The Impact of Earnings Management on the Performance of Earnings-Based Valuation Models

By

Lucie Courteau[a]

Jennifer L. Kao[b]

and

Yao Tian[c]

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a. School of Economics and Management, Free University of Bolzano, Via Sernesi 1. I-39100 Bolzano, Italy. Email: Lucie.Courteau@unibz.it
b. Department of AMIS, University of Alberta, Edmonton, Alberta, Canada, Tel: (780) 492-7972; Email: Jennifer.Kao@ualberta.ca
c. Department of AMIS, University of Alberta, Edmonton, Alberta, Canada, Tel: (780) 492-8008; Email: yao.tian@ualberta.ca

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Abstract:

Ohlson (1995) and Feltham and Ohlson (1995, 1996) provide a conceptual framework for relating accounting earnings with firm value. Since then, several empirical studies have shown that earnings-based valuation models (e.g. RIM) can better predict firm value than non-earnings-based valuation models (e.g. DCF). While accounting earnings have regained popularity among researchers, financial analysts and investors in recent years, evidence suggests that earnings are often subject to managerial manipulations. The purpose of this study is to examine empirically how the presence of earnings management may affect firm valuation.

We compare the performance of RIM and DCF valuation models for two subsets of US firms, the "Suspect" firms which are likely to have engaged in earnings management in the previous year and a set of matched "Normal" firms. Model performance is measured by pricing errors and by regression analysis. Our results suggest that the performance of RIM is negatively affected by earnings management unless the valuation process includes both short-term and long-term analyst forecasts of future performance.

JEL Classification: M41

Key Words: Earnings Management; Earnings Thresholds; Firm Valuation; Earnings- and Non Earnings-based Valuation Models; Valuation Errors

1. Introduction

Ohlson (1995) and Feltham and Ohlson (1995, 1996) provide a conceptual framework for relating accounting earnings with firm value. Since then, several empirical studies have shown that earnings-based valuation models can better predict firm value than non-earnings-based valuation models. While accounting earnings have regained popularity among researchers, financial analysts and investors in recent years, evidence suggests that earnings are often subject to managerial manipulations. Such manipulations, driven by the pressure to meet or beat earnings expectations, are believed to have eroded the quality of earnings and led to highly publicized corporate scandals such as Enron and WorldCom in the early 2000s. The perceived erosion of financial reporting quality in turn prompted the US Congress to pass the Sarbanes-Oxley Act (SOX) on July 30, 2002 with the stated objective of restoring investor confidence in financial and public reporting.

The purpose of this study is to examine empirically how the presence of earnings management may affect firm valuation. We integrate two major streams of academic research: First, we revisit the studies which compare the relative performance of earnings-based and non-earnings-based valuation models, after taking into consideration the effect of earnings management on model inputs. We aim to provide evidence on whether the well-documented superiority of the earnings-based valuation models continues to hold when earnings are managed (Beaver 2002). By explicitly allowing for the manipulations of reported earnings, we arguably offer a more accurate assessment of the predictive ability of earnings-based valuation models, relative to non-earnings-based models. Second, we extend the traditional earnings management literature looking into the incentives for, and the existence of, earnings management; and the more recent literature studying the market consequences of earnings management. Our contributions lie in documenting the impact of earnings management on the *usefulness* of earnings vs. cash flows in settings where analysts' forecasts of earnings and cash flows are used as proxies for current market expectations about future firm performance for valuation purposes. We shed light on whether the way analysts react to earnings management over short to long-term forecast horizons has different implications for the predictive ability of earnings-based valuation models vis-à-vis non-earnings-based models.

Results from our study are of potential practical relevance. Earnings are used extensively to evaluate firm performance and predict firm value in practice. The majority of the 400 CFOs surveyed by Graham, Harvey and Rajgopal (2005) believe that earnings, not cash flows, are the key metric used by outside stakeholders. Skinner and Sloan (2002) find that investors use earnings to evaluate firm performance. However, when earnings are managed, heavy reliance on earnings in firm valuation may result in inaccurate assessment, undesirable investment decisions and misallocation of resources. Our research intends to quantify this effect and to raise awareness among investors and practitioners about the pitfalls of taking managed earnings at face value and using them directly in firm valuation.

The matched-pair sample consists of 776 firm-year observations with complete annual financial and forecast data over an eleven-year (1990-2000) period. Firms which are suspected of having managed earnings are matched with 'normal' firms of similar size in the same industry and year.

Our results suggest that the performance of RIM is negatively affected by earnings management unless the valuation process includes both short-term and long-term analyst forecasts of future performance.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature and develops the hypothesis for the study; Section 3 discusses the research methodology, along with variable definitions and measurements; Section 4 summarizes our sample selection procedure; Section 5 presents the main empirical findings, followed by robustness checks and further analysis in Sections 6 and 7; and Section 8 concludes the study.

2. Literature Review and Hypothesis Development

Usefulness of Earnings in Firm Valuation

Earnings-based valuation models, such as the Residual Income Model (RIM), express firm value as a function of current book value and forecasted future earnings. Several studies have shown empirically that the intrinsic value metrics estimated using these models help identify potential stock mispricing and predict future returns (Dechow, Hutton, Sloan 1999; Lee, Myers and Swaminathan 1999; Frankel and Lee 1998). In particular, investors can earn positive abnormal returns by adopting a strategy of buying undervalued stocks and short selling overvalued stocks, relative to intrinsic value estimates. Using *ex ante* Value Line (VL) analyst forecasts as inputs for valuation models, Courteau, Kao and Richardson (2001) and Francis, Olsson and Oswald (2000) report that RIM yields smaller pricing errors (defined in Section 3) than the Discounted Cash Flow model (DCF) under the assumption that post-horizon performance will grow at a constant rate. These findings are consistent with similar pricing-error evidence presented by Penman and Sougiannis (1998) when model inputs are given by *ex post* payoffs over various horizons.

The aforementioned studies use current stock price as the benchmark for model comparisons under the maintained assumption that the market is efficient. Recently, Subramanyam and Venkatachalam (2007) argue that *ex post* intrinsic value measures (defined in Section 3) may provide a more appropriate benchmark than current stock price, as the former is not subject to potential problems resulting from temporary mispricing in the presence of earnings management. Like Penman and Sougiannis (1998), the authors assume that *ex post* realizations are a reasonable proxy for *ex ante* market expectations and conclude that earnings are superior to cash flows for firm valuation purposes. Taken together, evidence from the extant valuation literature suggests that earnings are more useful for firm valuation than cash flows, irrespective of the choice of benchmarks or proxies for model inputs.[1]

Earnings Management

Healy and Wahlen (1999) remark that "... earnings management occurs when managers use judgment in financial reporting and structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." Studies have shown that firms often manage their earnings in advance of IPOs and seasoned equity offerings (Teoh, Welch and Wong 1998a; Teoh, Welch and Wong 1998b; Erickson and Wang 1998; Dechow, Sloan and Sweeney 1996) and that firms involved in earnings manipulations or singled out by the SEC for accounting enforcement actions generally have weak internal governance (Farber 2005; Bédard, Marakchi-Chtourou and Courteau 2004; Klein 2002; Beasley 1996; Dechow, Sloan and Sweeney 1996).

Several factors have been cited as contributing to a firm's motivation to meet or beat earnings targets by managing reported earnings. First, the stock market tends to punish firms for falling short of earnings expectations (Skinner and Sloan 2002). In particular, firms maintaining strings of steadily increasing earnings are rewarded with market premiums and they are severely punished as soon as the string is broken (Myers, Myers and Skinner 2007; Barth, Elliott and Finn 1999). Second, meeting or beating earnings targets allows executives to enhance their reputation with stakeholders, enjoy better terms of trade and achieve higher bonus compensations (DeGeorge, Patel and Zeckhauser 1999; Burgstahler and Dichev 1997; Bowen, DuCharme and Shores 1995; Healy 1985). Failing to meet earnings expectations,

[1] These results are obtained when the authors assume that post-horizon performance will grow at a constant rate. An exception can be found in Courteau et al (2001) who report that, when analysts' long-term target price forecasts are used to calculate terminal value, the RIM model no longer enjoys any accuracy advantage over DCF.

such as analyst earnings forecasts, could result in reputation loss and pay cuts for CEOs (Matsunaga and Park 2001).

