

Accounting Defects, Financial Statement Credibility, and Equity Valuation

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Draft: January 1999

We would like to acknowledge helpful discussions with Robert Bowen and David Burgstahler.

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1. Introduction

Existing equity valuation models are silent on the question of how changes in financial statement credibility alter the usefulness of accounting data for valuation purposes.¹ Reported cash flow, earnings and balance sheet data are either taken at face value (e.g., Copeland, et al. [1994], Cornell [1993], Ohlson [1995]) or they are adjusted to eliminate alleged deficiencies unrelated to credibility concerns (e.g., Goldman Sachs [1998], Madden [1998], Milunovich and Tsuei [1996], Stewart [1991]). This is in sharp contrast to the role credibility plays in principal-agent settings involving adverse selection (e.g., Bartov [1991], Sansing [1992]) and in behavioral decision theory models of cascaded inference (e.g., Beach et al. [1978], Schume and DuCharme [1971]). In both literatures, a reduction in credibility attenuates the usefulness of reported information for decision-making purposes.

This paper investigates whether detectable attenuation effects are also present in the relation between accounting information and observed equity values once the credibility of the financial statements has been called into question. Specifically, we identify companies with rumored or acknowledged accounting defects, estimate parameters of a cross-sectional equity valuation model before and after the defects are made known, and then test for changes in the parameter estimates. If attenuation effects are present, the coefficient estimates for the accounting variables in the valuation model will decline in response to discovered accounting defects. On the other hand, the market may ignore the defects or assign a fixed penalty (an intercept decline) rather than placing less weight on reported accounting data. We also develop and test cross-sectional

¹ *Credibility* refers to the quality, capability or power to elicit belief and trust. In other words, credible financial statements convey information that can be believed and trusted. This notion is closely related to the more familiar concept of *reliability*. For example, “(a)ccounting information is reliable to the extent that users can depend upon it to represent the economic conditions or events that it purports to represent” (Financial Accounting Standards Board [1980], para. 62). Accounting researchers have traditionally used *reliability* to mean measurement error, noise or precision (e.g., Barth [1991] and Choi et al. [1997]).

predictions about the magnitude of attenuation based on characteristics of the accounting defects themselves and on the circumstances of their discovery.

Two broad types of accounting defects are examined: (1) alleged deficiencies identified by securities analysts, news reporters, or other commentators and (2) actual deficiencies acknowledged by a company spokesperson and corrected when restated interim or annual financial statements are issued. Approximately one-third of the rumored defects in our sample are eventually confirmed by company management and corrected. Our maintained hypothesis is that accounting defects, whether real or only rumored, make published financial statements less credible as a source of information about a company's past performance, current financial condition, and prospects for the future. Previous research has shown that defect allegations (Foster [1979], Kellogg [1984], Francis, Philbrick and Schipper [1994]) and acknowledgements (Feroz, Park and Pastena [1991], Kinney and McDaniel [1989]) are associated with reliably negative abnormal stock returns. Moreover, the share price declines that accompany confirmed defects often exceed what would be expected based solely on the sign and magnitude of the accounting restatement. In light of this finding, Kinney and McDaniel [1989, p. 91] conclude that:

“the market acts *as if* the existence of corrections is bad news irrespective of whether originally reported earnings are overstated or understated. This may be due to the negative implications of a breach in the internal accounting control/reporting system, intent by management to mislead, and perhaps discounting of possible future legal costs.”

It is this market penalty for accounting defects that we seek to better understand.

We find a sizable average decline in equity values for companies involved with rumored or confirmed accounting defects. The share price decline varies in cross-section with the magnitude of the defect, related management changes, and discovery by an outsider. There also appears to be an incremental market penalty associated with accounting defects labeled “errors” by company spokespersons. There does not appear to be any systematic reduction in securities analysts' EPS forecasts attributable to discovery of the accounting defects. This result suggests that the share price decline is likely to be attributable to changes in expectations about future profitability.

The results of our equity valuation analysis confirm that this market penalty is assessed both on the company and on its financial statement information. We find

attenuation of the valuation intercept and of the coefficients for the accounting variables in our valuation models. We also present exploratory evidence suggesting that the attenuation effects are related to characteristics of the accounting defects.

The remainder of the paper is organized as follows. Section 2 describes how changes in credibility affect the usefulness of information for decision-making, provides institutional background on accounting defects and their correction, and develops our research hypotheses. Sample selection procedures and descriptive statistics are presented in Section 3. Our analysis of the market reaction to alleged and confirmed accounting defects is contained in Section 4 where we also examine analysts' earnings forecast revisions made around the time the defects are first discovered. Section 5 presents our equity valuation tests for credibility-induced attenuation of financial statement information. Concluding remarks are contained in Section 6.

2. Research Hypotheses

There has been considerable interest among psychologists in how people utilize information to revise their opinions when the information source, and the information itself, is not completely credible. Much of this research has focused on settings where people revised probability assessments about the truth of hypotheses in light of new information. Intuition suggests that a reduction in credibility acts to decrease the diagnostic impact or inferential power of the information. An item of information that is highly diagnostic among competing hypotheses—a “clincher” piece of evidence—when delivered from a completely credible source somehow means something different if delivered from a source whose credibility is suspect. In other words, the diagnostic impact of new information is in some way contingent upon the credibility of the source from which it comes.

The Bayesian Hierarchical Inference model provides a normative framework for revising prior opinion when the information source, and thus the information itself, lacks complete credibility (Gettys and Willke [1969], Schum and DuCharme [1971], Schum and Kelly [1973]). Formal statements of the model can vary greatly across decision

settings and information environments, but they all retain the basic implication that the diagnostic impact of information is indeed reduced when its credibility declines.²

Laboratory research comparing subjects' unaided probability revision with the normative Bayesian probability revision shows that people react to noncredible data by reducing its influence on their judgments ("discounting"). However, the Bayesian model is not a good description of how they do it (Beach et al. [1978]). Instead, the discounting mechanisms people actually use are less complex in structure and frequently incorporate features of the decision context that normative Bayesian models indicate should be ignored.

2.1 Accounting Defects and Credibility

An accounting defect is an actual or alleged misstatement (or omission) in a company's quarterly or annual financial statements.³ Actual misstatements arise because of accounting errors or irregularities. Errors in financial statements may involve:

- mistakes in gathering or processing data from which the financial statements are prepared;
- unreasonable accounting estimates arising from oversight or misinterpretation of the facts that existed at the time the financial statements were prepared;⁴
- mistakes in the application of accounting principles relating to reported amounts, their classification, manner of presentation, or disclosure.

² The agency literature in accounting and economics (e.g., Banker and Datar [1989], Holmstrom [1982]) and the related literature in statistics (DeGroot [1970]) provide Bayesian models for aggregating informative signals of varying diagnosticity that parallel the hierarchical inference models found in psychology. The agency models, however, address issues of signal "sensitivity" and "precision" rather than signal credibility.

³ The discussion in this section draws on various elements of the professional accounting literature, including Accounting Principles Board Opinion No. 20, Accounting Series Release No. 177, Statement on Auditing Standards (SAS) No. 36, SAS No. 53, SAS No. 82, Statement of Financial Accounting Standards (SFAS) No. 16, and SFAS No. 109.

⁴ In contrast, a "change" in an accounting estimate occurs when the original estimate is revised in light of new information or subsequent developments that yield better insight or improved judgment. Thus an accounting estimate error is potentially distinguishable from a change in estimate, although this difference may be difficult for analysts and investors to discern.

Once an accounting error has been detected, the nature of the error and the effect of its correction on income before extraordinary items, net income, and related per share amounts must be disclosed (if material) in the period the error was discovered and corrected. The correction process involves a “prior period adjustment” to the opening balance of retained earnings for the period and culminates in restatement of the company’s previously issued financial statements.⁵ A change from one accounting principle that is not generally accepted to one that is generally accepted is considered to be a correction of an error.

The primary factor that distinguishes an error from an irregularity is intent. Errors are *unintentional* misstatements in the financial statements, while irregularities are *intentional* misstatements. For example, an inadvertent omission of a LIFO liquidation disclosure in the financial statements is an error; however, a disclosure omission intentionally made in a manner to deceive financial statement readers is an irregularity. Intent is often difficult to determine in practice, particularly in matters involving accounting estimates and the application of accounting principles. One reason for this difficulty is that similar forces influence the propensity for accounting errors and irregularities. These include: the stability and profitability of the industry; the complexity of the company’s business transactions and of the accounting issues involved; the extent to which estimates are used; the availability of corroborative evidential matter; the quality of the company’s internal control structure and corporate governance system; and the performance of the company’s external auditor.

