Review of Accounting Studies, 9, 337–356, 2004

The Effect of Accounting Restatements on Earnings Revisions and the Estimated Cost of Capital

PAUL HRIBAR* sph24@cornell.edu
Johnson Graduate School of Management, Cornell University, Ithaca, NY 14853

NICOLE THORNE JENKINS
Olin School of Business, Washington University in St. Louis

Abstract. This paper examines the effect of accounting restatements on a firm's cost of equity capital. We show that, on average, accounting restatements lead to both decreases in expected future earnings and increases in the firm's cost of equity capital. Depending on the model used, relative percentage increases in the cost of equity capital average between 7 and 19% in the month immediately following a restatement. The relative increase in the cost of capital dissipates as time passes and after controlling for analyst forecast biases, but continues to average between 6 and 15% in the most conservative setting. We also show that restatements initiated by auditors are associated with the largest increase in the cost of capital, and that firms with greater leverage experience greater increases in their cost of capital. Overall, our evidence is consistent with accounting restatements lowering the perceived earnings quality of the firm and increasing investors' required rates of return.

Keywords: accounting restatements, cost of capital, earnings quality

JEL Classification: M41, G12

This paper examines the effect of accounting restatements on expected future earnings and the cost of capital. Prior research has shown that restatements of financial statements result in a substantial loss of market value, with abnormal returns estimates ranging from -4 to -12%, depending on the sample examined (e.g., Dechow et al., 1996; Anderson and Yohn, 2002; Palmrose et al., 2004). This loss in market value has been attributed to a number of factors, including revisions of expected future earnings due to the non-existence of past earnings, revisions in expected growth rates, uncertainty regarding managerial competence and integrity, and perceptions about overall earnings quality. While some of these factors decrease the value of the firm through a direct reduction in expected future cash flows, others reduce the value of the firm through the discount rate that investors attach to the expected future cash flows (i.e., the cost of capital). Prior research on restatements has not directly measured the cost of capital effect. Rather, these studies have used proxies for characteristics that might be associated with increased cost of capital, such as whether the restatement was fraudulent or who initiated the restatement (Palmrose et al., 2004).

In this paper, we use implied cost of capital techniques to estimate directly the effect of a restatement on the firm's cost of capital. By their nature, accounting restatements often lead to downward revisions in future expected earnings because

*Corresponding author.

the restatement affects the past time series of earnings, thereby affecting projections based on these figures. Thus, firm value tends to decrease simply because the expected stream of future cash flows is lower. What is not evident, however, is how much (if any) of the downward price revision is attributable to an increase in the discount rate that investors assign to future cash flows because of the restatement. We use analyst forecast revisions following an accounting restatement to proxy for the effect of the restatement on expected future cash flows. Combined with a valuation model, this allows us to estimate empirically the change in the firm's cost of capital following a restatement, and examine whether the perceived risk of the firm going forward is affected by the restatement.

Our results show that reductions in expected future earnings and increases in cost of capital both contribute to the significant loss in market value. Depending on the valuation model used, relative percentage increases in the cost of equity capital average between 7 and 19% in the month immediately following a restatement. Using Easton et al. (2002) simultaneous estimation of growth and the cost of capital, we estimate a relative percentage increase in the estimated cost of capital of 7.65%. As robustness checks, we estimate the increase in the cost of capital three and five months after the restatement to reduce the effect of stale forecasts, and we remove observations that experience a change in the forecast fiscal year end between the pre- and post-restatement periods to control for analyst optimism at longer horizons. Even in the most conservative setting, average increases in the estimated cost of equity capital continue to be significantly positive under all estimation procedures, although the magnitude of the increase dissipates and median increases are not significant in some of the models. Finally, we show that restatements initiated by the auditor are associated with the largest increase in the firm's cost of capital, and firms with higher leverage exhibit greater increases in their cost of capital following a restatement. Overall, our results are consistent with accounting restatements increasing the information uncertainty among investors, leading to an increase in the firm's cost of capital.

Our paper contributes to the accounting literatures related to restatements and the estimation of the cost of capital. Other studies in accounting examine the association between disclosure quality and the cost of capital using both cross-sectional and long-window (i.e., multi-year) association tests (e.g., Welker, 1995; Botosan, 1997; Healy et al., 1999), and between long-term earnings quality and the cost of capital (e.g., Francis et al., 2003). In contrast, we use an event study methodology that captures changes in the cost of capital in response to accounting restatements. Because the restatements are associated with a substantial loss in market value and generate significant publicity, they provide a powerful setting, increasing the likelihood of detecting changes in the firm's cost of capital despite the noisy estimates resulting from the implied cost of capital methodology. Additionally, the short window and the ability to use the firm as its own control make our estimates of changes in the cost of capital less likely to be confounded by omitted variables than would a cross-sectional analysis or long time series.[1] Our tests demonstrate the efficacy of using an implied cost of capital model in a short-window, event study setting. To our knowledge, this is the first empirical paper to apply the implied cost of capital measure in this fashion.

Our paper also contributes to the literature on how restatements affect firm value. Prior research shows that accounting restatements decrease firm value (Dechow et al., 1996; Anderson and Yohn, 2002; Palmrose et al., 2004), increase bid-ask spreads (Anderson and Yohn, 2002; Palmrose et al., 2004), and increase analyst earnings forecast dispersion (Palmrose et al., 2004). However, these papers do not directly measure the effect of restatements on the perceived risk of the firm. Our result that accounting restatements are associated with increases in the firm's cost of capital is consistent with the claims that restatements increase uncertainty about the credibility and competence of the managers, and perhaps cause investors to question other aspects of the firm's financial statements. Thus, although the restatement might actually reduce uncertainty with respect to a given transaction or account, it appears as though the overall information uncertainty is increased following a restatement, causing investors to require a higher rate of return.

Although not captured by models such as the CAPM, the notion that information in general, and earnings quality in particular, affects capital costs has been discussed by other researchers (e.g., Easley and O'Hara, 2004; Francis et al., 2003). For example, Easley and O'Hara (2004) develop a rational expectations-based asset pricing model, in which the quantity and quality of information affects asset prices, resulting in cross-sectional differences in firms' required returns. Our tests demonstrate that accounting restatements, which likely lead to significant downward revisions in a firm's perceived earnings quality, are associated with significant increases in the cost of capital, providing support for the notion that perceptions about earnings quality affects a firm's cost of capital.