Countering these incentives to meet or beat earnings targets are the capital market consequences that firms face when their alleged earnings manipulations become public (Dechow, Sloan and Sweeney 1996). If the capital market is efficient, then market participants should be able to spot earnings management practices and undo manipulations to reflect real economic earnings for use in firm valuation. But, corporate disclosures often do not contain sufficient information for the investors to infer accounting accruals, hence limiting their ability to completely discount earnings management (Gleason and Mills 2008; Baber, Chen and Kang 2006; Balsam, Bartov and Marquardt 2002). In a similar vein, studies have also found that financial analysts cannot fully correct for earnings management in their forecasts (Bradshaw, Richardson and Sloan 2000).

While both the investors and financial analysts have at least some information about the firm to partially undo earnings manipulations, there is one important incentive difference that sets these two groups of market participants apart. Unlike the investors, most analysts are rewarded, financially or reputationally, for their ability to issue accurate forecasts. For that reason, it is generally believed that analysts are motivated to minimize forecast errors by strategically adjusting their short-term earnings forecasts upwards or downwards to fit the post-managed, rather than the pre-managed, earnings. Burgstahler and Eames (2003) for example show that analysts tend to forecast zero earnings far more frequently than the actual incidence of zero earnings reported by firms in practice and that analysts retain an ability, albeit weaker, to identify firms that may have engaged in earnings management to avoid small earnings decline. Consistent with these findings, Liu (2004) reports that for firms with negatively skewed earnings, analysts on average issue forecasts below the level obtained when strategic incentives are not at play. The converse is true for firms with positively skewed earnings. The observed patterns of analyst forecasts documented in these two studies are supportive of the notion that financial analysts can anticipate at least in part the prospect of earnings manipulations and factor that expectation into their earnings forecasts with a view to avoiding large optimistic or large pessimistic forecast errors.[2]

Hypotheses

A number of high-profile corporate scandals involving financial reporting frauds taking place around 2000 have called into question the integrity of published accounting numbers. Unlike the extant literature looking into the market consequences of earnings management reviewed above, our interest lies in contrasting the *usefulness* of earnings in firm valuation, relative to cash flows, when earnings are managed. In this case, earnings are likely to be measured with errors and hence cannot accurately reflect the firm's true performance. As a result, valuation models estimated using analyst short-term earnings forecasts that are potentially confounded by strategic considerations may be less accurate in predicting a firm's true intrinsic value.

Drawing on insights from Liu (2004) and Burgstahler and Eames (2003), we expect financial analysts to forecast post-managed earnings at least in the short run. When these short-term earnings forecasts are used in firm valuation, the predictive ability of earnings-based valuation models based on a constant growth assumption will worsen, implying that the previously documented superior performance of RIM over DCF may no longer hold. Specifically, we expect the usual result to apply only to a subset of firms not suspected to have managed earnings (labelled Normal firms hereafter). Moreover, any valuation advantage enjoyed by RIM in the absence of earnings management would likely diminish or dissipate completely for the subset of firms suspected to have managed earnings (labelled Suspect

[2] Unlike Liu (2004) and Burgstahler and Eames (2003), Ahmed et al (2005) find that analyst earnings forecasts give the same weight to discretionary and non-discretionary accruals. Since the latter are more persistent than the former, the authors suggest that their evidence is indicative of analysts' issuing forecasts with pre-managed earnings in mind. But, the link between earnings management and analyst forecasts documented by Ahmed et al is indirect and arguably noisier, as there may be measurement errors associated with the calculations of discretionary accruals.

firms hereafter). The above discussion leads to the first two hypotheses for the study (stated in the alternate form):

H1a: Among models that use a constant post-horizon growth assumption, the DCF valuation models generate larger prediction errors than the corresponding RIM valuation models for the Normal firms.

H1b: Among models that use a constant post-horizon growth assumption, the superiority of RIM over DCF valuation models is lower for the Suspect firms than for the Normal firms.

While a lack of detailed corporate disclosures may impair financial analysts' ability to clearly identify inter-temporal patterns of earnings management, as the most sophisticated users of financial statements they should know that ultimately such practice does not contribute to firm value. Moreover, analysts are keenly aware of the extent of damage that a "wrong" buy/sell recommendation could inflict on their reputation and resources, compared to periodic short-term overly optimistic or pessimistic forecasts. Thus, we expect analysts to have strong incentives to behave non-strategically by issuing long-term growth and/or target price forecasts along with buy/sell recommendations according to their best estimates of a firm's intrinsic value.

When RIM and DCF valuation models use analyst forecasts of both short-term and long-term valuation drivers as model inputs, they are expected to perform in a similar fashion with or without the presence of earnings management. The theoretical equivalence of these two valuation models over an infinite forecast horizon was established in Penman (1997) and subsequently confirmed empirically by Courteau, Kao and Richardson (2001) using VL analysts' long-term target price forecasts as a proxy for the post-horizon goodwill (see Footnote 1). However, neither study considers the prospect of earnings management. We extend this line of enquiry to settings where earnings management is suspected to be present vs. when it is not. This is summarized in the final hypothesis for the study (stated in the null form):

> **H2:** Among models that use long-term target price forecasts in the terminal value, the DCF and RIM valuation models generate similar prediction errors for the Normal and the Suspect firms.

3. Research Methodology

Normal and Suspect Firms

We consider two earnings thresholds in this study: loss avoidance and earnings-decline avoidance.[3] For the loss-avoidance earnings threshold, we follow the approach proposed by Givoly, Hayne and Yoda (2008) and classify firms into Suspect group when (1) their reported earnings exceed the loss-avoidance threshold of zero by no more than k% of the end-of-year market values of equity, where k = 1, 2 and 4;[4] (2) they report positive discretionary accruals; and (3) their level of discretionary accruals is greater than the amount of reported earnings, but not in excess of 4% of the market value of the equity.[5] The remaining firms are placed in the Normal group. The Suspect and Normal firms can be defined analogously for the earnings-decline avoidance threshold.[6]

We analyze the valuation consequences of earnings management under the assumption that firms may be motivated to meet/beat either loss avoidance or earnings-decline avoidance earnings threshold. This approach offers a more powerful test, as it

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[3] We do not consider the threshold of meeting or beating analyst forecasts, because earnings forecasts serve not only as a benchmark to measure earnings management, but also as an incentive for managers to manipulate earnings.

[4] Givoly et al (2008) work with quarterly data and define their Suspect firms as those whose earnings exceed the respective thresholds by no more than k% of the end-of-quarter market values of equity, where k = 0.25 0.5 or 1.

[5] Givoly et al (2008) define unexpected accruals as "too large" to emanate from earnings management when they exceed 1% of the market value of equity.

[6] Specifically, we classify firms into the Suspect group when (1) their reported earnings increase in year t exceed zero by no more than k% of the end-of-year market values of equity, where k = 1, 2 and 4, (2) they report positive discretionary accruals; *and* (3) their level of discretionary accruals is greater than the increase in earnings and moreover it is not too large to emanate from earnings management. In this case, discretionary accruals are viewed as “too large" when they exceed 2% of the market value of equity (see Givoly et al. 2008).

generates the largest number of Suspect firms, compared to the alternative of analyzing each earnings threshold separately. However, as discussed in Section 6.2, our results remain qualitatively unchanged when they are analyzed separately.