Correcting a defect in quarterly or annual accounting data may entail legal liability for management (and the external auditor) because it constitutes *de facto* admission that previously issued financial statements contained a material misstatement (Kellogg [1984], Francis et al. [1994]). Management’s credibility with the investment community is also damaged since the presence of a defect raises questions about

⁵ Adjustments of previously issued financial statements must also be made when there is a change in accounting principles that requires retroactive treatment (e.g., LIFO abandonment, long-term construction contract accounting, the full-cost accounting, and certain depreciation accounting changes), when certain income tax benefits are realized, when the “pooling-of-interests” method is used for business combinations, and for discontinued operations. In addition, prior interim financial reports must be restated when there is an adjustment (or settlement) of litigation or similar claims, income taxes, contract renegotiations, or utility revenue under rate-making processes provided that certain GAAP criteria are met.

management integrity, weaknesses in internal control structures, audit committee oversight, external auditor quality, and so on. Correction of the defect does not necessarily alleviate investor concern about these precipitating circumstances and their continuing influence on later financial statements.

Management intent, the distinction between an error and an irregularity, is likely to exert an important influence on investors' credibility assessments. Unintentional accounting defects may reveal internal control weaknesses but they are also likely to be isolated events involving comparatively small dollar amounts and short time periods. Clerical mistakes, accounting software malfunctions, and inadvertent disclosure omissions are unlikely to be a source of ongoing investor concern once they have been corrected. Accounting irregularities, on the other hand, involve management deception. Correction of these defects, even when accompanied by a change in management, may leave investors wondering if other undiscovered irregularities contaminate the financial statements.

Published allegations or rumors of accounting irregularities that go uncorrected may also cause investors to question financial statement credibility by raising the specter of management deception. Some allegations are undoubtedly well founded, others just reflect legitimate differences of opinion about proper GAAP, and still others are probably spurious and emanate from investors who hold short positions in the company's stock.

2.2 Implications for Equity Valuation

To visualize how credibility-induced discounting mechanisms might operate in securities markets, consider the following cross-sectional specification of a standard "residual income" equity valuation model:

$$(1) \quad PRICE_{jt} = \gamma_0 + \gamma_1 BVE_{jt} + \gamma_2 ABNEARN_{jt} + \varepsilon_{jt}$$

where the share price ($PRICE_{jt}$) for company j at time t is represented as a linear function of the company's current equity book value (BVE_{jt}) per share and the expected present value of its future abnormal earnings ($ABNEARN_{jt}$) per share.⁶ The cross-sectional

⁶ Abnormal earnings ("residual income") is a company's reported net after-tax operating profits (including interest expense) minus a cost of capital charge, computed by multiplying equity book value by the equity

market valuation coefficients (γ_1 and γ_2) measure the influence on share prices of each accounting-related variable, and γ_0 is an intercept term.

There are three ways in which a reduction in financial statement credibility might induce “discounting” in the equity valuation model. One possibility is that “discounting” manifests itself as a reduction in the accounting-variable valuation coefficients, γ_1 and γ_2 . This would be consistent with the notion that reduced financial statement credibility attenuates the informativeness of accounting data for equity valuation purposes. A second possibility is that market participants alter the relative weights assigned to the two accounting variables, attaching more importance to one and less to the other. We have no *a priori* prediction about which of the two accounting variables investors would “discount”. A third possibility is that the market penalty for reduced financial statement credibility manifests itself solely as a reduction in the intercept coefficient, γ_0 , with the accounting-related valuation coefficients remaining unchanged. This would equate to penalizing the company but not the accounting data.

Our empirical tests for financial statement credibility effects investigate these three discounting mechanisms by estimating the cross-sectional valuation coefficients immediately before the (alleged or confirmed) accounting defect is made known and then estimating the coefficients a second time immediately following publication of the defect rumor or acknowledgement. This research design helps insure that observed changes (if any) in the valuation coefficients can be attributed to discovery of the accounting defect and, thus, to a reduction in financial statement credibility.

An unavoidable complication that affects our empirical analysis is the possibility that discovery of the accounting defect changes how market participants view the company’s future prospects and, thus, alters their expectations about future abnormal earnings. For example, consider a published allegation that a company’s revenue recognition policies are overly aggressive and therefore suspect. Allegations of this sort can induce a change in equity value by causing investors to: (1) doubt the credibility of previously reported accounting numbers and accordingly “discount” them for equity

cost of capital. Consequently, both BVE_{jt} and $ABNEARN_{jt}$ are derived from the company’s financial statements. Details concerning our empirical proxy for the expected present value of $ABNEARN_{jt}$ are described later in the paper.

valuation purposes and/or (2) modify their forecasts of the company's future profit margins, sales growth, or capital investment requirements. We call this second possibility an *information content* effect because it manifests itself as a change in expectations about future abnormal earnings rather than as an attenuation of the valuation coefficients. Analysts' earnings forecast revisions and the time-series properties of earnings changes are used to control for information content effects in our analysis.

A second complicating feature of the study is that most accounting defects in our sample are eventually corrected. This means that the accounting information available to market participants changes once company management corrects the defect and issues revised financial statements. To illustrate how this complicates the analysis, consider the following two equity valuation equations where the subscript *B* (*A*) denotes variables measured immediately before (after) the accounting defect is made known:

$$(2a) \quad PRICE_B = \gamma_{B0} + \gamma_{B1} BVE_B + \gamma_{B2} ABNEARN_B + \varepsilon$$

$$(2b) \quad PRICE_A = \gamma_{A0} + \gamma_{A1} BVE_A + \gamma_{A2} ABNEARN_A + \varepsilon$$

Company and time subscripts are suppressed for notational convenience. Let ΔBVE denote the change in reported equity book value that occurs when the accounting defect is corrected; i.e., $BVE_A = BVE_B - \Delta BVE$. In our sample, the adjustment typically decreases equity book value. Similarly, let $\Delta ABNEARN$ denote the impact of error correction on the calculated value of abnormal earnings; i.e., $ABNEARN_A = ABNEARN_B - \Delta ABNEARN$.⁷ Substituting these expressions for the right-hand-side variables in Eqn. 2b yields:

$$(2c) \quad \begin{aligned} PRICE_A &= \gamma_{A0} + \gamma_{A1} [BVE_B - \Delta BVE] \\ &+ \gamma_{A2} [ABNEARN_B - \Delta ABNEARN] + \varepsilon \\ &= \gamma_{A0} + \gamma_{A1} BVE_B + \gamma_{A2} ABNEARN_B \\ &+ \gamma_{A1^*} [-\Delta BVE] + \gamma_{A2^*} [-\Delta ABNEARN] + \varepsilon \end{aligned}$$

Prior to discovery of the accounting defect, the information set embedded in share price ($PRICE_B$) includes BVE_B and $ABNEARN_B$. After discovery and correction, the

⁷ Exact mathematical expressions for $\Delta ABNEARN$ depend on the assumed time-series behavior of abnormal earnings. We address this issue further when we describe our empirical proxies for the abnormal earnings component of the equity valuation model.

information set embedded in the new share price ($PRICE_A$) includes these same accounting variables (BVE_B and $ABNEARN_B$) and their respective correction factors (the Δ terms) as shown in Eqn. 2c. If discovery and correction of the defect has done nothing more than alter the accounting information set available to investors (an *information content* effect), the valuation coefficients for the original data (BVE_B and $ABNEARN_B$) will be unchanged from their pre-discovery levels. Attenuation of the coefficients (γ_{A1} , γ_{A2}) or the γ_{A0} intercept relative to their pre-discovery levels would be consistent with the presence of a market penalty for reduced credibility. Moreover, the degree of coefficient attenuation should vary across accounting defects in response to differences in the magnitude and duration of the misstatements, the possibility of management deception, and other factors that have a bearing on investors' credibility assessments.