1. Prior Research

Palmrose et al. (2004) and Anderson and Yohn (2002) identify determinants of the market's reaction to restatement announcements. Both papers document a significant negative cumulative abnormal return surrounding the announcement of a restatement. Anderson and Yohn (2002) find more negative returns for firms with revenue recognition issues, while Palmrose et al. (2004) find more negative returns when the restatements are due to fraud, affect multiple accounts, decrease reported income, or are initiated by auditors or management. Anderson and Yohn (2002) also document a significant decline in earnings response coefficient following the restatement of financial statements. Also, both of these papers investigate the change in bid-ask spreads around the restatement announcement.[2] Anderson and Yohn (2002) find an increase in bid-ask spreads of firms with revenue recognition problems, although Palmrose et al. (2004) are unable to duplicate this result. However, they do find an increase in the dispersion of analyst forecasts, which proxies for increased uncertainty, and a possible increase in risk. Both the increase in dispersion and the bid-ask spread proxy for increased uncertainty and, therefore, are likely to be associated with the cost of capital, although these measures are not necessarily good proxies for the risk facing a long-term investor (Callahan et al., 1997; Easley and O'Hara, 2004). Therefore, we directly estimate the effect of the

restatement on the cost of equity capital using several different estimation procedures that have been recently developed.

The other stream of literature that is related to our paper examines the association between accounting information and the cost of capital (e.g., Welker, 1995; Botosan, 1997; Healy et al., 1999; Botosan and Plumlee, 2002). To date, most of these studies examine the relation between overall disclosure level and the cost of capital using either a proprietary or third party (e.g., AIMR rankings) evaluation of disclosure quality. For example, Botosan (1997) finds that cost of capital is negatively associated with the level of annual report disclosure for firms with low analyst followings. Similarly, a negative association is documented between disclosure level and relative bid-ask spreads, a proxy for cost of capital (Welker, 1995; Healy et al., 1999). Given the past findings with respect to disclosure level, one possibility is that a restatement, having removed some uncertainty about the firm's earnings, might actually reduce risk. However, offsetting factors that would tend to increase the risk of the firm include additional uncertainty about the remaining financial statements, and the perceived credibility and competence of management.

Rather than focus on cross-sectional differences in the cost of capital, we use accounting restatements to establish a link between accounting information and the cost of capital. The advantage of using accounting restatements to examine changes in the cost of capital is that the restatement leads to a significant loss in market value for the firm, with estimates ranging from -4 to -12% (e.g., Dechow et al., 1996; Richardson et al., 2002; Anderson and Yohn, 2002; Palmrose et al., 2004).[3] By approximating the portion of the restatement that directly impacts future cash flows, we are able to quantify the effect of accounting restatement on the firm's cost of capital and provide evidence on the extent to which accounting restatements lead to measurable increases in investors' required rates of return.

We begin our analysis by replicating the prior findings with respect to announcement-period abnormal returns. We measure the average announcement-period return associated with accounting restatements, as well as the downward revision in future earnings and earnings growth rates resulting from the restatement. Using average prices before and after the restatement, analyst forecast revisions, and a valuation model, we are able to estimate the change in the implied cost of capital. We examine the change in the estimated cost of capital one, three, and five months after the restatement, and after controlling for analyst forecast horizon biases. Last, we examine how changes in the cost of capital vary depending on the initiator of the restatement (i.e., the company, the auditor, or the SEC), which accounts are affected by the restatement, and firm characteristics such as size, past sales growth, and leverage.

2. Sample Selection and Research Design

2.1. Sample Selection

The General Accounting Office constructed a sample of 919 incidents of restatements from January 1, 1997 through June 30, 2002. The database includes

the name and ticker symbol of the restating firm, its exchange, the date of the announcement, the number of shares outstanding, the initiator of the restatement, and the reason(s) for the restatement. To ensure the efficacy of the dataset, we randomly selected 50 observations and confirmed the information reported. No errors were noted. Data availability reduced the size of the sample from the 919 initial observations. The unique firm identifier in the GAO database is the firm's ticker symbol, but because these are recycled in practice, we checked all of the company names after merging the GAO data with CRSP, Compustat, and IBES. We eliminated observations where these differ between databases and we could not find an appropriate match. The requirement that each observation have valid data in the CRSP, Compustat, and I/B/E/S databases eliminated 440 observations. We lost an additional 180 observations because we lacked the parameters needed to compute the implied cost of capital, either before or after the restatement.[4] This resulted in a final sample size of 292 restatements.

Figure 1 shows the average stock return for the 120 days surrounding the restatement announcement date for our sample of firms. The decline in stock price begins approximately 25 days prior to the announcement date and is likely attributable to a leakage of information concerning the impending restatement announcement. On average, firms appear to lose 3% of their market value from day

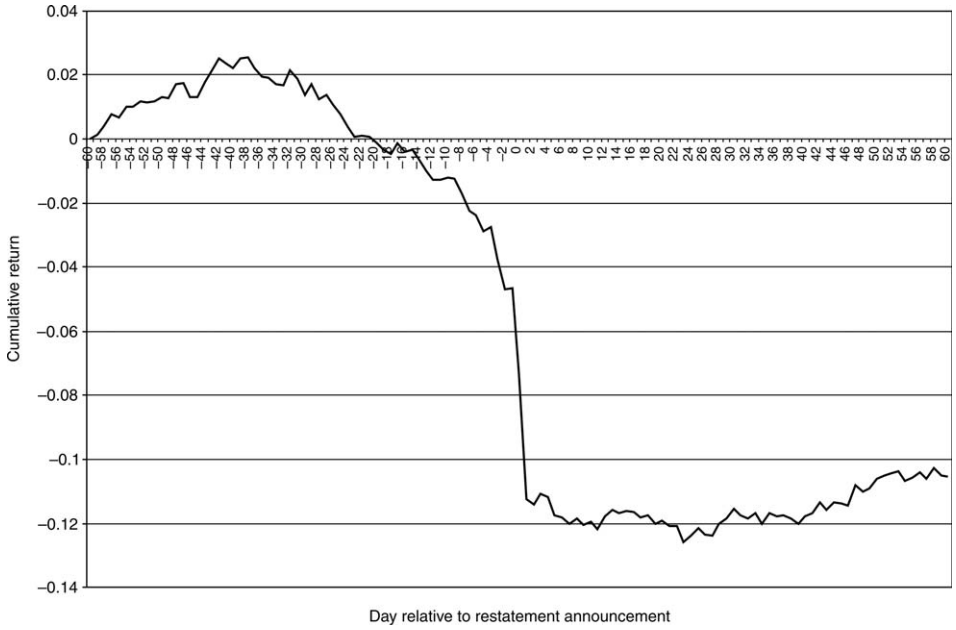

Figure 1. Cumulative returns for restating firms before and after the announcement.
This figure shows the average cumulative returns for the 286 firms that issue a restatement. The returns are reported for the 120 days surrounding the restatement announcements from the GAO dataset from the period 1997–2002. The measure of abnormal returns used in the main analyses is measured over the five days surrounding the restatement announcement where the majority of the price effect is observed.