Valuation Models

We use RIM (DCF) as the representative earnings- (non-earnings-) based valuation model. To test the predictions of Hypotheses H1a and H1b, we estimate intrinsic values (IV) for each firm-year observation on the valuation date t, as indicated below:

$$\mathrm{IV}_{\mathrm{t}}^{\mathrm{RIM}} = B_t + \sum_{\tau=1}^{T} R^{-\tau} E_t\left(X_{t+\tau}^{a}\right) + R^{-T}(R-1-g)^{-1} E_t\left(X_{t+T+1}^{a}\right); \quad (1)$$

$$\begin{aligned}\mathrm{IV}_{\mathrm{t}}^{\mathrm{DCF}} &= FA_t + \sum_{\tau=1}^{T} R^{-\tau} E_t\left(C_{t+\tau} - I_{t+\tau} + i_{t+\tau} - (R-1) FA_{t+\tau-1}\right) \\ &\quad + R^{-T}(R-1-g)^{-1} E_t\left(C_{t+T+1} - I_{t+T+1} + i_{t+T+1} - (R-1) FA_{t+T}\right).\end{aligned} \quad (2)$$

The valuation date t is defined as the first VL forecast made after the Year t earnings announcement, but not more than 30 days after first quarterly earnings announcement for Year t+1. The variable, *R*, is one plus the cost of equity capital. In Equation (1), B_t denotes the current book value;[7] $X_{t+\tau}^{a}$ is the abnormal income for forecast year t+τ; $X_{t+T+1}^{a} = (1+g) X_{t+T} - (R-1) B_{t+T}$, implying that earnings at the forecast horizon t+T will grow in simple perpetuity at a constant rate of g. In Equation (2), FA_t denotes the current net financial assets; $C_{t+\tau} - I_{t+\tau} + i_{t+\tau} - (R-1) FA_{t+\tau-1}$ is the abnormal free cash flows to common for forecast year t+τ; $\left(C_{t+T+1} - I_{t+T+1} + i_{t+T+1} - (R-1) FA_{t+T}\right) = (1+g)\left(C_{t+T} - I_{t+T} + i_{t+T}\right) - (R-1) FA_{t+T}$, i.e., free cash flows at the forecast horizon t+T will grow in perpetuity at a constant rate of g.[8]

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[7] We use the first year's earnings and dividend forecasts to update book value B_t to the forecast date.

[8] This version of the DCF model, proposed by Penman (1997), is equivalent to the version presented in all valuation textbooks and it has the advantage to avoid the measurement problems associated with the estimation of the weighted average cost of capital (WACC).

In the main analysis, we assume that the abnormal earnings (or cash flows) from the last period of the explicit forecast horizon will grow at a constant rate of 2%, which approximates the rate of inflation during our sample period (Courteau et al 2001; Penman and Sougiannis 1998), and that firms will have reached a steady state at the horizon. As robustness checks, we also extend the analysis to a 4% constant growth rate in Section 6.1.

To test the predictions of Hypothesis H2, we follow Courteau et al (2001) and use Value Line's long-term target price and book value forecasts to estimate terminal values at the end of forecast horizon t+T. In this case, intrinsic values for the RIM and DCF models on the valuation date t are given by:

$$\mathrm{IV}_t^{\mathrm{RIM}} = B_t + \sum_{\tau=1}^{T} R^{-\tau} E_t\left(X_{t+\tau}^a\right) + R^{-T} E_t\left(P_{t+T} - B_{t+T}\right); \qquad (3)$$

$$\mathrm{IV}_t^{\mathrm{DCF}} = FA_t + \sum_{\tau=1}^{T} R^{-\tau} E_t\left(C_{t+\tau} - I_{t+\tau} + i_{t+\tau} - (R-1) FA_{t+\tau-1}\right) + R^{-T} E_t\left(P_{t+T} - FA_{t+T}\right), \qquad (4)$$

where P_{t+T} denotes forecasted stock price at the forecast horizon t+T; ($P_{t+T} - B_{t+T}$) the market's expected premium; and ($P_{t+T} - FA_{t+T}$) the post-horizon operating cash flows. The remaining terms are as defined previously.

Valuation Benchmarks

To assess the relative performance of RIM and DCF valuation models, we employ the following two benchmarks: (1). Current stock price, which is rooted in the so-called "horse-race" valuation literature, reviewed in Section 2, and assumes that any bias or measurement error due to violations of the efficient market hypothesis is a constant factor in comparisons across DCF and RIM models. (2). *Ex post* intrinsic value (IV) measure, calculated as the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity (Subramanyam and Venkatachalam 2007).

Since our interest is in the relative accuracy of RIM vs. DCF models, we focus on the absolute value of percentage-prediction errors. For each firm-year observation, the percentage-prediction errors under RIM is defined as the difference between estimated intrinsic value calculated according to Equation (1) (Equation (3)) using the constant growth- (Value Line's long-term target price-) based terminal value expression and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter. The corresponding percentage-prediction errors under DCF can be defined analogously by reference to Equations (2) and (4), respectively.

Research Approaches

Two of our hypotheses (H1b and H2) contrast the difference in absolute percentage-prediction errors between RIM and DCF valuation models for Suspect firms vs. that for Normal firms. To ensure that any observed difference is due to earnings management, rather than variations in attributes characterizing these two groups of firms, we use a matched-pair design. Specifically, for each Suspect firm-year observation, we identify its match as the Normal firm drawn from the same Fama and French (1993) industrial sector and fiscal year and whose firm size, measured by total assets, is closest to the Suspect firm in question. This process is repeated for the remaining Suspect firm-year observations.[9]

Following the convention of the valuation literature (Courteau et al 2001; Francis et al 2000; Penman and Sougiannis 1998), we rely mainly on univariate comparisons of mean absolute percentage-prediction errors to test all three hypotheses in this study. Results based on comparisons of median absolute percentage-prediction errors are qualitatively similar and hence are not discussed in the text or reported in a table to conserve space. To facilitate the discussion, we label absolute percentage-prediction errors for each Normal firm-year observation as APE_RIM1^{Normal} and APE_DCF1^{Normal} (APE_RIM2^{Normal} and APE_DCF2^{Normal}) when the 2% constant growth rate (long-term target price) is used to calculate the terminal value for the RIM and DCF valuation models, respectively. The

[9] We allow the same Normal firm to serve as a match for more than one Suspect firm. In our final sample (discussed in Section 4), there are 25 Normal observations serving as matches for multiple Suspect observations.

corresponding labelings for Suspect firms are $APE\_RIM1^{Suspect}$ and $APE\_DCF1^{Suspect}$ ($APE\_RIM2^{Suspect}$ and $APE\_DCF2^{Suspect}$), respectively.

A significantly larger mean APE_DCF1^{Normal} than the mean of APE_RIM1^{Normal} distribution implies that the DCF model is less accurate than RIM among firms not suspected to have managed their reported earnings, as predicted in H1a. To test the prediction of Hypothesis H1b, we subtract the difference in absolute percentage-prediction errors between the RIM and DCF valuation models for each Suspect firm from that of its matched Normal firm i.e., (APE_DCF1^{Normal} – APE_RIM1^{Normal}) – ($APE\_DCF1^{Suspect}$ – $APE\_RIM1^{Suspect}$). If the mean of the resulting difference distribution is significantly positive, then it implies that the RIM model has relatively larger accuracy advantage over DCF for Normal firms than for Suspect firms, as predicted in H1b. Finally, Hypothesis H2 is supported if, for each group of firms (Normal or Suspect), the difference in mean absolute percentage-prediction errors between DCF and RIM is insignificantly different from zero. Moreover, the mean of the following difference distribution, i.e., (APE_DCF2^{Normal} – APE_RIM2^{Normal}) – ($APE\_DCF2^{Suspect}$ – $APE\_RIM2^{Suspect}$), is also insignificantly different from zero.

To control for other potential sources of variations between the Suspect and Normal firms not considered in our industry-year-size matching procedure, we also present multivariate analysis based on the following regression model:

$$DIFF = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE, \qquad (5)$$

where the dependent variable *DIFF* is defined as the difference in absolute percentage-prediction errors between RIM and DCF for each sample firm-year observation, i.e., (APE_DCF – APE_RIM). We use *DIFF1* (*DIFF2*) to denote the case where the terminal value is estimated based on a 2% constant growth rate (long-term target prices). "*SUSPECT*" is the test variable, set equal to one if firms are suspected to have managed their earnings and zero otherwise. The intercept a_0 captures the accuracy advantage of RIM over DCF for

Normal firms, and that for Suspect firms is given by the sum of coefficients $a_0 + a_1$. The slope coefficient a_1 therefore represents the difference between RIM's accuracy advantage over DCF in the Suspect group vs. that in the Normal group. In the *DIFF1* regression, the intercept a_0 is predicted to be positive under H1a and the slope coefficient a_1 negative under H1b. In the *DIFF2* regression, on the other hand, both a_0 and a_1 are predicted to be insignificantly different from zero under Hypothesis H2.