3. *Sample Selection and Descriptive Statistics*

The following procedures were used to identify *Wall Street Journal* articles published between January 1, 1990 and December 31, 1995 that describe rumored or confirmed accounting defects:

(1) The Dow Jones Interactivesm database of *Wall Street Journal* articles was searched electronically for news articles containing variations of the words CORRECTION, ERROR, REVISION, or RESTATEMENT in conjunction with ACCOUNTING, EARNINGS, FINANCIAL STATEMENTS, or RESULTS. A total of 1,729 articles were identified. Each article was then read and discarded from further consideration if it dealt with:

- A company whose previously issued quarterly or annual financial statements were restated for pooling-of-interests business combinations, discontinued operations, litigation settlements, stock splits, or accounting method changes requiring prior period adjustments;
- An adjustment to previously announced "preliminary" earnings (or other financial statement items) made before the statements themselves were issued;
- Any foreign company or a U.S. company not listed on the CRSP database;
- An accounting restatement made prior to 1990;

- A company that went public (IPO or spin-off) less than three years before the announced restatement or that was merged, acquired, liquidated or went private within two years after the restatement.
- (2) The result was a sample of 125 defect episodes where a company announced the restatement of its quarterly or annual financial report in response to a discovered error or irregularity. A second search of the Dow Jones Interactivesm database was then performed to identify all *Wall Street Journal* articles pertaining to each restatement.
 - (3) A second sample of alleged accounting defects (“rumors”) was constructed from *Wall Street Journal* articles published during the 1990-1995 period and identified in a third search of the Dow Jones Interactivesm database. One search string used variations of the words AGGRESSIVE, CONTROVERSIAL, DUBIOUS, MISLEADING, RED FLAG, QUESTIONABLE, or UNORTHODOX in conjunction with ACCOUNTING, EARNINGS, or FINANCIAL STATEMENTS. A second search string used the names of individuals who frequently comment on corporate accounting practices including BRILOFF, LEE SEIDLER, HOWARD SCHILIT, O’GLOVE and ROBERT OLSTEIN. A third search string identified articles pertaining to Securities and Exchange Commission (SEC) investigations of corporate accounting practices using variations of the words SEC and INVESTIGATION or PROBE in conjunction with ACCOUNTING or FINANCIAL STATEMENTS.⁸ A total of 638 articles were identified. Articles were discarded from further consideration for reasons described in (1) above, or if the allegation dealt solely with a transitory component of reported earnings such as an unusual gain or loss.
 - (4) The result was a sample of 26 alleged defect episodes. Another search of the Dow Jones Interactivesm database was then conducted to identify all *Wall Street Journal* articles pertaining to each rumor and to determine how (if at all) the company responded to the allegation.

The news articles for all defect episodes were then assigned to one of four mutually exclusive categories. Articles that first mentioned the accounting defect were designated “rumor” announcements if someone other than a company spokesperson was

⁸ Our sample does not contain financial statement frauds of the sort examined by Feroz et al. [1991]. None of our sample companies were the subject of an SEC Enforcement Release (the basis for the Feroz et al. [1991] sample), administrative hearing, or other enforcement action. Consequently, the companies

identified as the information source. Articles in which a company spokesperson first acknowledged the accounting defect were designated “acknowledgements”. These articles typically described the nature of the defect, its dollar magnitude, and the time period covered by the restatement. Some “acknowledgements” provided only sketchy information about the error or irregularity, however. Details regarding the accounting defect and its correction would then be described in a subsequent news article (designated a “correction”). All other articles relating to the accounting defect were designated “interim” announcements.

The final sample contains 151 accounting defect episodes involving 146 different companies. Thirty-six episodes (23.8%) involved a rumor, and company management never acknowledged 24 of these rumored defects. The remaining 12 rumored defects were eventually confirmed and corrected by management. Thus, the sample contains 127 episodes (84.1%) where the accounting defect was acknowledged and corrected.

We were able to identify the dollar impact on after-tax earnings of the alleged or acknowledged defect in 136 cases (90.1%). Of these, 31 episodes (22.8%) involved accounting defects that *understated* earnings and 9 episodes (6.6%) involved defects where the earnings impact was either zero or described as immaterial. The remaining 96 episodes (70.6%) involved defects that *overstated* earnings. The average after-tax earnings misstatement for the entire 136 episodes was a \$19.1 million overstatement, or 26.3% of cumulative earnings reported during the misstatement period.

3.1 Descriptive Statistics

Table 1 reports the distribution of defect episodes over time, industry and stock exchange. The sample is well dispersed across years except for a slight concentration (27.2%) of defect episodes in 1994. The sample contains companies from every economic sector. Business and financial services firms comprise 37.1% of the sample, with consumer and business products firms making up another 25.8%. Only 47 sample companies (31.1%) were listed on the New York Stock Exchange (NYSE).

examined here are less likely to experience large changes in operating, financing and investing activities of the sort often associated pervasive accounting fraud.

Selected characteristics of the accounting defects and sample firms are presented in Table 2. Thirty defect episodes (19.9%) involved accounting errors described as such by a company spokesperson. These included defects attributed to accounting software flaws and to clerical mistakes involving the calculation of inventories, contract revenues and tax benefits. Another 52 episodes (34.4%) involved accounting irregularities that included false entries, invalid sales orders and unrecorded product returns as well as instances where a company spokesperson described the defect as involving “overstated” revenues at a business unit or various “irregularities”. The remaining 69 unspecified episodes (45.7%) included corrections to loan loss provisions, revenue computations, restructuring charges and deferred costs as well as reclassifications of investment portfolio gains and losses.

Company management first reported eighty-eight defect episodes (58.3%). Another 13 episodes (8.6%) involved defects that were disclosed by management but discovered by the company’s external auditor. Regulatory agencies (bank and insurance company auditors and the SEC) were involved in the discovery of 28 defects (18.5%). Of the remaining cases, employee whistleblowers were involved on two occasions (1.3%) and 20 episodes (13.2%) involved reporters, analysts or investors as the initial source of information about the alleged accounting defect.

Twenty-eight episodes (18.5%) culminated in a management change, typically a middle manager or financial officer of the company. Nine episodes (6.0%) involved companies in financial distress as indicated by financial press reports of loan default or impending bankruptcy, or by auditors’ going concern qualifications. In seven cases (4.6%), the company’s external auditor changed or withdrew its opinion in conjunction with discovery of the accounting defect.

We measure the dollar magnitude of the defect in terms of its impact on after-tax earnings, an amount disclosed by the company as part of the restatement process. Among the 136 cases where the amount could be identified in news articles or from the restated financials statements themselves, the mean after-tax earnings misstatement was \$19.1 million and ranged from a \$117.7 million earnings understatement to a \$680.0 million overstatement. The misstatement period ranged from a minimum of 1 quarter to a maximum of 41 quarters, and averaged 4.6 quarters for the sample.

The average company had an asset book value of \$9,524 million, annual sales of \$2,956 million, and a market capitalization of \$1,928 million prior to discovery of the accounting defect. The sample average return on sales was -1.1% for the fiscal year ended just prior to discovery, and the mean return on equity during that year was 1.5% . In terms of market capitalization, the median company belonged to the seventh CRSP size decile. Only 11 companies (7.3%) belonged to the smallest CRSP size quintile whereas 60 companies (39.7%) belonged to the largest CRSP size quintile.

4. Share Price Impact of Accounting Defects

In this section, we document the change in equity values that occurs when accounting errors and irregularities are rumored to exist, acknowledged by company management and corrected. We conduct our empirical analysis in three parts. First, we estimate abnormal stock returns for accounting defect news reports appearing in the *Wall Street Journal*. These tests are designed to investigate whether firms with rumored or confirmed accounting defects experience shareholder wealth losses. Second, we examine analysts' consensus earnings forecasts revisions for evidence indicating whether accounting defects are associated with changes in expected future profitability. Third, we investigate the degree to which cross-sectional variation in abnormal stock returns can be explained by attributes of the accounting defects themselves and by characteristics of the discovery and disclosure process.

4.1 Abnormal Stock Returns

We measured the impact of accounting defect announcements on the common stock prices of sample firms using standard event study methods. For each defect episode news report (“rumor”, “acknowledgement”, or “correction”), we calculate a single-factor market model, using continuously compounded stock and market returns, estimated over the 260 trading days ending 10 trading days before the announcement and the 100 trading days beginning 10 days after the announcement. Scholes-Williams [1977] estimates of the market model coefficients are used to compensate for non-synchronous trading problems inherent in daily stock return data. The CRSP daily equal-

weighted return series is our measure of the market return.⁹ The announcement period is defined as the two-day period encompassing the *Wall Street Journal* publication date and the prior trading day, since this is the shortest daily window that will capture the market's reaction to a company announcement. The two-day announcement period abnormal stock return for episode i is AR_{ij} where $j=1,2$, or 3 denotes the report type (1 = rumor, 2 = acknowledgement, and 3 = correction).

Thirty-one announcements (23.7%) were published concurrently with regular quarterly earnings announcements. Consequently, we also calculate an alternate measure of abnormal stock return designed to filter out the contaminating effect of any earnings information released during the announcement period. For each announcement contaminated by an earnings release, we obtain two proxies for unexpected quarterly earnings from Zacks Investment Research, Inc.: standardized unexpected earnings (SUE_{ij}) and quarterly estimate surprise ($SURPRISE_{ij}$).¹⁰

To allow for both a response coefficient on unexpected earnings for those defect announcements contaminated by concurrent earnings information, and differential mean abnormal stock returns between clean and earnings-contaminated announcements, the following OLS regression was run:

$$(4) \quad AR_{ij} = \alpha_0 + \alpha_1 D_{ij} + \alpha_2 D_{ij} SUE_{ij} + \alpha_3 D_{ij} SURPRISE_{ij} + \varepsilon_{ij}$$

where D_{ij} equals 1 if the defect is announced concurrent with quarterly earnings, and zero otherwise.¹¹ When the defect announcement is contaminated by quarterly earnings information ($D_{ij}=1$), the intercept (or mean abnormal return when unexpected earnings are controlled for) is $\alpha_0 + \alpha_1$. If there was no quarterly earnings release, D_{ij} equals 0 and

⁹ The results are not sensitive to alternative definitions of the parameter estimation period, or to using the value-weighted market index, or to estimation of market model coefficients using standard OLS procedures.