-20 to day -3, and lose approximately 9% of their market value from day -2 to day $+2$. Thus, despite evidence of information leakage prior to the announcement date, the majority of the decline in price appears to occur within the five days surrounding the restatement announcement. Subsequent to the restatement, returns through day 60 remain relatively flat, indicating that the initial reaction does not appear to be an overreaction. Although our tables report abnormal returns for a five day window surrounding the restatement announcement, the average price and earnings forecasts are measured one month before and one month after the restatement for the purpose of measuring changes in the cost of capital.

Table 1 provides additional details about the characteristics of the restatements in our sample. The sample is divided into categories based on the reason for the restatement and the initiator of the restatement, both of which are included in the GAO database. Panel A shows the restatements as a function of the financial statement accounts that they affect. Most commonly, the restatements involve revenue recognition issues (40.4%), followed by cost of sales or operating expenses (14.1%), and restructuring charges or asset/inventory restatements (9.6%). These frequencies are consistent with the reported frequency in prior studies that collect data independently (e.g., Anderson and Yohn, 2002; Palmrose et al., 2003). Because there can be more than one account affected by a restatement, the total number of reasons reported in panel A exceeds our sample size.

Panel B of Table 1 reports the frequency of restatements by the initiator of the restatement. The majority of restatements in our sample are attributable to the company (38%). This is followed by restatements initiated by the SEC (16%), the auditor (7%), and other external bodies (e.g., NASDAQ, IRS, FASB). Thirty six percent of the restatements in our sample are not attributed to a specific source (uncertain). Although it is likely that restatements attributed to the SEC or the auditor were initiated by these parties, it is not clear that the sample of restatements attributed to the company were actually due to an internal review of their financial statements.[5] Thus, results related to company initiated restatements should be interpreted with caution.

Using the GAO classifications, we define a dichotomous variable (CORE), which captures whether the restatement affects core operating earnings or not. We set CORE equal to one if the restatement is categorized as affecting revenue recognition, cost of sales or operating expenses, or loan-loss provisions, and zero otherwise. We also include separate indicator variables that identify which group initiated the restatement (COMPANY, AUDITOR, and SEC). These variables are used later in the cross-sectional regression analysis.

2.2. Estimating the Cost of Capital

Several recent papers have examined empirical methods for computing the implied cost of equity capital given stock prices and expectations of future earnings (e.g., Botosan, 1997; Gebhardt et al., 2001; Gode and Mohanram, 2002; Botosan and Plumlee, 2002; Easton and Monahan, 2003). In general, these models use published

Table 1. Sample composition.

Panel A: Reason for Restatement

Reason for Restatement	Number	Frequency (%)
Revenue recognition	135	40.4
Cost of sales or operating expense	47	14.1
Restructuring, assets, or inventory	32	9.6
In-process R&D	19	5.7
Acquisitions and mergers	27	8.1
Other	24	7.2
Securities related	11	3.3
Reclassification	12	3.6
Loan-loss	5	1.5
Related party transaction	10	3.0
Unspecified	9	2.8
Tax related	3	0.9
Total*	334	100

Panel B: Initiator of Restatement

Initiator of Restatement	Number	Frequency (%)
Uncertain	105	36.0
Company	112	38.4
Auditor	21	7.2
SEC	48	16.4
Other (includes one each of NASDAQ, FASB, IRS, and external)	4	1.4
Total	292	100

*Note that total does not equal sample size due to some restatements affecting more than one category.

The table provides descriptive statistics for the reduced sample of 292 restatements from the period 1997–2001.

forecasts of future earnings expectations and current stock prices as inputs to a valuation model, and make some assumption about the evolution of the future earnings stream in order to derive a firm-specific cost of capital measure. Much has been written about the advantages or disadvantages of the various methods and the estimates that emerge from using different approaches. Our paper is not intended to provide evidence about the relative superiority of one measure over the other. Instead, we employ multiple measures of the implied cost of capital as a robustness check to ensure that our results with respect to restatements and the cost of capital are not model specific. The different estimation procedures differ primarily with respect to their assumptions about the evolution of future earnings given analyst forecasts of one-year ahead earnings, two-year ahead earnings, and long-term growth rates. We initially choose three firm-specific estimation models that vary substantially with respect to their complexity and the restrictiveness of the key assumptions, with the hope of providing a reasonable sample of the different estimation techniques available.

First, we use implied cost of capital methodology developed by Gebhardt et al. (2001), based on the residual income model developed in Ohlson (1995):

$$P_0 = \mathrm{BVE}_0 + \sum_{t=1}^{T-1} \frac{(\mathrm{ROE}_t - r_e)\mathrm{BVE}_{t-1}}{(1+r_e)^t} + \mathrm{TV}, \tag{1}$$

where P_0 equals the price at time zero, BVE_t equals book value at time t, ROE_t equals return on beginning equity for year t, r_e equals cost of equity capital, and TV equals the terminal value and the end of the finite forecasting horizon.

To compute the implied cost of capital, Gebhardt et al. (2001) use the current book value of equity for B_t, analyst forecasts of future earnings, and long-term growth rates to estimate expected future residual income for the first seven periods, and assume mean reversion to the industry median ROE over a 12-year period. The mean one-year ahead forecast (FY1), mean two-year ahead forecast (FY2), and the long-term growth rate (LTG) are obtained from I/B/E/S. The third year ahead forecast is estimated as: $\mathrm{EPS}_{t+3} = \mathrm{FY2}(1 + \mathrm{LTG})$. Earnings beyond three years are forecasted by linearly extrapolating future ROEs to the industry median ROE, where negative ROEs are removed when computing the industry average.

Second, we follow Gode and Mohanram's (2002) implementation of the Ohlson and Juettner-Nauroth (2001) model as follows:

$$P_t = \frac{\mathrm{FY1}}{r_e} + \frac{\mathrm{FY2} + r_e\mathrm{DIV1} - (1+r_e)\mathrm{FY1}}{r_e(r_e - g)}. \tag{2}$$

FY1 and FY2 represent analyst forecasts of one-year and two-year ahead earnings per share taken from I/B/E/S, and DIV1 represents actual dividends per share. Growth (g) is set equal to the risk-free interest rate less 3%.

Third, we use the basic price to forward earnings model in Easton and Monahan (2003), which is implemented as follows:

$$P_t = \frac{\mathrm{FY1} + r_e(\mathrm{DIV1}) + \mathrm{FY2}}{(r_e+1)^2 - 1}. \tag{3}$$

This model assumes no growth in abnormal earnings beyond period two. When required, the dividend payout ratio is calculated as actual dividends divided by earnings. We replace earnings with 0.06 multiplied by total assets for firms that experience negative earnings to obtain an estimate of the payout ratio. No payout ratio in our sample exceeds one. We refer to estimates using the Gebhardt et al. (2001) methodology as *re_gls*, using the Gode and Mohanram (2002) methodology as *re_gm*, and using Easton and Monahan's (2003) price to forward earnings model as *re_pfe*.