Equation (5) also includes four control variables, found to affect the predictability of accounting earnings in prior literature (e.g., Lang and Lundholm, 1996; Kross, Ro and Schroeder 1990; Brown, Richardson and Schwager 1987): (1). Book-to-Market ratio (*BM*), defined as book value per share over stock price per share, measured at fiscal yearend. (2). Earnings volatility (*EV*), calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date. (3). Earnings shock (*ES*), defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets. (4). Standard deviation of return on equity (*Std_ROE*) over a 5-year period immediately preceding the annual report date. On one hand, we expect earnings to be less predictable for growth firms and for firms with highly volatile past earnings or return and considerable current-period earnings shock. For these firms, the RIM valuation model may become less accurate. However, financial analysts' cash flow forecasts are unlikely to be completely independent of their assessment of the firm's growth prospects and the volatility of its past and/or current past performance. Since these forecasts are used to calculate intrinsic value under DCF, the accuracy of DCF may also decline. On balance, it is not clear whether the reduction in model performance is greater under RIM or under DCF. Thus, we do not offer directional predictions on any of the four control variables in Equation (5).

4. Sample Selection

Our initial sample consists of 39,826 annual earnings announcements made between 1990 and 2000 by publicly traded US firms with complete financial and stock price information during the announcement year. Predating major corporate scandals and the ensuing legislative events, our sample period represents the "hey days" of earnings management and hence allows us to better isolate the effect of earnings management on the relative performance of RIM and DCF.

Following the tradition of prior literature, we delete observations in the Financial (SIC code 6022 to 6200), Insurance (SIC code 6312 to 6400) and Real Estate (SIC code 6500 to 6799) industries. We then apply the following three filters: (1). Forecasted valuation attributes, including long-term target prices (P_{t+T}), are available from the Datafile and Historical Reports published by Value Line (VL) Investor Services.[10] (2). Financial and stock price information required to compute the second valuation benchmark, i.e., *ex post* intrinsic value over a three-year period following the fiscal yearend, is available from COMPUSTAT and CRSP, respectively. (3) Data required to construct all regression variables are available. Moreover, extreme observations in the top and bottom 1% of the distribution of each regression variable are deleted.[11]

For the sample using current stock price as the valuation benchmark (termed the pricing-error sample hereafter), the above filters reduce the initial sample to 5,123 firm-year observations, of which 420 are classified as "Suspect" and 4,703 are classified as "Normal" (see Column 1, Panel A of Table 1). Among the 420 Suspect firm-year observations, 32 cannot be matched with a Normal firm with total assets within +/– 80% of the corresponding

[10] We choose not to use IBES forecast data in this study because IBES provides a more limited range of forecasted valuation attributes that excludes, among others, long-term target price forecasts. Moreover, unlike VL whose forecasts are provided by a single in-house analyst, analysts contributing to IBES generally have investment banking relationships with firms that they follow, thus potentially affecting their incentives to issue unbiased forecasts.

[11] All the regression results without trimming (not reported) are qualitatively similar.

Suspect firm's total assets. Deleting these observations from further consideration results in a final sample of 388 Suspect and 388 matched Normal firm-year observations. The corresponding sample for the *ex post* IV-based analysis (termed the valuation-error sample hereafter) are 384 and 384, respectively (see Column 2, Panel A of Table 1).

Except for the year 2000, both pricing-error and valuation-error samples are evenly distributed from 1990 to 1999 (see Columns 1-2, Panel B of Table 1). Moreover, there is no obvious domination by any particular industry in either sample. As is evident in Column 1 (2), Panel C of Table 1, the industry distribution ranges from a high of 9% (9.1%) in the Automobiles and Trucks (Machinery) industry to a low of 0% (0.3%) in the Printing & Publishing and Consumer Goods (Textiles) industries for the pricing-error (valuation-error) sample.

[Insert Table 1 about Here]

5. Empirical Results

5.1 Descriptive Statistics

Panels A and B of Table 2 report the descriptive statistics on earnings predictability variables, defined in Section 3, for the overall sample and separately for the Suspect and Normal firms, respectively. On average, Suspect firms have a significantly larger Book-to-Market ratio (*BM*; 0.339 vs. 0.493), but much smaller earnings volatility (*EV*; 0.024 vs. 0.044), earnings shock (*ES*; 4.053 vs. 7.486) and standard deviation of return on equity (*Std_ROE*; 0.132 vs. 0.164), compared to the corresponding matched Normal firms. The means of differences for the first three control variables, *BM*, *EV* and *ES*, are statistically significant at the 1%, 5% and 1% levels, respectively. While Suspect firms are more likely to have higher growth, they tend to have lower earnings shock and return volatility, and hence higher earnings predictability, than Normal firms. These patterns are consistent with potential income smoothing by Suspect firms.

Panel C of Table 2 present pair-wise Pearson correlations for our regression variables (i.e., Equation 5), except for Suspect. Two of the control variables, *BM* and *ES*, are positively correlated with the dependent variable in the *DIFF1* (*DIFF2*) regression, i.e., 0.104 and 0.105 (0.270 and 0.101), both significant at the 1% level. The correlations between *DIFF1* and the remaining control variables, *EV* and *Std_ROE*, are positive but weaker. These descriptives point to the need to control for all four variables in the analysis of relative accuracy of RIM and DCF, as we do in a multivariate setting.

[Insert Table 2 about Here]

5.2 Results from Tests of Hypotheses H1a and H1b

Panels A and B of Table 3 present, respectively, the univariate and multivariate (one-tailed) tests of Hypotheses H1a and H1b using a 2% constant growth rate to estimate terminal values. We report two sets of results in each panel, the first one based on the pricing-error sample using current stock price as the benchmark to compare model performance (see Column 1) and the other based on the valuation-error sample using *ex post* intrinsic value as the benchmark (see Column 2).

Focusing first on the univariate comparisons of mean absolute percentage-prediction errors for RIM1 and DCF1 valuation models appearing in Panel A. For the pricing-error sample, the Normal group's DCF1 model on average generates larger absolute percentage-pricing error than its RIM1 counterpart (i.e., 0.389 vs. 0.350). The difference of 0.040 is significant at the 1% level, implying that DCF1 is less accurate than RIM1 absent earnings management, as predicted in H1a. In contrast, the Suspect group's mean absolute percentage-pricing error is statistically identical across the two valuation models, i.e., 0.400 vs. 0.404

(see Column 1b). Column 1c presents formal t-tests of the mean of matched-pair differences between an individual Suspect firm and its matched Normal firm for a given valuation model. Results indicate that the mean difference is statistically insignificant for DCF1 (i.e., –0.011 = 0.389 – 0.400), but significantly different from zero at the 1% level for RIM1 (i.e., –0.055 = 0.350 – 0.404). While cash flow forecasts do not appear to be affected by the presence of earnings management, RIM1's ability to predict firm value is greatly diminished when earnings are managed. Equivalently stated, the wedge between DCF1 and RIM1 narrows in the presence of earnings management,[12] consistent with the prediction of H1b. Extending the analysis to the overall level, we find that RIM1 enjoys a significant accuracy advantage over DCF1, i.e., 0.377 vs. 0.395 (see Column 1d). The difference of 0.018 for the full sample is comparable to that documented in the extant literature[13] and, as expected, lies in-between the differences of 0.040 and –0.004 observed in the Normal and Suspect groups, respectively.