¹⁰ Standardized unexpected earnings (SUE_{ij}) is calculated by Zacks as the deviation of rolling 12-month earnings per share from an EPS exponential time-series forecast derived from the prior 20 quarters of 12-month earnings, divided by the standard error of the EPS forecast. Zacks' quarterly estimate surprise ($SURPRISE_{ij}$) measures the deviation of actual quarterly EPS from the last available consensus EPS forecast for that quarter, expressed as a percentage of the EPS forecast.

¹¹ The coefficient estimates and related t-statistics (in parentheses) are: -0.0722 (-4.569) for α_0 ; -0.0436 (-0.802) for α_1 ; 0.0280 (1.785) for α_2 ; and -0.0002 (-0.873) for α_3 .

the intercept is α_0 . Thus, our second measure of the individual abnormal stock return to the defect announcement is:

$$(5) \quad \begin{aligned} AR_{ij}^* &\equiv AR_{ij} - (\alpha_2 D_{ij} SUE_{ij} + \alpha_3 D_{ij} SURPRISE_{ij}) \\ &\equiv \alpha_0 + \alpha_1 D_{ij} + \varepsilon_{ij} \end{aligned}$$

It should be noted that AR_{ij}^* intentionally captures only the mean impact of the defect announcement; it does not control for characteristics of the defects per se. Our initial focus is not on explaining cross-sectional variation in individual firms' abnormal stock returns, but simply on identifying the mean share price impact of defect announcements, assuming adequate control for unexpected earnings.

Table 3 reports cumulative abnormal stock returns for rumors, acknowledgements and corrections over trading days -10 to -2 , days -1 to 0 , and days $+1$ to $+10$ where day 0 corresponds to the publication date of the *Wall Street Journal* which contained the accounting defect news report. Cumulative daily abnormal stock returns over the entire 21-day period for each type of announcement are shown in Figure 1.

Panel A of Table 3 shows that defect allegations (rumors) are accompanied by an average two-day share price decline of 14.83%. Acknowledgement of the accounting defect is accompanied by a 15.14% average two-day share price decline. Separate correction announcements are associated with a two-day share price decline of -3.42% , but this decline is not statistically different from zero at conventional levels of significance. Filtering out the contaminating effects of any earnings information released during the two-day announcement period does not markedly change these results. Common stock prices fall by -14.82% in response to a rumor, by -14.00% in response to confirmation by the company, and by -2.67% when a separate correction announcement is later issued. As before, the share price decline associated with correction announcements is not statistically different from zero.

Panel A of Table 3 also shows that common stock prices decline over the 9 days before publication of accounting defect announcements. Rumors are preceded by an average share price decline of -7.09% ; acknowledgements by a mean decline of -3.08% ; and corrections by a decline of -9.50% . In each case the share price decline is reliably

different from zero at a 5% level of significance or better. Only one acknowledgement announcement (0.7%) followed a rumor published within this 9 day pre-announcement period. Eight correction announcements (22.2%) were preceded by acknowledgements published during days -10 to -2 and this may account for some (perhaps all) of the pre-announcement share price decline observed for this subsample.

Discovery of an accounting defect seems to be bad news for investors regardless of whether the defect is acknowledged by company management or just alleged by outsiders. The next section examines whether defect discovery alters analysts' consensus earnings forecasts. The analysis sheds light on whether the negative abnormal stock returns associated with accounting defect announcements are attributable to changing expectations about firms' future profitability.

4.2 Earnings Forecast Revisions

For each sample company in the Zacks Investment Research universe, we obtain the one-month percentage change in analysts' consensus estimates of earnings-per-share (EPS) for the current quarter, the next quarter, and the next fiscal year relative to the fiscal quarter in which publication of the accounting defect news report occurred. For example, consider a calendar-year company where the announcement was made in August of 1992. Earnings forecast revisions are collected for the current fiscal quarter (Q3 of 1992), the next fiscal quarter (Q4 of 1992), and the next fiscal year (1993).¹² Forecast revisions for the current fiscal year (1992) are not examined because they unavoidably incorporate the prior-period correction (if any) of Q1 and Q2 earnings. Many of our sample companies do not have analyst coverage sufficient to be included in the Zacks' historical forecast files. As a result, consensus earnings forecasts are available for 23 rumors (63.9%), 68 acknowledgements (53.5%), and 17 corrections (48.6%).

If accounting defect announcements alter analysts' earnings forecasts, the effect should be concentrated in months 0 and +1 in Panel B of Table 3. Defect announcements published early in month 0 will be impounded in analysts' forecasts released that same

¹² Quarterly earnings announcement dates from Zacks Investment Research are used to correctly align the forecast revision data in event time.

month. However, defect announcements published late in month 0 will only be reflected in forecasts released during month +1.

Panel B of Table 3 reports mean and median EPS forecast revisions for a five-month period centered on the month in which the rumor, acknowledgement, or correction was announced. All three forecast intervals are characterized by downward revision of analysts' consensus EPS forecasts. However, the average magnitude of these quarterly and annual revisions is often not statistically significant, nor is the revision concentrated in months 0 and +1.¹³ There is a statistically significant downward mean revision (but not median revision) of consensus EPS forecasts for the current quarter and the next fiscal year over the two months prior to defect acknowledgement. Although this result could possibly reflect the impact of allegations surfacing prior to acknowledgement, the absence of statistically significant month 0 and +1 revisions to defect rumors argues against this interpretation of the data.

Despite the general tendency for consensus earnings forecasts to be revised downward, the data do not provide overwhelming evidence to suggest that these revisions are a response to the accounting defects.

4.3 Cross-sectional Variation in Abnormal Stock Returns

To examine how abnormal stock returns are conditioned by characteristics of the accounting defects and by attributes of the discovery process, the third part of our analysis requires cross-sectional tests be performed on sample firms. Two-day abnormal returns (AR_{ij}) are pooled across announcements (i.e., rumor, acknowledgement and correction) for a given defect episode, standardized and then used as the dependent variable in a regression that incorporates controls for concurrent earnings releases.¹⁴ Our use of pooled abnormal returns ensures that measured stock price changes reflect information about the entire defect episode. A weighted-least-squares estimation

¹³ The mean forecast revisions reported in Table 3 are frequently influenced by one or more extreme negative observations (i.e., a value in excess of -100.0%).

¹⁴ Pooled two-day abnormal stock returns are standardized by correcting for the number of announcements included in the return measure. For example, if a rumor and acknowledgement are pooled together, the resulting two-day standardized abnormal stock return is defined as $(AR_{i1} + AR_{i2})/2^{0.5}$.

procedure is used to control for cross-sectional heteroscedasticity of returns (Chandra and Balachandran [1992]).

The independent variables in the regression model capture information about the accounting defects and the circumstances of their discovery. The variables we consider are:

AMOUNT of the cumulative earnings misstatement as a percentage of pre-announcement market capitalization;

LENGTH is the duration of the misstatement period, in quarters;

NO_ERROR is assigned a value of 1 if the defect is an irregularity or unspecified, and zero otherwise;

RUMOR is assigned a value of 1 if the alleged accounting defect is not confirmed by a company spokesperson, and zero otherwise;

OUTSIDE is assigned a value of 1 if someone other than a company spokesperson first reported the defect, and zero otherwise;

M_CHANGE is assigned a value of 1 if a management change is reported concurrently with defect confirmation or correction, and zero otherwise;

DISTRESS is assigned a value of 1 if loan default, bankruptcy, or going concern issues are reported concurrently with defect confirmation or correction, and zero otherwise;

AUDITOR is assigned a value of 1 if an auditor change or opinion withdrawal is announced concurrently with defect confirmation or correction, and zero otherwise;

Abnormal stock returns are predicted to be negatively related to AMOUNT because positive values of this variable denote earnings overstatements. Negative regression coefficients are also predicted for LENGTH, NO_ERROR, OUTSIDE, M_CHANGE, DISTRESS and AUDITOR since these variables are suggestive of an increased likelihood that management deception underlies the misstatement. The cross-sectional regression coefficient associated with RUMOR is predicted to be positive, indicating that alleged accounting defects are less damaging than confirmed defects.

Our controls for concurrent earnings releases are: the dummy variable EARN, which is assigned a value of 1 if the defect announcement also reported quarterly earnings, and zero otherwise; SUE is standardized unexpected earnings and SURPRISE

is the consensus earnings forecast surprise percentage, as previously defined. Both SUE and SURPRISE take on values of zero in the absence of earnings contamination.