Several other model variants have been examined in the literature, and the possible assumptions used to operationalize these models are essentially limitless. The fact that we focus on short-window changes, however, somewhat mitigates the problems associated with the estimation specific assumptions because the same assumptions

are used both prior to and following the restatement. The reason for choosing three fairly different models is to demonstrate that the results we document are at least not specific to one of these commonly used models.

To calculate the firm's expected future earnings and cost of capital prior to the restatement, we use the average daily prices and I/B/E/S forecasts issued in the month prior to the month of the restatement. To compute the firm's expected future earnings and cost of capital subsequent to the restatement, we use average daily prices and I/B/E/S forecast of earnings one, three, and five months after the month of the restatement. There are a number of firms that issue restatements concurrent with an annual earnings release (approximately 25% of our restatements). Therefore, I/B/E/S forecasts shift by one year after the earnings are released, and the FY1 forecast in the month following the restatement no longer corresponds to the FY1 forecasts prior to the restatement. In order to compare similar earnings streams, we use the actual EPS following the earnings release as analogous to FY1 prior to the earnings release, FY1 post-earnings release as analogous to FY2 pre-release, and FY2 post-release as analogous to FY2(1 + LTG) pre-release. We also provide supplemental analyses where we remove all observations when there is a change in the forecast fiscal year.

Another potential complication is that when we observe no change in analyst forecasts, it might be due to a stale forecast rather than the restatement not causing a downward revision in future earnings expectations. In this case, any loss in value would show up as an increase in the cost of capital, since the observed expectation of future earnings has not changed. To minimize this problem, we perform a supplemental analysis on only those firms for which an analyst explicitly changes a forecast after the restatement ($n = 259$), and report the results of our estimation of the change in cost of capital for this sample as well. In later tests, we also examine estimates of the change in the cost of capital three and five months after the restatement to allow for delays in analysts' revisions of forecasts in light of the restatement.

Table 2 provides descriptive statistics. Panel A shows general profitability and size measures for the most recent fiscal year ended prior to the restatement, as well as the annualized returns for the two years prior to the restatement. Average assets are \$6.1 B, although this number is highly skewed, with a median of only \$672 M. At least 25% of the firms have over \$2.7 B in assets, which is quite large, and reflects the fact that we require analyst forecasts for our sample. Prior year's sales growth is on average 32%, although the median is a more modest 15%. Average ROA is negative in the year prior to the restatement, although more than half of the firms report have positive ROA (median = 2.9%).

Panels B and C report the market capitalization, expected future earnings and earnings growth rates, and estimated cost of equity capital both before and after the restatement. The average market capitalization drops from \$3.6 B to \$3.4 B over a five-day period, reflecting the fact that there is a significant loss in value associated with a restatement. Forecasts of one-year ahead earnings are on average \$1.25 per share prior to the restatement, and \$1.18 per share following the restatement. Two-year ahead earnings forecasts average \$1.66 prior to the restatement and \$1.60 after

Table 2. Descriptive statistics.

	Mean	Std. Dev.	*Q*1	Median	*Q*3
Panel A: Firm Characteristics					
Total Assets (000s)	$6,087	33,008	202	672	2,714
Leverage	1.026	3.288	0.051	0.484	1.304
Sales Growth	0.324	0.784	0.050	0.151	0.343
Return_{t-1}	0.096	0.759	−0.301	−0.017	0.326
Return_{t-2}	0.154	0.687	−0.296	0.000	0.470
ROA	−0.0109	0.2727	−0.0075	0.0288	0.0674
Panel B: Pre-Restatement					
Mkt. Cap (000s)	$3,580	10,418	192	579	2,236
FY1	1.25	1.21	0.49	1.08	1.76
FY2	1.66	1.20	0.81	1.42	2.08
LTG	0.206	0.128	0.125	0.177	0.250
re_gls	0.1095	0.0418	0.0809	0.0998	0.1292
re_gm	0.1413	0.0688	0.0981	0.1235	0.1619
re_pfe	0.0748	0.0465	0.0466	0.0690	0.0884
Panel C: Post-Restatement					
Mkt. Cap (000s)	$3,434	10,297	170	517	2,210
FY1	1.18	1.24	0.46	1.00	1.68
FY2	1.60	1.22	0.83	1.35	2.06
LTG	0.203	0.116	0.125	0.180	0.247
re_gls	0.1190	0.0523	0.0837	0.1040	0.1358
re_gm	0.1588	0.0875	0.1055	0.1288	0.1901
re_pfe	0.0865	0.0695	0.0487	0.0707	0.0989

Variable definitions: Earnings per share calculated by dividing net income before extraordinary items by common shares outstanding at year end (EPS); the sum of long term and short term debt divided by equity (Leverage); current year sales divided by prior year sales (Sales Growth); average common shares outstanding times stock price during the month before and after the restatement (Mkt. Cap); mean analysts' forecast of one year ahead EPS during the month following/preceding the date of the restatement from I/B/E/S (FY1); mean analysts' forecast of one year ahead EPS for the month following/preceding the date of the restatement from I/B/E/S (FY2); long term growth in earnings estimation from I/B/E/S (LTG); estimation of the implied cost of capital following Gerbhardt, Lee and Swaminathan (*re_gls*); estimation of the implied cost of capital following Gode and Mohanram (*re_gm*); estimation of the implied cost of capital using forward P/E ratios following Easton and Monahan (*re_pfe*).

The table below provides descriptive statistics for the reduced sample of 286 restatements from the period 1997–2001. This table reports the mean, standard deviation, first quartile, median and third quartile for the full sample in the year of the restatement is announced as well as variables related to the implied cost of capital one month before and one month after the restatement announcement.

the restatement. The average estimated cost of capital prior to the restatement is 10.95% for *re_gls*, 14.13% for *re_gm*, and 7.48% for *re_pfe*. The difference in the estimated level for each of these approaches is generally consistent with other research comparing cost of capital estimates (e.g., Easton and Monahan, 2003; Guay et al. 2003). Following the restatement, the estimated cost of capital is higher for each of the three models, averaging 11.90% for *re_gls*, 15.88% for *re_gm*, and 8.65% for *re_pfe*. It appears that accounting restatements cause an increase in the cost of capital, as well as a reduction in the expectation of future cash flows.

3. Empirical Results

3.1. Estimated Change in the Cost of Capital

Table 3 quantifies the relative percentage changes in the estimated cost of capital one month after the accounting restatement. We use relative percentage changes instead of unscaled changes to standardize the changes across firms. It should be emphasized that the values reported are relative changes, not absolute, such that an increase of 8% implies that a firm's cost of capital would change from 10 to 10.8%, not to 18%. Table 3 reports the adjusted stock return, as well as the percentage change in expected future earnings, earnings growth, and each of the cost of capital estimates. Rather than delete outliers, all observations are retained in the sample in order to capture the most egregious cases of earnings management. However, to ensure that

Table 3. Percentage change future earnings, earnings growth, and cost of capital.