The above univariate pricing-error results continue to hold for the valuation-error sample (see Column 2, Panel A)**.** Consistent with the prediction of H1a, the Normal group's mean absolute percentage-valuation error, at 0.569 under DCF1, is larger than 0.512 under RIM1, significant at the 1% level (see Column 2a). While RIM1 still enjoys a significant accuracy advantage over DCF1 in the Suspect group, the wedge in performance between these two models nonetheless narrows considerably, compared to the Normal group, i.e., from 0.057 to 0.021, with the difference of 0.036 significant at the 5% level, as predicted in H1b (see Column 2c).

Moving next to the multivariate analysis based on the *DIFF1* version of Equation (5), reported in Panel B. After controlling for covariates, we find weak support for the prediction that DCF1 performs worse than RIM1 in the Normal group (H1a). While the intercept is

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[12] That is, $(APE\_DCF1^{Suspect} - APE\_RIM1^{Suspect}) < (APE\_DCF1^{Normal} - APE\_RIM1^{Normal})$. The inequality can be equivalently expressed as $(APE\_RIM1^{Normal} - APE\_RIM1^{Suspect}) < (APE\_DCF1^{Normal} - APE\_DCF1^{Suspect})$.

[13] Courteau et al (2001) for example report that over a five-year (1992-1996) sample period, the mean absolute percentage-pricing errors for their DCF and RIM models are 0.397 and 0.372, respectively.

positive (0.0367) and significant at the 10% level in the valuation-error sample (see Column 2), it is insignificantly different from zero in the pricing-error sample (see Column 1). The support for H1b, on the other hand, is much stronger. The coefficient estimates on the SUSPECT variable in both valuation-error and pricing-error samples are negative (–0.0307 and –0.0259) and significant at the 5% level. Thus, our univariate findings that RIM1's accuracy advantage over DCF1 is diminished for Suspect firms extend to a multivariate setting.

Of the four control variables, the coefficient estimates on *BM, ES* and *Std_ROE* are positive and significant at the 5% level or better in the pricing-error based *DIFF1* regression (see Column 1, Panel B). By comparison, only the variable *Std_ROE* is positive and significant in the valuation-error based *DIFF1* regression (see Column 2, Panel B). It would appear that DCF1 yields higher absolute prediction errors, and hence is relatively less accurate, than RIM1 among firms experiencing a large earnings shock (i.e., large values of *Std_ROE*) in the past. Evidence on the association between the relative accuracy DCF1 vs. RIM1 valuation models and growth (i.e., *BM*) or current period earnings shock (i.e., *EV* and *ES*) is mixed, however.

[Insert Table 3 about Here]

Taken together, Table 3 results suggest that when terminal values are estimated based on a 2% constant growth rate, the RIM1 model can better predict a firm's intrinsic value than DCF1 absent earnings management (H1a). However, the presence of earnings management can adversely affect the performance of RIM1, so much so that the previously documented accuracy advantage of RIM1 over DCF1 would dissipate completely (H1b). Since analyst forecasts are typically used as model inputs to proxy for market expectations, these findings imply that earnings management affects short-term earnings forecasts by financial analysts, who are likely motivated by a desire to minimize forecast errors and hence preserve their reputation.

5.3 *Results from Tests of Hypothesis H2*

Panels A and B of Table 4 present, respectively, the univariate and multivariate (two-tailed) tests of Hypothesis H2 using VL long-term target prices to estimate terminal values. In both panels, we report results based on parallel analysis conducted on two samples, pricing-error (see Column 1) and valuation-error (see Column 2).

As is evident in Panel A, both DCF2 and RIM2 exhibit similar predictive ability in the pricing-error sample, without or with the presence of earnings management. The mean absolute percentage-pricing errors are 0.235 vs. 0.235 and 0.184 vs. 0.184 for the Normal and Suspect firms, respectively (see Columns 1a and 1b). Results are qualitatively similar for the valuation-error sample, i.e., 0.721 vs. 0.720 and 0.659 vs. 0.659, respectively (see Columns 2a and 2b). In both samples, the mean of matched-pair differences is effectively zero even though it is statistically significant at the 5% level or better (see Columns 1c and 2c). Thus, among models that use VL's long-term price forecasts as inputs to calculate terminal values, RIM2 does not appear to enjoy any economically significant accuracy advantage over DCF2, whether firms have managed their reported earnings or not. These results lend support for the prediction of H2.[14]

Turning next to the *DIFF2* regression, appearing in Panel B. For the valuation-error sample, both the regression intercept (0.0000) and the coefficient estimate on SUSPECT (–0.0001) are insignificantly different from zero (see Column 2), implying that there is no difference in model performance between DCF2 and RIM2 for not just Normal firms, but also Suspect firms, as predicted in H2. Results based on the pricing-error sample are mixed,

[14] Not surprisingly, these observations also hold at the overall level. The mean absolute percentage-pricing errors of 0.210 and 0.209, appearing in Column 1d, are comparable to 0.191 and 0.195 reported by Courteau et al (2001).

however (see Column 1). While the coefficient estimate on the test variable SUSPECT is insignificantly different from zero, the regression intercept is nonetheless negative (–0.0004) and significant at the 1% level. The latter result in particular is contrary to the predictions of H2. Finally, results on control variables in both *DIFF2* regressions suggest that RIM2 enjoys a larger accuracy advantage over DCF2 when firms have low growth prospects (i.e., large values of *BM*) and face a large past earnings shock (i.e., large values of *Std_ROE*).

[Insert Table 4 about Here]

In short, we find little evidence of erosion to the performance of earnings-based valuation models when financial analysts' long-horizon target price forecasts are used as model inputs. Neither DCF2 nor RIM2 enjoys any economically significant accuracy advantage over the rival model, whether or not the prospect of earnings management is taken into account (H2). An implication from this analysis is that financial analysts would appear to behave non-strategically over a long-run forecast horizon. In particular, they adjust their target price forecasts to correct for potential negative long-term effects that earnings management may have on firm value.[15]

6. Further Analyses

In this section, we assess the robustness of our main findings by conducting the following three sets of sensitivity tests using: (1). An alternative constant growth assumption (Section 6.1); (2). Alternative definitions of Suspect firms (Section 6.2); (3). Alternative definitions of Normal firms (Section 6.3). Results appear in Tables 5, 6-7 and 8, respectively. Following the convention employed in Tables 3 and 4, we present complementary results based on the pricing-error sample (Column 1) and the valuation-error sample (Column 2) in each table. Since results are qualitatively similar, to conserve space we will only speak to the valuation-

[15] In support of this observation, note that RIM2 generates significantly lower mean absolute percentage-pricing errors in the Suspect group, compared to the Normal group (0.184 vs. 0.235; Columns 1b and 1a, Panel A, Table 4); whereas the converse is true for RIM1 (0.404 vs. 0.350; Columns 1b and 1a, Panel A, Table 3).

error based analyses in the text and make brief references to the pricing-error results in a footnote.

6.1 Alternative Definitions of Constant Growth Rate

Panels A and B of Table 5 present, respectively, univariate and multivariate (one-sided) tests of Hypotheses H1a and H1b when both valuation models (labelled DCF3 and RIM3) use a constant growth rate of 4% to calculate terminal values. For these analyses, we work with a total of 770 (772) firm-year observations for the valuation-error (pricing-error) sample, of which 385 (386) are Suspect firms and another 385 (386) are their matched-Normal firms. Both total sample sizes are slightly different from the corresponding combined 768 (776) firm-year observations used in the main analyses, due to the elimination of different outliers.

As is evident in Column 2a of Panel A, the Normal group's mean absolute percentage-valuation error is larger under DCF3 than under RIM3 (0.654 vs. 0.534) and, moreover, the difference of 0.120 is statistically significant at the 1% level. While DCF3 continues to yield a larger mean absolute percentage-valuation error than RIM3 in the Suspect group (0.526 vs. 0.483; Column 2b), the difference is nonetheless narrowed considerably, from 0.120 to 0.043. A formal t-test of the reduction is significant at the 1% level (Column 2c). On average, DCF3 generates higher valuation errors than RIM3 in the absence of earnings management. However, RIM3 does not enjoy as much accuracy advantage over DCF3 for the Suspect firms, compared to the Normal firms. Both findings are consistent with the main results reported in Panel A of Table 3 and lend support for the predictions of H1a and H1b.