Table 4 reports the results of our cross-sectional analysis of abnormal stock returns for the 151 accounting defect episodes. The first regression model incorporates only those variables that control for concurrent earnings releases. The coefficient estimate associated with the dummy variable EARN is negative but not statistically different from zero. The SUE coefficient is reliably positive and the SURPRISE coefficient is indistinguishable from zero. The overall explanatory power of these earnings announcement control variables is relatively modest (adjusted R-squared of 8.40%) in keeping with the fact that only 31 defect announcements (15.7%) were contaminated by earnings information.

The second regression model includes all of the accounting defect variables; whereas, the third model retains only those variables exhibiting a statistically reliable association with abnormal returns. The negative coefficient estimates associated with AMOUNT, OUTSIDE and M_CHANGE are statistically significant and consistent with our predictions. The share price decline experienced by accounting-defect companies increases with the magnitude of the error, and is greater when there is a management change reported in conjunction with confirmation and/or correction of the defect. The market penalty for confirmed defects is also greater when someone other than a company spokesperson first reports the defect (OUTSIDE).

The positive coefficient estimate for NO-ERROR is statistically different from zero. However, the sign of the coefficient is opposite to our prediction. After controlling for the magnitude of the defect, the results suggest that investors do not assign less importance to accounting defects labeled as “errors” by management when compared to those involving management “irregularities” or where no attribution is made. Instead, so-called accounting errors seem to be associated with an incremental market penalty.¹⁵ The coefficient estimate for RUMOR is statistically indistinguishable from zero, indicating that unconfirmed allegations are not associated with an incremental share price change.

¹⁵ This results is not sensitive to the exclusion of unspecified defects in the coding of NO_ERROR.

The coefficient estimates associated with LENGTH, DISTRESS and AUDITOR are not reliably different from zero. The coefficient estimate for the SUE earnings announcement control variable continues to be statistically positive while the coefficients for the other control variables (EARN and SURPRISE) are not reliably different from zero. The adjusted R-squared is 29.73% for the second regression model and 30.58% for the reduced model.

In summary, our results document a sizable average decline in equity values for companies involved with rumored or confirmed accounting defects. The share price decline varies in cross-section with the magnitude of the defect, related management changes, and discovery by an outsider. There also appears to be an incremental market penalty associated with accounting defects labeled “errors” by company spokespersons. There does not appear to be any systematic reduction in securities analysts’ EPS forecasts attributable to discovery of these accounting defects.

5. Valuation Impact of Accounting Defects

In this section, we investigate whether a change in financial statement credibility alters the usefulness of accounting information for equity valuation purposes. We first construct an accounting-based measure of firm value motivated by Ohlson [1995] and Frankel and Lee [1996]. Specifically, we measure firm value as the sum of equity book value (*BVE*) plus the present value of expected abnormal earnings (*ABNEARN*):

$$(6) \quad PRICE_{jt} = \gamma_0 + \gamma_1 BVE_{jt} + \gamma_2 ABNEARN_{jt} + \varepsilon_{jt}$$

$$ABNEARN_{jt} = \sum_{k=1}^4 \frac{E_t(EPSt_{t+k}) - rE_t(BVE_{t+k-1})}{(1+r)^k} + \frac{E_t(EPSt_{t+5}) - rE_t(BVE_{t+4})}{r(1+r)^4}$$

where $E_t(EPSt_{t+k})$ equals the time t expected earnings per share for year $t+k$; $E_t(BVE_{t+k})$ equals $E_t(BVE_{t+k-1}) + E_t(EPSt_{t+k}) - E_t(DIV_{t+k})$; and $E_t(DIV_{t+k})$ is expected dividends in year $t+k$. We set $E_t(DIV_{t+k})$ equal to $E_t(EPSt_{t+k}) \times PAYOUT$, where *PAYOUT* is the company’s dividend payout ratio averaged over the most recent three years. The company’s cost of equity capital, r , equals $R_f + ERP_I$ where R_f is the 10-year Treasury

Bill yield and ERP_t is the industry-specific equity risk premium reported by Fama and French [1992].¹⁶

In order to isolate *credibility* effects that are distinguishable from *information content* effects, we must specify how restated financial amounts alter the valuation model in Eqn. 6 in the absence of any credibility concerns. Consider a typical restatement that corrects previously reported annual earnings ($EPS_A = EPS_B - \Delta EPS$) and equity book value ($BVE_A = BVE_B - \Delta BVE$) where the subscripts B and A denote financial statement amounts as originally reported (Before discovery of the defect) and as restated (After defect correction), respectively. The effects of this restatement on the equity valuation model are threefold. First, the original equity book value term is replaced by BVE_A . Second, correction of the historical earnings series alters the expected future earnings component of $ABNEARN$. For example, if earnings evolve as a random walk process, then restatement causes expected future earnings to become $E_t(EPS_{t+k}^*) = E_t(EPS_B - \Delta EPS)$ or EPS_A . Third, the equity book value component of $ABNEARN$ is also altered by ΔBVE and, over time, by ΔEPS .¹⁷ These three *information content* effects of restatement can be isolated by rewriting the equity valuation model as:

$$(7a) \quad PRICE_B = \gamma_{B0} + \gamma_{B1} BVE_B + \gamma_{B2} ABNEARN_B + \varepsilon$$

$$(7b) \quad \begin{aligned} PRICE_A &= \gamma_{A0} + \gamma_{A1} BVE_A + \gamma_{A2} ABNEARN_A + \varepsilon \\ &= \gamma_{A0} + \gamma_{A1} BVE_B + \gamma_{A1} [-\Delta BVE] + \\ &\quad \gamma_{A2} ABNEARN_B + \gamma_{A2} [-\Delta ABNEARN] + \varepsilon \end{aligned}$$

¹⁶ This approach to measuring the cost of equity capital presumes that r itself is immune to changes in financial statement credibility. To investigate this issue, we compare the Scholes-Williams market model β s estimated immediately before and after discovery of the accounting defects. Systematic risk declined on average by 13.9% (median decline 14.3%) across the 151 discovery events and 88 of the individual β s (58.3%) were smaller after discovery than before. The direction of the change in market model β s is inconsistent with the notion that increased informational risk is a primary factor contributing to the share price declines we document in the study.

¹⁷ In this case, the two correction terms will not equal one another if the misstatement period extends beyond one year. This is because ΔBVE is the cumulative after-tax earnings impact of restatement for all affected quarters whereas ΔEPS is the correction for the most recent year's earnings only.

where all variables are as previously defined and the abnormal earnings correction term ($\Delta ABNEARN$) incorporates the combined effects of corrections made to equity book value and to the historical earnings series.

If discovery and correction of the accounting defect does nothing more than alter the accounting information set available to investors (an *information content* effect), the valuation coefficients for the original data (BVE_B and $ABNEARN_B$) in Eqn. 7b will be unchanged from their pre-discovery levels. Attenuation of these valuation coefficients (γ_{A1} , γ_{A2}) or the γ_{A0} intercept from their pre-discovery levels would be consistent with the presence of a market penalty for reduced credibility.

We conduct our empirical analysis in two parts. First, we simultaneously estimate the two valuation equations using a “seemingly unrelated regression” (SUR) procedure to control for the presence of cross-equation residual correlation. Stock prices measured before discovery of the accounting defect are used as the dependent variable in Eqn. 7a, and post-discovery stock prices are used to estimate Eqn. 7b. We assess attenuation of the BVE and $ABNEARN$ valuation coefficients and the intercept term using standard SUR test procedures. Second, we investigate the degree to which cross-sectional variation in the intercept shift and coefficient attenuation can be explained by variables that proxy for change in financial statement credibility.

5.1 Attenuation Test Results

Lacking an unambiguously appropriate specification for expected EPS in the abnormal earnings component of the valuation equation, we model the time-series evolution of earnings using three different processes. Each process represents an alternate way of describing how expectations adapt to restatement of previously reported earnings and equity book value in the absence of credibility effects.

First, we assume that annual earnings follow a random walk. In this case, accounting restatements alter expectations about equity book values and earnings in a straightforward manner. The adjusted equity book value term (BVE_A) impounds the cumulative after-tax earnings impact of restatement. Only that portion of the cumulative earnings impact applicable to the most recent year is included as an adjustment to the EPS forecasts in $ABNEARN_A$. For the pre-discovery valuation model in Eqn. 7a,

expected annual earnings for $t+1$ through $t+5$ are set equal to earnings as reported for the four quarters just before discovery of the accounting defect.¹⁸ The post-discovery valuation model (Eqn. 7b) uses this same earnings expectation but after correction for the accounting defect.

Our second model of the time-series evolution of earnings assumes perfect foresight of next year's reported earnings. Expected annual earnings for $t+1$ through $t+5$ are set equal to the firm's actual reported earnings for the four quarters beginning just after correction of the defect (or just after the rumor was reported if the alleged defect was never corrected). This means that restatement continues to effect the equity book value term (BVE_A) as described for the random walk process, but it has no impact on the earnings forecast components of $ABNEARN_A$.