Panel A: Full Sample (n = 292)

	Mean	Std. Dev.	$Q1$	Median	$Q3$
CAR5	-0.0920^{a}	0.1962	-0.1661	$-0.0463^{b,c}$	0.0194
ΔFY1	-0.1468^{a}	1.5093	-0.1503	$0.0000^{b,c}$	0.0769
ΔFY2	-0.0782^{a}	0.7308	-0.1020	0.0000	0.0749
ΔLTG	-0.0137	0.1063	-0.0296	$0.0000^{b,c}$	0.0000
$\Delta(r_e\_gls)$	0.1567^{a}	0.4732	-0.0602	$0.0686^{b,c}$	0.2677
$\Delta(r_e\_gm)$	0.1083^{a}	0.2275	-0.0413	$0.0599^{b,c}$	0.2235
$\Delta(r_e\_pfe)$	0.1949^{a}	0.4286	-0.0734	$0.0904^{b,c}$	0.3829

Panel B: Observations with Explicit Revisions in Analyst Forecasts (n = 259)

CAR5	-0.0887^{a}	0.1808	-0.1534	$-0.0384^{b,c}$	0.0152
ΔFY1	-0.1730^{a}	1.6373	-0.2368	$-0.0204^{b,c}$	0.1230
ΔFY2	-0.1036^{a}	0.7772	-0.1411	-0.0014	0.1045
ΔLTG	-0.0123	0.1042	-0.0322	$0.0000^{b,c}$	0.0005
$\Delta(r_e\_gls)$	0.1477^{a}	0.4730	-0.0602	$0.0613^{b,c}$	0.2582
$\Delta(r_e\_gm)$	0.1090^{a}	0.2312	-0.0379	$0.0671^{b,c}$	0.2270
$\Delta(r_e\_pfe)$	0.1884^{a}	0.4197	-0.0706	$0.0767^{b,c}$	0.3657

[a]Significantly different from zero, 5% level two-tailed *t*-test.
[b]Non-parametric sign test rejected at 5% level.
[c]Non-parametric signed-rank test rejected at 5% level.

Variable definitions: Five day cumulated abnormal return centered on the restatement announcement day (CAR5); Other definitions are given in Table 2.

The table below provides statistics on the inputs to the implied cost of capital model and the resulting cost of capital estimates for 286 restatements from the period 1997–2001. Panel A reports the mean, standard deviation, first quartile, median and third quartile of the five-day return, percentage change in analyst forecasts of one and two year ahead EPS, and change in long-term growth forecasts, as well as estimates of the relative change in the cost of capital. Panels B uses only the observations for which at least one analyst explicitly revises forecasts following the restatement, to avoid stale forecasts contaminating the calculation of changes in the cost of capital.

the inferences hold for the majority of the sample and are not due to a few extreme observations, non-parametric sign and signed-rank tests are also conducted.

Consistent with prior research, we show a significant loss associated with the restatement, with a five-day market adjusted return of -9.2%. Twenty-five percent of the observations lose more than 16% of their market value over this five-day period. The average revision in the one-year ahead forecasts is a reduction of approximately 14.7% from the pre-restatement forecast, while two-year ahead forecasts are revised downward by an average of 7.8%. Thus, it appears that analysts expect the effect of the restatement to taper off for some firms. For the non-parametric tests, the decrease in FY1 is significant but the decrease in FY2 is not. This pattern in forecast revisions is interesting, in that it is consistent with prior research that shows a positive relation between optimism and forecast horizon. To the extent that there is an optimism bias at longer forecast horizons, our tests might understate the cash flow effect of the restatement. The mean decrease in long-term growth rates is not significant, but the non-parametric tests suggest that this is likely due to a large increase in certain firms.

Estimated cost of capital shows a statistically significant increase for all three models. The average relative increase in the cost of capital ranges from 15.7% for *re_gls*, to 10.8% for *re_gm*, and 19.5% for *re_pfe*. The median increase is also significant across all three specifications using both the sign test and the signed-rank test, suggesting that significantly more firms experience an increase in their cost of capital after a restatement than firms that experience a decrease. Panel B examines the differences after removing the firms for which none of the forecasts changed following the restatement, to avoid problems with stale forecasts. Here again, the results show statistically significant post-restatement increases in the cost of capital for both the mean and the median. In summary, all of the estimation methods show a significant increase in the cost of capital following the restatement. This finding is consistent with the notion that increased uncertainty about the credibility and competence of management and the overall reduction in earnings quality leads to a significant increase in the cost of capital.

To deal with issues of IBES long term growth rates being poor proxies for investors' long term growth expectations, we utilize Easton et al.'s (2002) regression-based estimation technique that simultaneously estimates the cost of capital and the expected growth in residual income.[6] Although this technique does not provide firm specific estimates of the change in the cost of capital, its advantage is that it allows us to simultaneously infer both "r" and "g" from observed prices, which provides greater assurance that the changes we observed in the cost of capital in Table 3 are not actually capturing revisions in expected growth that differ from IBES reported long-term growth rates.

Table 4 reports the results of the Easton et al. (2002) estimation of growth and cost of capital. Consistent with the results in Table 3, we find that there is a positive relative percentage increase in the estimated cost of capital of 7.65%. The magnitude of this increase is fairly similar to the change in the portfolio cost of equity capital that can be computed from Table 2.[7] Interestingly, the expected growth that is inferred from prices actually increases following the restatement. Thus, it appears as

Table 4. Estimates of the implied cost of capital and expected long term growth before and after an accounting restatement.

Model: $X_{i,T}/B_{i,0} = \gamma_0 + \gamma_1(P_{i,0}/B_{i,0}) + \varepsilon_i$					
	γ_0	γ_1	R^2	r_e (%)	g_{ri} (%)
Pre-restatement	0.156	0.216	0.902	8.23	3.70
(standard error)	(0.045)	(0.005)			
Post-restatement	0.178	0.227	0.911	8.86	4.17
(standard error)	(0.043)	(0.005)			
Percentage change in estimated cost of equity capital: 7.65%					

Variable definitions: $X_{i,T}$ equals aggregate four year cum-dividend earnings. This variable is computed by summing FY1 and FY2, and applying the long-term growth rate to estimate FY3 and FY4. Dividends are added to this summation by using current dividends as an expectation for dividends in periods one through four, and reinvesting the dividends at the estimated cost of capital. $B_{i,0}$ represents the firm's current book value of equity per share. $P_{i,0}$ represents the average daily price of the firm one prior to or one month following the restatement. Under this framework, $\gamma_0 = ((1+g_{ri})^4 - 1)$ and $\gamma_1 = (1+r)^4 - (1+g)^4$. Thus, r_e is the estimated cost of equity capital and g_{ri} is the estimated growth in residual income, computed from the regression coefficients.