Extending the analysis to the multivariate setting, we find that, while the regression intercept is insignificantly different zero (0.0351; t = 0.94), the estimated coefficient on the test variable SUSPECT is in the hypothesized direction (–0.0537) and significant at the 5%

level (Column 2, Panel B). The latter result implies that earnings management adversely affects the performance of earnings-based valuation models, such that RIM3's accuracy advantage over DCF3 is reduced from the level observed for the Normal firms, as predicted in H1b and reported previously in Panel A of Table 4.[16]

[Insert Table 5 about Here]

6.2 Alternative Definitions of Suspect Firms

Table 6 (7) presents robustness checks of our main results when Suspect firms are defined by reference to the earnings-decline avoidance (loss avoidance) earnings threshold. In each table, results from univariate (multivariate) one-sided tests of Hypotheses H1a-H1b using a 2% constant growth rate appear in Panel A (B); whereas those based on two-sided tests of Hypothesis H2 using VL target prices appear in Panel C (D).

Focusing first on the earnings-decline avoidance threshold (see Table 6). For the valuation-error sample, we identify 318 firm-year observations as Suspect and match them against 318 Normal firms by industry, year and size to yield a total of 636 firm-year observations.[17] The Normal group's mean absolute percentage-valuation error is higher under DCF1 than under RIM1 with the difference of 0.042 (= 0.566 – 0.524), significant at the 1% level (see Column 2a, Panel A). RIM1 retains a significant accuracy advantage over DCF1 in the presence of earnings management, i.e., 0.467 vs. 0.452, at the 5% level (see Column 2b, Panel A), though the size of its advantage decreases from 0.042 to 0.015 (= 0.467 – 0.452).[18] These univariate findings are consistent with a positive and significant regression intercept (i.e., a1 = 0.0386; t = 1.44) and a negative and significant coefficient estimate on the SUSPECT variable (i.e., a1 = –0.0269; t = 1.34) in the *DIFF1* regression (see Column 2,

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[16] The corresponding univariate results for the pricing-error sample are mixed, though multivariate results continue to hold.

[17] The corresponding figures for the pricing-error sample are 322 and 644 firm-year observations, respectively

[18] The mean of matched pair differences is nonetheless insignificantly different from zero (see Column 2c, Panel A).

Panel B). Together with our earlier Table 3 results, they lend further support for the predictions of H1a and H1b.[19]

Turning next to the tests of Hypothesis H2. While the mean absolute percentage-valuation errors are statistically significantly different across the DCF2 and RIM2 models in the Normal as well as the Suspect group (see Columns 2a-2b, Panel C), both mean differences (i.e., 0.000 and 0.000) are nonetheless economically insignificant. After controlling for the potential effects of covariates, we once again find statistically insignificant regression intercept and coefficient estimate on the SUSPECT variable in the *DIFF2* regression (see Column 2, Panel D). These findings are consistent with our main Table 4 results and the prediction of H2.[20]

[Insert Table 6 about Here]

Much the above evidence extends to the case where Suspect firms are alternatively defined according to the loss-avoidance criterion (see Table 7). Staying with the valuation-error sample, we identify 72 Suspect and 72 Normal firms for a total of 144 firm-year observations.[21] Take the tests of H1a-H1b for example. The difference in mean absolute percentage-valuation error between RIM1 and DCF1 in the Normal group is positive (0.117) and significant at the 1% level, consistent with the prediction of H1a (see Columns 2a, Panel A). Moreover, the mean of matched-pair differences, at 0.080, is also positive and significant at the 10% level (see Column 2c, Panel A). The latter result, along with a negative and significant coefficient estimate on the SUSPECT variable in the *DIFF1* regression, i.e., a1 = –0.0758 and t = –1.86 (see Column 2, Panel B), provides evidence in support of H1b. Finally, neither regression intercept nor coefficient estimate on the SUSPECT variable is

[19] Both univariate and multivariate pricing-error results are much weaker than the valuation-error results discussed in the text.
[20] While univariate results based on pricing-error sample are qualitatively similar, multivariate results for this case are nonetheless mixed.
[21] The corresponding figures for the pricing-error sample are 73 and 146 firm-year observations, respectively.

statistically significant at the conventional levels in the *DIFF2* regression, as hypothesized under H2 (see Column 2, Panel D).[22]

Taken together, Tables 6-7 results imply that the earlier findings that earnings management impairs the performance of earnings-based valuation models vis-à-vis non earnings-based valuation models over a short-term forecast horizon, but not so over a long-term forecast horizon, are invariant to the alternative definitions of earnings thresholds.

[Insert Table 7 about Here]

6.3 Alternative Definitions of Normal Firms

Up to now, we have used an industry-year-size matching procedure to create a matched Normal firm for each Suspect firm that meets the chosen earnings threshold criterion. This approach has the advantage of holding constant potential confounding factors that may have also contributed to differences in the performance of RIM and DCF models across these two groups of firms, quite apart from earnings management. However, matching assumes that there is an equal number of Normal and Suspect firms. This assumption is unlikely to be representative of the actual distribution of Normal and Suspect firms in practice. To ensure that our findings are invariant to this design choice, we replicate the univariate analysis by re-defining Normal firms as *all* the remaining firms among the 5,781 firm-year observations that survive the first two filters and which are not classified as Suspect (see Panel A, Table 1 and Section 4). Under this alternative definition, there are a total of 5,303, 5,380 and 5,698 (478, 401 and 83) firm-year observations classified as Normal (Suspect) when Suspect firms are defined as either earnings-decline or loss avoiders (labelled Subsample 1 hereafter), earnings-decline avoiders (labelled Subsample 2 hereafter) and Loss avoiders (labelled Subsample 3 hereafter), respectively. Panel A (B) of Table 8 presents results using a 2% constant growth

[22] Both univariate and multivariate pricing-error analyses generate qualitatively similar results in support of H1a, and H1b. The support for H2 is, however, mixed based on the regression analysis.

rate (target price forecasts) to calculate terminal values. Each panel consists of three sub-panels, corresponding to Subsamples 1, 2 and 3, respectively.

According to the univariate (one-sided) tests of H1a-H1b for Subsample 1, DCF1 on average has a significantly larger mean absolute percentage-valuation error than RIM1 (0.822 vs. 0.734) in the Normal group with the difference of 0.087 (= 0.822 – 0.734) statistically significant at the 5% level (see Column 2a, Panel A1). In contrast, DCF1's valuation error is statistically insignificantly different from that of RIM1 in the Suspect group (0.503 vs. 0.489; see Column 2b, Panel A1). Both results extend to not just Subsamples 2 and 3 (see Columns 2a-2b, Panels A2 and A3), but also the corresponding pricing-error comparisons (see Columns 1a-1b, Panels A1, A2 and A3). Taken together, these results lend support for the prediction of H1a and imply that our earlier conclusion about the accuracy advantage of RIM1 over DCF1 in the absence of earnings management can be generalized to a much larger number of unmatched Normal firms. The fact that RIM1 enjoys an accuracy advantage over DCF1 in the Normal group, but not in the Suspect group, is consistent with the notion that the difference in mean absolute percentage-valuation error between these two models is smaller for firms suspected to have managed earnings (H1b).[23]

For all three subsamples, the univariate (two-sided) tests of H2 indicate that DCF2 on average has a statistically similar mean absolute percentage-valuation error as RIM2, with or without the presence of earnings management (see Columns 2a-2b, Panels B1, B2 and B3).[24] It follows that the support for the prediction of Hypothesis H2 appears invariant to our use of a matching procedure in the main analysis. In particular, earnings management does not affect the relative performance of earnings- and non earnings-based valuation models for a much broadly defined set of Normal firms when both models use analyst long-term price forecasts, as opposed to short-term earnings forecasts, as model inputs.