The third earnings expectations model relies on analysts' consensus forecasts of annual EPS obtained from Zacks Investor Research, Inc. We calculate $ABNEARN_B$ using consensus earnings forecasts for $t+1$ and $t+2$ released the month before discovery of the defect. Earnings forecasts for $t+3$ through $t+5$ are then calculated using analysts' consensus forecasts of 3-year to 5-year earnings growth rates also released the month prior to discovery. The post-discovery abnormal earnings term ($ABNEARN_A$) uses consensus EPS and growth rate forecasts released after discovery or correction (if any) of the accounting defect.

The dependent variable $PRICE_B$ is the company's closing share price 11 days prior to publication of the first *Wall Street Journal* article reporting the alleged or acknowledged accounting defect. Two different post-discovery share prices ($PRICE_A$) are examined. The first $PRICE_A$ is constructed to represent stock price levels immediately following publication of the first *Wall Street Journal* news report describing the defect. We calculate this post-discovery price as $PRICE_B$ multiplied by $(1 + AR^*)$ where AR^* is the two-day abnormal stock return associated with initial discovery of the accounting defect, adjusted for the concurrent release of quarterly earnings information as described in Eqn. 5. Our second $PRICE_A$ represents stock price levels attained after all defect episode announcements have been made public. We use AR^* to form a multiple

¹⁸ We use this approach instead of relying on fiscal-year earnings to ensure that the earnings number in our valuation model is consistent with the most recent earnings information impounded in stock price.

announcement compounded two-day abnormal return, and multiply this factor by $PRICE_B$.¹⁹

The results of our analysis are summarized in Table 5. The equity valuation regressions in Panel A presume a random-walk expectation model of annual earnings. With this specification, the valuation coefficients associated with both accounting information variables BVE and $ABNEARN$ as well as the intercept are statistically significant and positive when the equity valuation model is estimated using pre-discovery share prices. These results continue to hold using post-discovery share prices that impound the market reaction to first announcement of the accounting defect. More importantly, all three parameters exhibit post-discovery attenuation. Specifically, the intercept term falls by 0.875, the BVE coefficient is reduced by 0.161 and the $ABNEARN$ coefficient declines by 0.003 after first announcement of the accounting defects. The shift in intercept and BVE coefficient are both statistically significant but the attenuation effect for $ABNEARN$ is only significant at the 0.07 level.

A similar pattern of attenuation holds when the random-walk equity valuation regression is estimated using post-discovery share prices that impound the abnormal returns for all defect announcements. The intercept term and book value of equity coefficient decline significantly, while the attenuation for $ABNEARN$ is not statistically significant. None of the coefficient estimates associated with the restatement information content terms are statistically different from zero.

Panel B of Table 5 reports the results obtained when the earnings expectation process is characterized by perfect foresight. The intercept and coefficients on the accounting variables are all positive and statistically significant using both pre- and post-discovery share prices. Again, post-discovery attenuation is present and statistically significant in the equity valuation intercept and in the coefficient for BVE . However, the post-discovery coefficient estimate for $ABNEARN$ increase rather than decline. The correction term coefficient estimates are not statistically different from zero.²⁰ These

¹⁹ This approach to the construction of post-discovery share price mitigates against the possibility that unrelated (but value relevant) post-discovery information about the company contaminates $PRICE_A$.

²⁰ The coefficient for $\Delta ABNEARN$ cannot be estimated in the perfect foresight model because the two correction terms are perfectly correlated. This occurs because restatement only affects beginning equity book value.

results are robust to using post-discovery share prices that impound the market reaction to all defect announcements.

Analysts' consensus earnings forecasts are used to generate earnings expectations in Panel C regressions. While the intercept and coefficient on book value of equity are positive and statistically significant using pre-discovery prices, the coefficient on the abnormal earnings term is positive but not statistically significant at conventional levels. Moreover, the explanatory power of the pre-discovery regressions in Panel C is below that obtained elsewhere in Table 5. These results are unusual because valuation models that incorporate analysts' earnings forecasts typically outperform those using time-series expectation models of earnings.

Using post-discovery share prices based on the first defect announcement, all three regression parameters are positive and statistically significant, and the explanatory power exceeds that of the other two earnings expectation model specifications. As before, the intercept is attenuated after discovery; however the coefficients on both of the accounting variables increase. None of these parameter shifts are statistically different from zero. In addition, neither of the coefficients on the correction terms are statistically different from zero. These results are similar using post-discovery prices that impound the market reaction to all defect announcements.

5.2 Attenuation and Proxies for Reduced Credibility

The results in this section are exploratory. The determinants of changes in financial statement credibility are likely to be highly contextual, difficult to measure, and difficult to aggregate into a single composite measure. For instance, the dimensionality of our data on accounting defect characteristics and circumstances of discovery was not measurably reduced when principal component analysis was applied. Lacking a single composite measure for changes in financial statement credibility, we resort to an ad hoc approach for investigating the degree to which attenuation of the equity valuation parameters with cross-sectional variation in the accounting defects. Specifically, we focus on the four credibility measures that were significant in explaining announcement period abnormal returns. Each measure in turn is used to condition the post-discovery

equity valuation parameters. Given the exploratory nature of this work, only qualitative results are reported.

The strongest results are observed for M_CHANGE, the variable denoting management changes reported concurrently with accounting defect announcements. For all three earnings expectation models, M_CHANGE is associated with increased attenuation of the valuation intercept and decreased attenuation of the accounting variable coefficients. This result is consistent with the notion that the market penalizes the firm more, and its financial statement information less, when discovery of the accounting defect culminates in a management change. However, the attenuation effects conditioned by M_CHANGE are not generally significant.

There is also a systematic (but generally not significant) pattern to the effects of OUTSIDE and NO_ERROR, characteristics that denote accounting defects first reported by someone outside the company and defects not described as “errors” by company the spokesperson, respectively. Both characteristics are associated with reduced attenuation of the intercept and increased attenuation of the accounting variables. There is no consistent pattern to the effects of AMOUNT, the magnitude of misstatement.

Overall, the evidence in Table 5 and our qualitative results support the notion that the market imposes a penalty on firms when the credibility of their financial statement information is called into question. This penalty is reflected in the attenuation of the valuation intercept, which is statistically significant in two of the three earnings expectation model specifications. In addition, the evidence also suggests that the market alters the weight it applies to the equity book value term in the valuation model. The attenuation in this coefficient is again statistically significant in two of the three earnings expectation specifications. However, the results for the abnormal earnings term are mixed in that it displays no systematic pattern of attenuation. Since this term is affected by the earnings expectation specification chosen, it is perhaps not surprising that the results vary across alternative specifications. Lastly, the results using analyst forecasts for earnings expectations are somewhat surprising in the pre-discovery period in that the valuation coefficient is not statistically significant and the explanatory power of the regression model is low. While further analysis is required to understand these later results, they do

not negate the supportive evidence for the attenuation effects of a reduction in financial statement credibility on the equity valuation model parameters for equity book value.

6. Conclusions

Prior evidence has documented a market penalty for financial statement revisions that correct accounting errors and irregularities as well as penalty for alleged accounting defects identified by securities analysts, news reporters, and other commentators. We posit that this penalty is due to a reduction in financial statement credibility that attenuates the usefulness of reported accounting information for equity valuation purposes. There are three messages from our analysis.

First, we identify characteristics of the accounting defects themselves and of the circumstances of their discovery that we believe capture aspects of the change in financial statement credibility. We then show that several of these characteristics are associated with the market penalty (announcement-period abnormal stock returns) in ways consistent with our predictions.

Our second message concerns the mechanism by which the market levies this penalty for reduced credibility. Using an accounting-based equity valuation model, we are able to separate the penalty imposed on the company from the penalty imposed on its accounting information. Our results on attenuation of the equity valuation model support the presence of both types of market penalty.

Our final message is that the determinants of financial statement credibility are highly contextual and difficult to measure. The descriptive evidence we present can hopefully guide future research in this area.