This table uses the Easton et al. (2002) methodology to simultaneously estimate the cost of equity capital and the expected long term growth in earnings. The sample includes 292 restatements from the period 1997–2001, for which analyst forecasts exist before and after the restatement.

though the market expects the firm to grow at a higher rate in the long term (perhaps because of the reduced base from which it is growing), but that expected future earnings are discounted at a higher rate. This provides further support for the idea that a restatement raises concerns about the firm's earnings quality, thereby increasing investors' required rates of return.

Our last set of univariate tests are intended to control for some empirical issues that arise when using analyst forecasts to infer changes in the cost of capital. Table 5 reports the relative percentage changes in the cost of capital three and five months after the restatement announcement, to allow enough time for analysts to revise their forecasts based on the restatement and for prices to stabilize. Results in the first three rows of Panel A show average increases in the cost of capital three months after the restatement of 8.92% for *re_gls*, 11.0% for *re_gm*, and 23.2% for *re_pfe*. Panel B shows average increases in the cost of capital five months after the restatement of 11.05% for *re_gls*, 13.81% for *re_gm*, and 17.98% for *re_pfe*, all of which are statistically significant at the 5% level. The non-parametric tests are also significant across all three specifications using the signed rank test, and the sign test is significant in half of the specifications. Overall the reported results are consistent with the notion that increases in uncertainty as measured by cost of capital persist for up to five months following a restatement announcement.

To provide an even more conservative estimate of the increase in the cost of capital, we attempt to control for the fact that analyst forecasts are more optimistic at longer horizons. As we expand the window to three and five months following the restatement, a significantly greater number of firms experience a change in the fiscal year end that analysts are forecasting. For example, consider a restatement that

Table 5. Percentage change in estimated of cost of capital three and five months after restatement.

Panel A: Three Months After the Month of the Restatement

	Mean	Std. Dev.	$Q1$	Median	$Q3$
All Firms ($n = 292$)					
$\Delta(r_e\_gls)$	0.0892[a]	0.4723	−0.1397	0.0164[c]	0.2221
$\Delta(r_e\_gm)$	0.1100[a]	0.2468	−0.0561	0.0440[b,c]	0.2564
$\Delta(r_e\_pfe)$	0.2321[a]	0.7508	−0.1295	0.0528[b,c]	0.3782
Observations where forecast period does not change between pre- and post-periods ($n = 163$)					
$\Delta(r_e\_gls)$	0.0679[a]	0.5243	−0.1737	0.0072	0.1926
$\Delta(r_e\_gm)$	0.1301[a]	0.2429	−0.0330	0.0824[b,c]	0.2955
$\Delta(r_e\_pfe)$	0.1587[a]	0.7870	−0.1902	0.0024	0.3010

Panel B: Five Months After the Month of the Restatement

	Mean	Std. Dev.	$Q1$	Median	$Q3$
All Firms ($n = 292$)					
$\Delta(r\_gls)$	0.1105[a]	0.5801	−0.1597	0.0191[c]	0.2591
$\Delta(r_e\_gm)$	0.1381[a]	0.2612	−0.0607	0.0735[b,c]	0.2908
$\Delta(r_e\_pfe)$	0.1798[a]	0.8116	−0.1988	0.0473[c]	0.3388
Observations where forecast period does not change between pre- and post-periods ($n = 113$)					
$\Delta(r_e\_gls)$	0.0651	0.5890	−0.2522	−0.0283	0.2149
$\Delta(r_e\_gm)$	0.1499[a]	0.2502	−0.0210	0.1065[b,c]	0.3143
$\Delta(r_e\_pfe)$	0.0851[a]	0.8537	−0.2913	0.0053	0.2481

[a]Significantly different from zero, 5% level two-tailed *t*-test.
[b]Non-parametric sign test rejected at 5% level.
[c]Non-parametric signed-rank test rejected at 5% level.

For variable definitions see Table 2.

The table below reports that change in the implied cost of capital estimates for 292 restatements from the period 1997–2001. Panels A and B report the mean, standard deviation, firms quartile, median and third quartile of the change in cost of capital three and months following a restatement announcement, respectively. These Panels also report these statistics for the same sample of firms excluding those firms that experience a year end in the three or five months follow the restatement announcement.

takes place in October of 1999. The cost of capital estimate three and five months after the restatement would occur in January and March of 2000, respectively. If the firm issues its annual earnings announcement in December of 1999, then the forecast a month before the restatement will be for 2000 and the forecast in months three and five will be for 2001. Because of the long horizon effect on analysts' forecasts, the forecasts in January and March of 2000 are inclined to be more optimistically biased than the forecast made in September of 1999. By construction, this bias will increase the implied costs of capital after the restatement, all else equal. This would bias our tests towards finding significant positive changes in cost of capital for these observations.

To control for this effect, we exclude those firms that report their annual earnings in the three and five months after the restatement announcement. Note that these modifications to our sample biases against finding significant results, since we

continue to include observations for which the fiscal year forecast has not changed, but by construction we are measuring expectations either four or six months closer to the actual earnings announcement. We report the results of this analysis in the bottom three rows of Panels A and B, respectively. We find that all of the measures show significantly positive average increases in cost of capital three months following the restatement. Changes in *re_gm* (14.99%), and *re_pfe* (8.51%) are significant at the five month horizon. The change in *re_gls* (6.51%) is only marginally significant ($\alpha = 0.10$). Estimated median increases, however, are only significantly positive for the *re_gm* model (10.6%). This suggests that at longer horizons after controlling for forecast horizon biases, there appears to be a similar number of firms that experience increases as there are firms that experience decreases. However, the increases in the cost of capital tend to be larger than the decreases since the means results are significantly positive. Thus, even in the most conservative setting where the research design is biased against finding results, we still generally see increases in the estimated costs of capital.

3.2. Cross-Sectional Analysis

Table 6 provides a regression analysis that examines some of the cross-sectional characteristics that lead to larger revisions in expected earnings and changes in the firm's cost of capital. The intent of this analysis is to provide a better sense of the factors that increase a firm's cost of capital, which may not necessarily be the same factors that cause a larger downward price revision, since factors that reduce value might be associated with larger reductions in expected future cash flows and not necessarily increases in the cost of capital.