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[23] We cannot formally test this prediction, nor can we calculate the associated significance levels, due to differences in sample sizes across Suspect and Normal firms.

[24] The univariate pricing-error results are qualitatively similar.

7. Conclusion

This objective of this study is to examine the effect of earnings management on the performance of earnings-based valuation methods (namely, RIM) relative to non-earnings-based valuation (DCF). Previous studies have consistently found that earnings-based models generate more accurate valuation estimates than those based on cash flows, but the quality of the earnings that constitute the input for the model may affect this superiority.

We match a sample of 388 firms which are suspected of earnings management in the previous year, with a sample of non-suspect firms and compare the difference in valuation model performance between the two type of firms and find that the superiority of RIM measured on the Normal firms is significantly reduced in the Suspect sample, when the valuation is done employing only short-term analyst forecasts of cash flows and earnings as proxies for market expectations.

The use of analyst forecasts in the valuation models poses a problem, however. Several studies have shown that analysts do not seem to fully recognize earnings management but recent examination of their forecasts in the presence of earnings management suggest that they act strategically by forecasting managed earnings in order to minimize their forecast errors and protect their reputation. This could explain the decrease we find in the relative accuracy of RIM when we move from Normal to Suspect firms.

When we include both short-term and long-term analyst forecasts in the valuation models, however, we no longer find any differences in performance between DCF and RIM. We interpret this result as indicating that analysts recognise at least part of the negative effect of earnings management on firm value and reflect this in their long-term estimates.

The results from our study are of potential practical relevance. They may help to raise awareness among investors and practitioners about the pitfalls of taking managed earnings at face value and using them directly in firm valuation.

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Table 1.
Sample Selection and Distributions by Year and Industry

Sample Period: 1990-2000
Suspect Group: Loss or Earnings-Decline Avoiders

Panel A: Sample Selection

	Valuation Benchmarks	
	(1). Current Stock Price	**(2). *Ex Post* Intrinsic Value**
Number of earnings announcements (1990-2000)	39,826	39,826
Less: Filter 1. Missing VL forecasts and historical data for t0	(32,636)	(32,636)
Less: Filter 2. Missing financial/stock data and extreme values	(1,409)	(1,409)
Sub-total	5,781	5,781
Less: Filter 3. Missing data to construct regression variables &	(68)	(68)
deleting top and bottom 1% of each regression variable	(590)	(569)
Final sample before matching	5,123	5,144
"Suspect" sub-sample	420	416
"Normal" sub-sample	4,703	4,728
Matched "Normal" sample based on industry, year and firm size		
Number of "Suspect" sample	388	384
Number of matched "Normal" sample	388	384

Panel B: Sample Distribution by Year

	Valuation Benchmarks			
	(1). Current Stock Price		**(2). *Ex Post* Intrinsic Value**	
Year	**No. of Firms**	**Percent**	**No. of Firms**	**Percent**
1990	78	10.1	76	9.9
1991	70	9.0	68	8.9
1992	88	11.3	90	11.7
1993	84	10.8	84	10.9
1994	50	6.4	50	6.5
1995	82	10.6	82	10.7
1996	84	10.8	80	10.4
1997	84	10.8	84	10.9
1998	86	11.1	86	11.2
1999	62	8.0	60	7.8
2000	8	1.0	8	1.0
Total	776	100.0	768	100.0

Panel C: **Sample Distribution by Industry**

	Valuation Benchmarks			
	(1). Current Stock Price		(2). *Ex Post* Intrinsic Value	
Industry	**No. of Firms**	**Percent**	**No. of Firms**	**Percent**
Food Production	26	3.4	26	3.4
Candy and Soda	8	1.0	8	1.0
Recreational Products	4	0.5	4	0.5
Entertainment	6	0.8	6	0.8
Printing and Publishing	0	0.0	20	2.6
Consumer Goods	0	0.0	34	4.4
Apparel	20	2.6	10	1.3
Health Care	36	4.6	6	0.8
Medical Equipment	10	1.3	30	3.9
Drugs	6	0.8	34	4.4
Chemicals	30	3.9	62	8.1
Rubber and Plastic Products	36	4.6	8	1.0
Textiles	62	8.0	2	0.3
Construction Materials	8	1.0	28	3.7
Steel Works, Etc.	2	0.3	10	1.3
Fabricated Products	26	3.4	2	0.3
Machinery	10	1.3	70	9.1
Electrical Equipment	2	0.3	22	2.9
Automobiles and Trucks	70	9.0	8	1.0
Aircraft	22	2.8	18	2.3
Precious Metals	8	1.0	8	1.0
Non-metallic Mining	20	2.6	4	0.5
Petroleum and Natural Gas	10	1.3	38	5.0
Utilities	6	0.8	12	1.6
Telecommunications	38	4.9	30	3.9
Personal Services	12	1.6	14	1.8
Business Services	30	3.9	48	6.3
Computers	14	1.8	16	2.1
Electronic Equipment	48	6.2	54	7.0
Measuring and Control Equipment	16	2.1	20	2.6
Business Supplies	54	7.0	32	4.2
Shipping Containers	20	2.6	8	1.0
Transportation	32	4.1	4	0.5
Wholesale	8	1.0	26	3.4
Retail	4	0.5	34	4.4
Restaurants, Hotel, Motel	26	3.4	12	1.6
Total	776	100.0	768	100.0

Table 2.
Summary Statistics Based on the Pricing-Error Sample

Sample Period: 1990-2000
Suspect Group: Loss or Earnings-Decline Avoiders

Panel A: Continuous Control Variables for the Overall Sample

Variables	N	1st Quartile	Mean	Median	3rd Quartile	Std Dev
BM	776	0.236	0.416	0.348	0.530	0.255
EV	776	0.223	5.770	0.630	2.636	20.606
ES	776	0.009	0.034	0.021	0.043	0.040
Std_ROE	776	0.036	0.148	0.069	0.120	0.310

Panel B: Means of Continuous Control Variables for the Suspect and Normal Subsamples

Variables	Suspect (N = 388)	Normal (N = 388)	Mean of Differences	*t-statistic*
BM	0.339	0.493	0.154	9.532***
EV	0.024	0.044	3.434	2.326**
ES	4.053	7.486	0.020	7.322***
Std_ROE	0.132	0.164	0.032	1.444

Panel C: Pearson Correlation Coefficients for the Overall Sample

	BM	***EV***	***ES***	***Std_ROE***	***DIFF1***	***DIFF2***
BM	1.000	0.077 0.032	-0.019 0.597	-0.081 0.023	0.104 0.004	0.270 < 0.000
EV		1.000	0.039 0.276	0.214 < 0.000	0.049 0.176	0.019 0.606
ES			1.000	0.153 < 0.000	0.105 0.004	0.101 0.005
Std_ROE				1.000	0.081 0.025	0.047 0.191
DIFF1					1.000	0.107 0.003

BM (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *EV* (earnings volatility) is calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

"*DIFF1*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM), where terminal value is calculated using a 2% constant growth rate;

"*DIFF2*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM), where terminal value is calculated using VL target price forecasts.

Summary statistics based on the valuation-error sample are qualitatively similar and hence not reported in a table.

***, **,* t-tests on the difference in means across valuation models, significant at the 1%, 5% and 10% levels, respectively (two-sided).

