less liquid market for the security.
- 8 Feroz et al. (1991) provide a detailed description of the SEC's enforcement program, the AAERs issued by the SEC, and the effects of these releases on managers, auditors, and firms' financial statements.
- 9 In many of the AAERs relating to IPO firms, the SEC directly alleges that earnings are inflated in order to issue securities at higher prices. Thus, the exclusion of IPO firms reduces the power of our tests investigating the demand for financing motivation.
- 10 While the SEC (1989, p.8) categorizes all AAERs as financial reporting violation cases, it pursues differing actions depending on the severity of the violation. The SEC pursues *injunctive actions* under the fraud provisions of the Securities Act of 1934 when it charges an intentional material misstatement (69 firms). The agency pursues *administrative proceedings* under the 1964 amendments when the registrant failed to comply with the reporting provisions of the 1934 Act (19 firms). The SEC issues an *Exchange Act Release* when injunctive actions or administrative proceedings are not pursued, but public criticism of the registrant's accounting is warranted (4 firms).
- 11 Few of either the SEC or the control sample firms pay dividends (i.e., the median dividend payment is zero in both samples). Assuming dividends are an additional required use of cash does not change the tenor of the results.
- 12 We do not use capital expenditures in the manipulation period since managers may reclassify expenses as capital expenditures in order to delay their recognition in income. If a firm has less than three years of data, we average over the shorter period. In addition, investment expenditures are also calculated as capital expenditure plus increases in investments less sales of property, plant and equipment and sale of investments. The tenor of the results does not change using this alternative definition.
- 13 We scaled FreeC by total assets and total tangible assets and the results are similar. We recognize that a firm cannot continue to exist without current assets. Thus, by assuming a firm can convert all their current assets to cash we are potentially understating the need for financing.
- 14 Analysis of the individual cases in our sample confirms the existence of this problem. For example, Chronar Corporation included its financial statements for 1983 in

- a registration statement filed in 1984 in conjunction with a planned public offering. The registration statement never became effective as a result of intervening actions by the SEC (see AAER 78, n2).
- 15 The Emerging Issues Task Force release 86-30 (1986) specifies that covenant violations must be disclosed in footnotes to firms' annual reports if a "violation has occurred or would have occurred absent a loan modification." The keywords used to search the annual reports include 'violation', 'default', 'covenant', 'noncompliance', and 'waiver'.
  - 16 We are grateful to Jim Jambalvo for suggesting we investigate firms' accounting procedural choice.
  - 17 The results reported do not use a matched-paired design, the sample size is reduced and the power of the test are lower when we only include matched pairs. However, the tenor of the results does not change.
  - 18 The cumulative variation explained by the two factors is 55 percent, with approximately 36 percent being explained by "Low Oversight of Management." We standardize each variable and estimate a standardized scoring coefficient that is then multiplied by the corresponding standardized variables and summed to obtain a score for "Low Oversight of Management" and for "Power of CEO over Board" for each firm. Cronbach's alpha on "Low Oversight of Management" is 0.684 and for "Power of CEO over Board" is 0.25 for the standardized variables. This suggests that the factors hold together well for "Low Oversight of Management" but not for "Power of CEO."
  - 19 We thank Paul Asquith and Lisa Meulbroek for providing access to their database. See Asquith and Meulbroek (1993) for a complete description of the short interest database and the data collection process used to create this database.
  - 20 The tenor of the results is unchanged if analysts' forecasts made either six months or three months prior to the fiscal year end are used rather than those made in the month of the fiscal year end.
  - 21 An alternative explanation is that the announcement increased the probability of shareholder litigation and that this in turn caused the stock price decline. We found that 35 SEC firms (and eight control firms) had threats of shareholder lawsuits within three years of the announcement. However, this alternative explanation is unlikely to fully explain the nine percent stock price decline. Romano (1991) documents that class action suits produce only around a 3.5 percent decline in stock prices.
  - 22 The intercept ( $\alpha_0$ ) ranged from -0.123 in 1983 to 0.573 in 1986 and had a pooled value (when all years were included in the regression) of 0.065.  $\beta_1$  ranged in value from -0.172 in 1986 to -0.115 in 1992 and had a pooled value of -0.128.  $\beta_2$  ranged from -0.520 in 1991 to -0.732 in 1983 and had a pooled value of -0.583.  $\beta_3$  ranged from -0.204 in 1983 to -0.495 in 1988 and had a pooled value of -0.378.
  - 23 The median (average) firm in the sample faced a relative bid-ask spread of 2.9 (4.4) percent prior to day zero. After day zero the relative bid-ask spread increases to 4.8 (6.5) percent. The amount of the spread that is predictable is 3.4 (5.6), so of the change, approximately 1.3 (1.8) percent is attributable to the change in price, volume and the number of market makers with the remaining increase of 0.6 (0.3) percent being the residual. Hence an investor purchasing \$100 of stock in the median (average) firm after the announcement date is now paying 60 (30) cents more in round-trip transaction costs that cannot be attributed to the change in price, volume or the number of market makers.
  - 24 Lee, Mucklow and Ready (1993) find that for NYSE intraday data, bid-ask spreads widen and depths fall in response to abnormally high trading volume. They suggest this is consistent with specialists using volume to infer the presence of informed traders. Consistent with Lee et al., we find that on the announcement day, both

volume and spreads increase, suggesting the presence of informed traders. The negative cross-sectional relation between volume and spreads documented by our model, indicates that firms with higher volume are more liquid and hence have lower spreads. Thus our model controls for the general relation between spreads and volume. As we are interested in the effect of asymmetric information, we do not control for a change in the proportion of informed traders (or the positive time-series relation between volume and spreads documented by Lee et al.).

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