For completeness, we examine models with three alternative dependent variables in Table 6: abnormal returns, future earnings revisions, and changes in cost of capital. The independent variables that we include are ones that have been identified in prior research as being associated with a loss in value, or that we believe lead to changes in the cost of capital for other reasons. Following Palmrose et al. (2004), we include a variable for CORE, which captures whether the restatement affects core operating earnings or not. We also include indicator variables for restatements where the GAO was able to identify the initiating party. This includes variables for COMPANY, AUDITOR, and SEC. These variables are equal to one if the party was listed as initiating the restatement, and zero otherwise. We include a variable for past sales growth (*Sales_growth*) which measures the revenue growth of the company in the year prior to the restatement. Firms with higher growth might experience a larger increase in their expected future cash flows, if the restatement was somehow associated with the past growth. We include a variable for leverage (Leverage), which measures the total debt to equity ratio for the firm. The higher the leverage, the greater the impact that increased uncertainty about the firm might have on the cost of equity capital. We also include a variable for size (Size), measured as the natural log of total assets. Finally, we include year fixed effects to examine whether there appears to be time varying differences in either abnormal returns,

Table 6. Regressions of earnings revisions and changes in cost of capital due to accounting restatements.

	Five-Day Abnormal Return		One-Year Ahead Earnings Revision		Change in Cost of Capital (gls model)	
	Model 1		Model 2		Model 3	
Dependent Variable	Est.	*t*-stat	Est.	*t*-stat	Est.	*t*-stat
Intercept	−0.006	−0.18	−0.140	−1.36	0.013	0.039
Core	−0.025	−1.05	−0.105[a]	−2.41	−0.006	−0.27
Company	−0.071[a]	−2.92	−0.038	−0.72	0.048[a]	2.43
Auditor	−0.148[a]	−3.23	−0.051	−0.51	0.137[a]	4.04
SEC	−0.013	−0.39	−0.017	−0.02	0.018	0.55
Leverage	−0.019[b]	1.77	0.006	0.37	0.042[b]	1.85
Size	0.000	0.90	−0.000	−0.66	−0.000	−1.43
Sales_growth	−0.026	−1.66	−0.075[a]	−2.43	0.021	0.56
Year97	0.014	0.29	−0.040	−0.96	−0.027	−0.73
Year98	−0.053[a]	−2.12	−0.221	−0.12	−0.043	−1.51
Year99	−0.017	−0.56	0.137	0.19	0.030	0.98
Year00	−0.041	−1.33	0.026	1.20	0.042	1.62
Number of observations	286		286		286	
Adjusted R^2	0.089		0.072		0.068	

[a]Significant at $\alpha = 0.01$ one-tailed; [b] Significant at $\alpha = 0.05$, one-tailed.

Variable definitions: dichotomous variable equal to one if the restatement relates to core earnings and zero otherwise (Core) Core includes restatements involving revenue recognition, cost of sales or ongoing operating expenses; dichotomous variable equal to one if initiated by the company and zero otherwise (Company); dichotomous variable equal to one if initiated by the auditor and zero otherwise (Auditor); dichotomous variable equal to one if initiated by the SEC and zero otherwise (SEC); the sum of long term and short term debt divided by equity (Leverage); Log of total assets (Size); percentage change in mean analysts' forecast of one year ahead EPS from one month before and one month following the date of the restatement from I/B/E/S (ΔFY1); percentage change in mean analysts' forecast of two year ahead EPS from one month before and one month following the date of the restatement from I/B/E/S (ΔFY2); percentage change in long-term growth in earnings estimations from one month before and one month following the date of the restatement from I/B/E/S (ΔLTG); change in estimation of the implied cost of capital from the Gerbhardt, Lee and Swaminathan (2001) model from one month before and one month after the date of the restatement (Δr_e); (Year_*xx*) dummy variable equal to one if the restatement occurs in year *xx*, and zero otherwise.

This table decomposes the regression of abnormal returns into the cash flow (earnings revision) and risk (cost of capital) effect. Columns one and two regress the five day abnormal return on independent variables, while columns three and four separately examine the impact of the same set of independent variables on the earnings revisions and the changes in estimated cost of capital. The sample includes 286 restatements from the period 1997–2001.

earnings revisions or changes in cost of capital (Year97 through Year00). We use White heteroscedasticity-consistent standard errors in all significance tests.[8]

The first model is the specification used in prior research, and examines the determinants of the abnormal returns in the five-day window encompassing the restatement. Overall, the result from the regression shows that both company initiated (−7.1%) and auditor initiated (−14.8%) restatements are associated with

significantly more negative abnormal returns, relative to SEC initiated restatements or restatements where the initiator is unidentified. However, whether or not the restatement affects core earnings is not a significant determinant of the price reaction after controlling for the other factors. Leverage is moderately significant, providing some evidence that firms with higher leverage experience more negative abnormal returns (coefficient $= -0.019$, t-stat $= 1.77$). Neither size nor sales growth appears to be a significant determinant of the abnormal return.

The regressions in Models 2 and 3 in Table 6 examine the association between firm/restatement specific characteristics and either revisions in expected earnings or changes in the cost of capital. Model 2 examines the association between the revision in one-year ahead forecasts and the test variables. We examine only the revision in one-year ahead forecasts as our dependent variable because the majority of the variation in the revision in analyst forecasts shows up in the FY1 estimate. Moreover, ΔFY1 is positively correlated with ΔFY2 with $\rho = 0.56$ (p-value < 0.001).[9] Results of this estimation show that the downward revision in one-year ahead forecasts is larger for restatements that affect core earnings than restatements that do not. This is consistent with core earnings being more permanent and therefore leading to larger declines in expected future earnings when they are affected by a restatement.

None of the variables identifying the initiator are statistically significant in the multivariate regression. Thus, it appears that the revision in future forecasts is primarily a function of which accounts are affected by the restatement (i.e., the nature of the restatement), and not the party initiating the restatement. Past sales growth is significantly negative, indicating that firms that experienced rapid growth in the past have their estimates of future earnings revised downwards more sharply. Neither size, leverage, nor year fixed effects is significant.

Model 3 in Table 6 examines the association between the change in the cost of capital based on the GLS model and our independent variables. It appears that the increase in risk associated with restatements is invariant to the accounts that are affected by the restatement, because the coefficient on CORE is insignificant. We also find that increases in cost of capital are greatest for restatements that are initiated by the auditor, relative to all other groups of initiators. For example, relative to the unidentified initiators, the change in the cost of capital is 13.7% greater for auditor initiated restatements, while it is only 4.8% greater for company initiated restatements, and 1.8% SEC initiated restatements. The difference between auditor and each of the other identifier variables is significant at the 0.01 level. One explanation might be that investors are more alarmed when the auditor initiates the restatement, potentially creating more uncertainty about the firm and raising more questions about the integrity of management and what other accounts that might be affected. Leverage also appears to increase the cost of capital, which is consistent with a restatement creating greater uncertainty and unease among investors when the firm has a higher debt load. Neither size nor sales growth is statistically significant. With respect to the year dummies, none of the individual variables are statistically significant. However, including a time trend variable instead of the year fixed effects shows a significantly positive coefficient (t-stat $= 2.16$), which suggests that the effect

on the cost of capital has increased over this time frame. The time trend variable is not significant for earnings revisions, but is significant for abnormal returns.