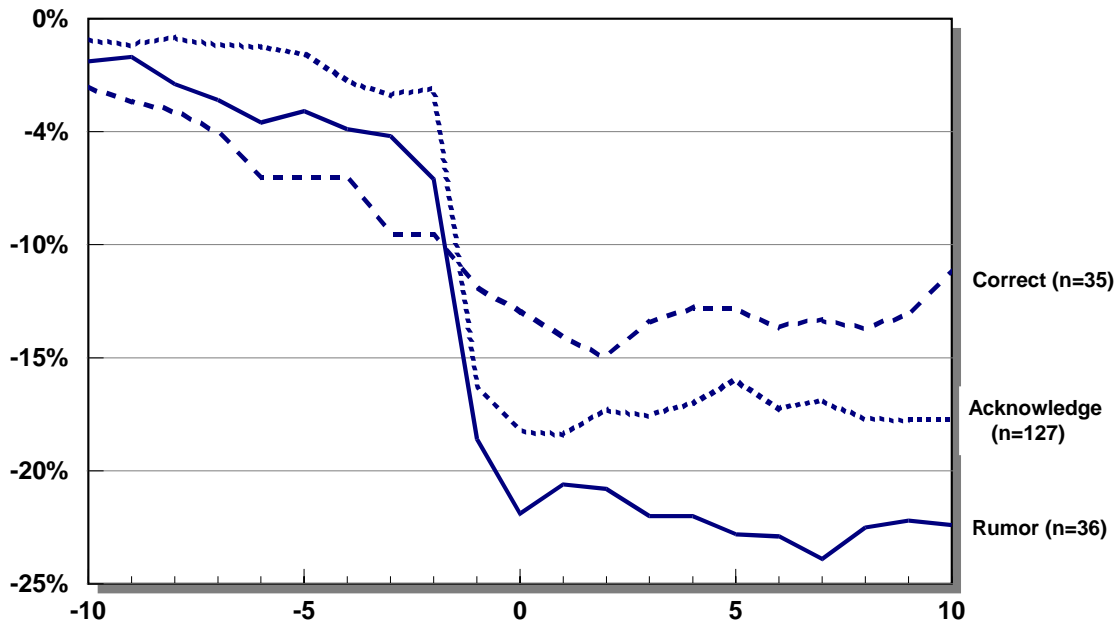
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Figure 1
Cumulative Abnormal Stock Returns Over 21 Days Surrounding
the Announcement of an Accounting Defect



Day 0 corresponds to the *Wall Street Journal* publication date of either an article that alleged (Rumor) or confirmed (Acknowledged) the accounting defect or a subsequent article that described details of the final error restatement (Correct). Rumored defects involve allegations made by someone other than a company spokesperson. Acknowledgements typically described the nature of the defect, its dollar magnitude, and the time period covered by restatement. Abnormal stock returns were estimated using a single-factor market model and the Scholes-Williams adjustment for nonsynchronous trading.

Table 1
Distribution of Defect Episodes Over Time, Industry and Stock Exchange

Panel A. Calendar Year of Discovery

	<u>Frequency</u>	<u>Percentage</u>
1990	18	11.9%
1991	21	13.9%
1992	28	18.5%
1993	23	15.2%
1994	41	27.2%
1995	20	13.3%
	<u>151</u>	<u>100.0%</u>

Panel B. Industry Membership by SIC Code

	<u>Frequency</u>	<u>Percentage</u>
Basic material	6	4.0%
Industrial manufacturing	13	8.6%
Consumer and business products	39	25.8%
Utilities	12	8.0%
Wholesale and retail	18	11.9%
Financial services	26	17.2%
Business services	30	19.9%
Healthcare services	7	4.6%
	<u>151</u>	<u>100.0%</u>

Panel C. Stock Exchange Listing

	<u>Frequency</u>	<u>Percentage</u>
NYSE	47	31.1%
NASDAQ - AMEX	104	68.9%
	<u>151</u>	<u>100.0%</u>

Discovery refers to publication of the first *Wall Street Journal* article (rumor or acknowledgement) describing the accounting defect.

Table 2
Selected Characteristics of Accounting Defects and Sample Firms

Defect Announcements by Category	<u>Frequency</u>			<u>Percentage</u>
Rumor	36			18.2%
Acknowledgement	127			64.1%
Separate Correction	35			17.7%
	<u>198</u>			<u>100.0%</u>
Type of Accounting Defect	<u>Frequency</u>			<u>Percentage</u>
An "Error", as described by management	30			19.9%
Irregularity	52			34.4%
Unspecified	69			45.7%
	<u>151</u>			<u>100.0%</u>
Who First Reported the Defect	<u>Frequency</u>			<u>Percentage</u>
Company management	88			58.3%
Regulatory agency	28			18.5%
Reporter/investor/analyst	20			13.2%
Auditor	13			8.6%
Employee (whistleblower)	2			1.3%
	<u>151</u>			<u>100.0%</u>
Related Events Disclosed with Defect Announcement	<u>Frequency</u>			<u>Percentage</u>
Management change	28			18.5%
Loan default, bankruptcy, or going concern issues	9			6.0%
Auditor change or opinion withdrawal	7			4.6%
None	107			70.9%
	<u>151</u>			<u>100.0%</u>
Magnitude and Duration of the Defect	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Cumulative earnings overstatement (\$mm)	\$19.1	\$69.3	(\$117.7)	\$680.0
Earnings overstatement / market capitalization	0.07%	0.73%	-7.30%	2.57%
Number of quarters restated	4.6	5.6	1	41
Company Characteristics Prior to Discovery (\$mm)	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Annual net income	\$5.0	\$763.0	(\$6,865.0)	\$4,424.0
Annual sales	\$2,956	\$10,005	\$1.4	\$64,523
Asset book value at yearend	\$9,524	\$37,921	\$4	\$251,506
Market capitalization	\$1,928	\$8,181	\$0.5	\$85,910
Leverage (total debt / equity book value)	3.47	5.91	(11.28)	28.72
Return on sales (net income / sales)	-1.1%	36.3%	-214.8%	269.4%
Return on equity (net income / equity book value)	1.5%	51.8%	-316.3%	297.8%

Defect announcements are initial *Wall Street Journal* articles that either allege (Rumor) or confirm (Acknowledgement) the accounting defect or subsequent articles that described the final error restatement (Separate Correction). Rumored defects involve allegations made by someone other than a company spokesperson. Errors are defects so labeled by a company spokesperson. Irregularities must be described as involving fictitious or invalid transactions, fraud, or intentional misstatements. Otherwise the defect type is unspecified. Company characteristics are measured as of the fiscal yearend immediately preceding publication of the first *Wall Street Journal* article describing the alleged or confirmed accounting defect, except for market capitalization which is measured 11 days prior to the publication date.

Table 3
Abnormal Stock Returns and Analysts' Earnings Forecast Revisions During Periods Surrounding the Announcement of an Accounting Defect

Panel A: Cumulative Abnormal Common Stock Returns

	Rumor (n = 36)		Acknowledgement (n = 127)		Correction (n = 35)	
	Mean		Mean		Mean	
	Return	t-statistic	Return (%)	t-statistic	Return (%)	t-statistic
Days -10 to -2	-7.09%	-3.28 **	-3.08%	-2.03 *	-9.50%	-2.44 *
Days -1 to 0	-14.83%	-13.43 **	-15.14%	-20.81 **	-3.42%	-1.85
Days 1 to 10	-0.48%	-0.21	0.51%	0.31	1.70%	0.41
Days -1 to 0 corrected for unexpected earnings	-14.82%	-13.42 **	-14.00%	-19.25 **	-2.67%	-1.44

Panel B: Percentage Change in Analysts' Earnings Per Share Forecasts

	Rumor (n = 23)		Acknowledgement (n = 68)		Correction (n = 17)	
	Mean	Median	Mean	Median	Mean	Median
	EPS for current quarter					
Month -2	-16.4%	0.0%	-10.2% **	-1.3%	-15.1% **	-10.8%
Month -1	-5.8%	-0.5%	-13.0% *	-0.7%	-32.3%	-11.5%
Month 0	-25.7%	-0.4%	-16.2% **	-3.3%	-12.9%	-12.7% *
Month +1	-12.2% *	-0.8%	-9.0%	-1.4%	-46.5%	-6.9%
Month +2	-80.5%	-0.5%	-40.2% *	-3.1%	-3.8%	0.0%

Day 0 (Month 0) corresponds to the *Wall Street Journal* publication date of either an article that alleged (Rumor) or confirmed (Acknowledgement) the accounting defect or a subsequent article that described details of the final error restatement (Correction). Rumored defects involve allegations made by someone other than a company spokesperson. Acknowledgements typically described the nature of the defect, its dollar magnitude, and the time period covered by restatement. Abnormal stock returns were estimated using a single-factor market model and the Scholes-Williams adjustment for nonsynchronous trading. Analysts earnings consensus earnings forecasts are from Zacks Investment Research, Inc. Statistical significance is indicated by * (0.05) and ** (0.01).