4. Conclusion

In this paper, we empirically demonstrate that the loss in firm value caused by an accounting restatement is comprised of both a cash flow and a risk effect. We document that the relative percentage increase in the cost of capital is fairly substantial, ranging between 7 and 20% depending on the estimation model used. This finding is robust across several estimation procedures and over different time horizons. Thus, our empirical results are consistent with anecdotal evidence that an accounting restatement increases uncertainty with respect to management credibility, managerial competence, and the overall perception of earnings quality, thereby increasing investors' required rates of return. We also show that restatements initiated by auditors lead to the largest increase in the cost of capital, and that firms with higher leverage experience greater increases in their cost of capital. Restatements that affect core earnings and firms that exhibit high past sales growth are associated with larger revisions in future cash flows, but neither factor appears to be related to changes in the cost of capital.

Future research can extend our study by examining factors such as the length of time it takes for cost of capital to revert to pre-restatement levels, whether the revisions in analyst forecasts resulting from a restatement tend to be overly optimistic or pessimistic, or whether the firm experiences actual increases in financing costs (e.g., cost of debt) after the restatement.

Acknowledgments

We gratefully acknowledge the helpful comments and suggestions made by Stephen Penman (the editor), Ron Kasznik (the discussant), Peter Easton, Dan Gode, Bruce Johnson, Charles Lee, Maureen O'Hara, Jim Ohlson, Bhaskaran Swaminathan, an anonymous referee, and workshop participants at Cornell University and the 2003 Review of Accounting Studies Conference.

Notes

1. For example, estimates of cost of capital over a long time series will be significantly affected by structural changes in the firm, interest rate changes and general market conditions.
2. Cost of capital and the width of bid-ask spreads measure are posited to be positively correlated (e.g., Amihud and Mendelson, 1986). It is likely the case that cost of capital is positively correlated with the information asymmetry component of the spread.
3. Five of the six studies examined show short-window abnormal returns of less than -9% for their sample of restatements, while Anderson and Yohn (2002) report an abnormal return of approximately -4%.

4. We require that a firm have available data for all of our estimation models, to ensure that we have the same observations when we compute changes in the cost of capital across different models. Thus, if the firm has a missing FY2 or long-term growth forecast, or has a negative FY2 forecast, they will not be included in our final sample. We also end up eliminating observations where analyst coverage is dropped subsequent to the restatement, or the firm is delisted. If anything, dropping these observations should bias downwards our estimated change in the cost of capital.
5. In many cases, these were difficult to distinguish from unattributed restatements. The primary difference appears to be that company initiated restatements are associated with a press release specifically for the purpose of the restatement, while many of the unattributed restatements were often contained within the context of another press release (e.g., the annual earnings announcement).
6. Easton et al. (2002) also provide a transformation to approximate the expected growth in earnings (which is more comparable to the IBES long-term growth forecast) after the growth in residual income has been estimated. Since we are primarily interested in the cost of equity capital, we do not report the results of this procedure, although it appears that the estimated growth in earnings would be significantly lower than the IBES average long-term growth forecasts.
7. Note that Table 3 reports the average firm specific change in the cost of capital, while Table 4 reports the relative percentage change in the portfolio average cost of capital. A metric that is more similar to the number reported in Table 4 can be obtained by calculating the change in the portfolio average cost of capitals which are reported in Table 2.
8. Although we do not control for outliers in the reported results, a supplemental analysis that winsorizes the variables at the first and ninety-ninth percentiles yields qualitatively similar results.
9. An alternative measure of the revision in future earnings is computed as the percentage change in $[FY1 + FY2 + ((1 + LTG) * FY2)]$ before and after the revision.

References

Anderson, K. and T. Yohn. (2002). "The Effect of 10-K Restatements on Firm Value, Information Asymmetries, and Investors' Reliance on Earnings." Working paper, Georgetown University.

Botosan, C. A. (1997). "Disclosure Level and the Cost of Equity Capital." *The Accounting Review* 72, 323–349.

Botosan, C. and M. Plumlee. (2002). "A Re-examination of Disclosure Level and the Expected Cost of Equity Capital." *Journal of Accounting Research* 40, 21–40.

Callahan, C., C. Lee and T. Yohn. (1997). "Accounting Information and Bid-Ask Spreads." *Accounting Horizons* 11, 50–61.

Dechow, P. M., A. P. Hutton and R. G. Sloan. (1996). "Economic Consequences of Accounting for Stock-Based Compensation." *Journal of Accounting Research* 34, 1–20.

Easley, D. and M. O'Hara. (2004). "Information and the Cost of Capital." *The Journal of Finance* 59.

Easton, P. and S. Monahan. (2003). "An Evaluation of the Reliability of Accounting Based Measures of Expected Returns: A Measurement Error Perspective." Working paper, Insead.

Easton, P., G. Taylor, P. Shroff and T. Sougiannis. (2002). "Using Forecasts of Earnings to Simultaneously Estimate Growth and the Rate of Return on Equity Investment." *Journal of Accounting Research* 40, 657–676.

Francis, J., R. Z. LaFond, P. Olsson and K. Schipper. (2003). "Cost of Capital and Earnings Attributes." Working paper, Duke University.

Gebhardt, W., C. Lee and B. Swaminathan. (2001). "Toward an Implied Cost of Capital." *Journal of Accounting Research* 39, 135–176.

General Accounting Office. (2002). "Financial Statement Restatements: Trends, Market Impacts, Regulatory Responses, and Remaining Challenges." Washington D.C. GAO-03-138.

Gode, D. and P. Mohanram. (2002). "Inferring the Cost of Capital using the Ohlson-Juettner Model." *Review of Accounting Studies* 8, 399–432.

Guay, W., S. P. Kothari and S. Shu. (2003). "An Empirical Assessment of Accounting Based Cost of Capital Measures." Working paper, University of Pennsylvania.

Healy, P. M., A. P. Hutton and K. G. Palepu. (1999). "Stock Performance and Intermediation Changes Surrounding Sustained Increasing Disclosure." *Contemporary Accounting Research* 16, 485–520.
Ohlson, J. (1995). "Earnings, Book Value, and Dividends in Security Valuation." *Contemporary Accounting Research* 11, 661–687.
Ohlson, J. and B. Juettner-Nauroth. (2001). "Expected EPS and EPS Growth as Determinants of Value." Working paper, New York University.
Palmrose, Z-V., V. J. Richardson and S. Scholz. (2004). "Determinants of Market Reactions to Restatement Announcements." *Journal of Accounting and Economics* 37, 59–90.
Richardson, S., I. Tuna and M. Wu. (2002). "Predicting Earnings Management: The Case of Earnings Restatements." Working paper, University of Pennsylvania.
Welker, M. (1995). "Disclosure Policy, Information Asymmetry, and Liquidity in Equity Markets." *Contemporary Accounting Research* 11, 801–827.