Table 3 continued
Abnormal Stock Returns and Analysts' Earnings Forecast Revisions During Periods Surrounding
the Announcement of an Accounting Defect

Panel B: Percentage Change in Analysts' Earnings Per Share Forecasts (continued)

	Rumor (n = 23)		Acknowledgement (n = 68)		Correction (n = 17)	
	Mean	Median	Mean	Median	Mean	Median
EPS for next quarter						
Month -2	-1.8%	-0.3%	-1.1%	0.0%	-1.3%	-2.8%
Month -1	-2.7%	-0.3%	-1.4%	0.0%	-15.2%	-4.9%
Month 0	-5.6%	0.0%	0.3%	0.0%	-34.4%	-3.3%
Month +1	-13.3%	0.0%	-4.6%	0.0%	-58.2%	-6.6%
Month +2	-19.1%	-0.1%	-19.1%	0.0%	5.1%	0.0%
EPS for next year						
Month -2	-0.4%	0.2%	0.0%	0.0%	-7.8% **	-6.6%
Month -1	-1.3%	0.0%	-3.7% **	-0.3%	-10.0% **	-8.8%
Month 0	-2.1%	0.0%	-7.4% **	-1.6%	-10.1% **	-5.7%
Month +1	-3.0% *	-0.1%	-7.6% **	-0.8%	-7.2% **	-1.7%
Month +2	-7.4%	0.0%	-2.9%	0.0%	-4.0%	0.0%

Day 0 (Month 0) corresponds to the *Wall Street Journal* publication date of either an article that alleged (Rumor) or confirmed (Acknowledgement) the accounting defect or a subsequent article that described details of the final error restatement (Correction). Rumored defects involve allegations made by someone other than a company spokesperson. Acknowledgements typically described the nature of the defect, its dollar magnitude, and the time period covered by restatement. Abnormal stock returns were estimated using a single-factor market model and the Scholes-Williams adjustment for nonsynchronous trading. Analysts earnings consensus earnings forecasts are from Zacks Investment Research, Inc. Statistical significance is indicated by * (0.05) and ** (0.01).

Table 4
Cross-Sectional Regression of Cumulative Two-day Abnormal Stock Returns on Characteristics of the 151 Accounting Defects and on Unexpected Earning Control Variables

Model	AMOUNT	LENGTH	NO_ERROR	RUMOR	OUTSIDE	M_CHANGE	DISTRESS	AUDITOR	Earnings Announcement			Adjusted R-squared
									EARN	SUE	SURPRISE	
	-	-	-	+	+	-	-	-	?	+	+	
1 Control variables for contemporaneous quarterly earnings announcements												
Coefficient									-0.030	0.048	0.000	8.40
P value									0.552	0.003	0.225	0.00
2 Accounting defect variables and earnings announcement control variables												
Coefficient	-0.454	0.001	0.139	0.009	-0.066	-0.243	-0.085	-0.052	-0.014	0.065	0.000	29.73
P value	0.001	0.488	0.002	0.837	0.086	0.000	0.327	0.394	0.770	0.000	0.480	0.00
3 Reduced model with earnings announcement control variables												
Coefficient	-0.506		0.136		-0.059	-0.235			-0.014	0.065	0.000	30.58
P value	0.000		0.002		0.064	0.001			0.813	0.000	0.482	0.00

Two-day abnormal stock returns are cumulated across announcements for each accounting defect episode and then standardized for multiple announcements. Thirty-one announcements (15.7%) also reported quarterly or annual earnings. The independent variables are: AMOUNT is the cumulative earnings overstatement as a percent of pre-announcement market capitalization; LENGTH is the duration of the misstatement period, in quarters; NO_ERROR is assigned a value of 1 if the defect is an irregularity or unspecified, and zero otherwise; RUMOR is assigned a value of 1 if the alleged accounting defect is not confirmed by a company spokesperson, and zero otherwise; OUTSIDE is assigned a value of 1 if someone other than a company spokesperson first reported the defect, and zero otherwise; M_CHANGE is assigned a value of 1 if a change in management was announced concurrently with defect confirmation or correction, and zero otherwise; DISTRESS is assigned a value of 1 if loan default, bankruptcy, or going concern issues are reported concurrently with defect confirmation or correction, and zero otherwise; AUDITOR is assigned a value of 1 if an auditor change or opinion withdrawal is reported concurrently with defect confirmation or correction, and zero otherwise; EARN is assigned a value of 1 if the announcement also reports quarterly or annual earnings, and zero otherwise; SUE is standardized unexpected earnings; and SURPRISE is the Zacks consensus earnings forecast surprise percentage. Exact probability values are shown below coefficient estimates and R-squared values.

Table 5
Cross-sectional Equity Valuation Regressions Before and After Discovery of an Accounting Defect

Model	Before Discovery			After Discovery					Adjusted R-squared Before	Adjusted R-squared After
	Intercept ?	BVE +	ABNEARN +	Intercept ?	BVE +	ABNEARN +	Δ BVE ?	Δ ABNEARN ?		
Panel A: Random-walk expectations model of earnings (n = 121)										
First announcement										
Coefficient	10.324	1.182	0.194	9.449	1.021	0.191	1.107	-0.267	20.51	20.85
P value	0.000	0.000	0.021	0.000	0.000	0.013	0.234	0.302	0.00	0.00
Attenuation				0.875	0.161	0.003				
P value				0.000	0.000	0.071				
All announcements										
Coefficient	10.400	1.182	0.196	9.078	1.046	0.183	1.517	-0.316	20.51	21.26
P value	0.000	0.000	0.019	0.000	0.000	0.019	0.161	0.293	0.00	0.00
Attenuation				1.322	0.136	0.013				
P value				0.000	0.000	0.177				

continued

Pre-discovery share price is measured as the closing price 11 trading days before publication of the first *Wall Street Journal* article describing the alleged or acknowledged accounting defect. Post-discovery share price is the pre-discovery price multiplied by 1 plus the two-day abnormal return (compounded multi-announcement abnormal return) for the first defect announcement (all announcements). The independent variables are equity book value (*BVE*), the present value of abnormal earnings (*ABNEARN*), and the two information content correction factors described in the paper. Attenuation refers to the predicted decline in valuation coefficients and the intercept term following discovery of the accounting defect. All reported P values are for two-sided tests.

Table 5 continued
Cross-sectional Regressions of Equity Book Value and Abnormal Earnings on Stock Price
Before and After Discovery of an Accounting Defect

Model	Before Discovery			After Discovery					Adjusted R-squared Before	Adjusted R-squared After
	Intercept ?	BVE +	ABNEARN +	Intercept ?	BVE +	ABNEARN +	Δ BVE ?	Δ ABNEARN ?		
Panel B: Perfect foresight expectations model of earnings (n = 115)										
First announcement										
Coefficient	11.185	1.201	0.233	10.545	1.159	0.377	1.344E15	na	18.37	23.00
P value	0.000	0.000	0.049	0.000	0.000	0.000	0.641		0.00	0.00
Attenuation				0.640	0.042	-0.144				
P value				0.000	0.000	0.000				
All announcements										
Coefficient	11.242	1.203	0.237	10.209	1.189	0.381	0.968E15	na	18.42	23.11
P value	0.000	0.000	0.044	0.000	0.000	0.000	0.775		0.00	0.00
Attenuation				1.033	0.014	-0.144				
P value				0.000	0.000	0.000				

correction

Pre-discovery share price is measured as the closing price 11 trading days before publication of the first *Wall Street Journal* article describing the alleged or acknowledged accounting defect. Post-discovery share price is the pre-discovery price multiplied by 1 plus the two-day abnormal return (compounded multi-announcement abnormal return) for the first defect announcement (all announcements). The independent variables are equity book value (*BVE*), the present value of abnormal earnings (*ABNEARN*), and the two information content correction factors described in the paper. Attenuation refers to the predicted decline in valuation coefficients and the intercept term following discovery of the accounting defect. The Δ *ABNEARN* correction factor is not identified in this model. All reported P values are for two-sided tests.

Table 5 continued
Cross-sectional Regressions of Equity Book Value and Abnormal Earnings on Stock Price
Before and After Discovery of an Accounting Defect

Model	Before Discovery			After Discovery					Adjusted R-squared Before	Adjusted R-squared After
	Intercept ?	BVE +	ABNEARN +	Intercept ?	BVE +	ABNEARN +	Δ BVE ?	Δ ABNEARN ?		
Panel C: Analysts' consensus forecasts of earnings (n = 76)										
First announcement										
Coefficient	11.676	1.029	0.407	9.719	1.277	0.578	0.565	0.281	15.78	25.15
P value	0.000	0.000	0.156	0.001	0.000	0.050	0.354	0.069	0.00	0.00
Attenuation				1.957	-0.248	-0.171				
P value				0.416	0.588	0.992				
All announcements										
Coefficient	11.673	1.029	0.410	9.880	1.235	0.524	0.848	0.235	15.85	22.73
P value	0.000	0.000	0.142	0.001	0.000	0.089	0.195	0.151	0.00	0.00
Attenuation				1.793	-0.206	-0.114				
P value				0.391	0.634	0.804				

Pre-discovery share price is measured as the closing price 11 trading days before publication of the first *Wall Street Journal* article describing the alleged or acknowledged accounting defect. Post-discovery share price is the pre-discovery price multiplied by 1 plus the two-day abnormal return (compounded multi-announcement abnormal return) for the first defect announcement (all announcements). The independent variables are equity book value (*BVE*), the present value of abnormal earnings (*ABNEARN*), and the two information content correction factors described in the paper. Attenuation refers to the predicted decline in valuation coefficients and the intercept term following discovery of the accounting defect. All reported P values are for two-sided tests.