Table 3.
Main Results Based on Tests of Hypotheses H1a and H1b

Sample Period: 1990-2000
Suspect Group: Loss or Earnings-Decline Avoiders

Panel A: Univariate Tests Using a 2% Constant Growth Rate

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	388	388	388	776	384	384		768
DCF1	0.389	0.400	-0.011	0.395	0.569	0.488	0.081*	0.529
RIM1	0.350	0.404	-0.055***	0.377	0.512	0.467	0.045	0.490
DCF1–RIM1	0.040***	-0.004	0.044***	0.018***	0.057***	0.021**	0.036**	0.039***

Panel B: Multivariate Tests Using a 2% Constant Growth Rate

Model: $DIFF1 = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE$

		Valuation Benchmarks			
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	Sign	Coefficient Est.	t-Statistics	Coefficient Est.	t-Statistics
Intercept	+	-0.0127	-0.71	0.0367	1.54*
SUSPECT	–	-0.0259	-1.90**	-0.0307	-1.72**
BM		0.0607	2.33***	0.0295	0.86
EV		0.0002	0.49	-0.0002	-0.47
ES		0.3404	2.09**	-0.0273	-0.13
Std_ROE		0.0389	1.85**	0.0506	1.74**
Ajusted R2		0.0264		0.0043	
N		776		768	

Ex post intrinsic value in Column 2 of both panels = the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

In Panels A-B, absolute percentage-prediction errors for each firm-year observation under RIM1 (or DCF1) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (1) (or Equation (2)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel B, "*DIFF1*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM), where terminal value is calculated using a 2% constant growth rate; "*SUSPECT*" is set equal to one if firms are suspected to have managed their reported earnings, and zero otherwise; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *EV* (earnings volatility) is calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

***, **,* Significant at the 1%, 5% and 10% levels, respectively (one-sided).

Table 4.
Main Results Based on Tests of Hypothesis H2

Sample Period: 1990-2000
Suspect Group: Loss or Earnings-Decline Avoiders

Panel A: Univariate Tests Using Price-Based Terminal Values

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	388	388	388	776	384	384	384	768
DCF2	0.235	0.184	0.051***	0.210	0.721	0.659	0.062	0.690
RIM2	0.235	0.184	0.051***	0.209	0.720	0.659	0.061	0.690
DCF2–RIM2	0.000***	0.000	0.000***	0.000**	0.000***	0.000***	0.000**	0.000***

Panel B: Multivariate Tests Using Price-Based Terminal Values

Model: $DIFF2 = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE$

		Valuation Benchmarks			
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	Sign	Coefficient Est.	t-Statistics	Coefficient Est.	t-Statistics
Intercept	ns	-0.0004	-3.75***	0.0000	-0.09
SUSPECT	ns	0.0000	-0.31	-0.0001	-0.76
BM		0.0010	7.52***	0.0008***	3.91***
EV		0.0000	-0.56	0.0000	0.28
ES		0.0023	2.65***	-0.0008	-0.65
Std_ROE		0.0002	1.63**	0.0002*	1.37*
Ajusted R2		0.0817		0.0215	
N		776		768	

Ex post intrinsic value in Column 2 of both panels = the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

In Panels A-B, absolute percentage-prediction errors for each firm-year observation under RIM2 (or DCF2) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (3) (or Equation (4)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel B, "*DIFF2*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM) where terminal value is calculated using VL target price forecasts; "*SUSPECT*" is set equal to one if firms are suspected to have managed their reported earnings, and zero otherwise; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *EV* (earnings volatility) is calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

***, **,* Significant at the 1%, 5% and 10% levels, respectively (two-sided).

Table 5.
Further Analysis Based on Alternative Definitions of Constant Growth Rate

Sample Period: 1990-2000
Suspect Group: Loss or Earnings-Decline Avoiders

Panel A: Univariate Tests of Hypotheses H1a-H1b Using a 4% Constant Growth Rate

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	386	386	386	772	385	385	385	770
DCF3	0.417	0.360	0.058***	0.389	0.654	0.526	0.129**	0.590
RIM3	0.342	0.374	-0.032***	0.358	0.534	0.483	0.052	0.508
DCF3–RIM3	0.076***	-0.014*	0.090***	0.031***	0.120***	0.043***	0.077***	0.082***

Panel B. Multivariate Tests of Hypotheses H1a-H1b Using a 4% Constant Growth Rate

Model: $DIFF3 = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE$

	Valuation Benchmarks				
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	Sign	Coefficient Est.	t-Statistics	Coefficient Est.	t-Statistics
Intercept	+	-0.0216	-0.86	0.0351	0.94
SUSPECT	–	-0.0602	-3.17***	-0.0537	-1.91**
BM		0.1741	4.69***	0.1870	3.44***
EV		-0.0001	-0.28	-0.0005	-0.73
ES		0.1856	0.81	-0.2961	-0.87
Std_ROE		0.0349	1.27	0.0567	1.34*
Ajusted R2		0.0544		0.0232	
N		772		770	

Ex post intrinsic value in Column 2 of both panels = the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

In Panels A-B, absolute percentage-prediction errors for each firm-year observation under RIM1 (or DCF1) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (1) (or Equation (2)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel B, "*DIFF3*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM) where terminal value is calculated using a 4% constant growth rate; "*SUSPECT*" is set equal to one if firms are suspected to have managed their reported earnings, and zero otherwise; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *EV* (earnings volatility) is calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

***, **,* Significant at the 1%, 5% and 10% levels, respectively (one-sided).

Table 6.
Further Analysis Based on Earnings-Decline Avoidance Earnings Threshold

Sample Period: 1990-2000

Panel A: **Univariate Tests of Hypotheses H1a-H1b Using a 2% Constant Growth Rate**

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	322	322	322	644	318	318	318	636
DCF1	0.378	0.384	-0.006	0.381	0.566	0.467	0.099**	0.517
RIM1	0.352	0.393	-0.041***	0.373	0.524	0.452	0.072	0.488
DCF1–RIM1	0.026***	-0.009	0.035***	0.009*	0.042***	0.015**	0.026	0.029***

Panel B: **Multivariate Tests of Hypotheses H1a-H1b Using a 2% Constant Growth Rate**
Model: $DIFF1 = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE$

		Valuation Benchmarks			
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	Sign	Coefficient Est.	t-Statistics	Coefficient Est.	t-Statistics
Intercept	+	-0.0156	-0.78	0.0386	1.44*
SUSPECT	–	-0.0170	-1.14	-0.0269	-1.34*
BM		0.0386	1.36*	0.0151	0.40
EV		-0.0003	-0.79	-0.0002	-0.44
ES		0.4712	2.52***	-0.1611	-0.63
Std_ROE		0.0295	1.36*	0.0258	0.82
Ajusted R2		0.0186		-0.0024	
N		644		636	

Panel C: **Univariate Tests of Hypothesis H2 Using Price-Based Terminal Values**

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	322	322	386	644	318	318	318	636
DCF2	0.224	0.173	0.051***	0.199	0.708	0.629	0.080	0.668
RIM2	0.224	0.173	0.051***	0.198	0.708	0.628	0.080	0.668
DCF2–RIM2	0.000***	0.000	0.000***	0.000***	0.000***	0.000**	0.000***	0.000***

Table 6.
Further Analysis Based on Earnings-Decline Avoidance Earnings Threshold

Panel D: Multivariate Tests of Hypothesis H2 Using Price-Based Terminal Values

Model: *DIFF2* = $a_0 + a_1$*SUSPECT* + a_2*BM* + a_3*EV* + a_4*ES* + a_5*Std_ROE*

		Valuation Benchmarks			
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	**Sign**	**Coefficient Est.**	**t-Statistics**	**Coefficient Est.**	**t-Statistics**
Intercept	ns	-0.0003	-2.97***	-0.0001	-0.43
SUSPECT	ns	0.0000	-0.50	-0.0001	-0.92
BM		0.0010	6.42***	0.0008	3.64***
EV		0.0000	-0.35	0.0000	1.50*
ES		0.0028	2.76***	0.0000	0.01
Std_ROE		0.0001	1.07	0.0001	0.56
Ajusted R2		0.0799		0.0286	
N		644		636	

Ex post intrinsic value in Column 2 of all four panels = the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

In Panel A, the absolute percentage-prediction errors for each firm-year observation under RIM1 (or DCF1) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (1) (or Equation (2)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel B, "*DIFF1*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM) where terminal value is calculated using a 2% constant growth rate.

In Panel C, the absolute percentage-prediction errors for each firm-year observation under RIM2 (or DCF2) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (3) (or Equation (4)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel D, "*DIFF2*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM) where terminal value is calculated using VL target price forecasts.

In Panels B and D, "*SUSPECT*" is set equal to one if firms are suspected to have managed their reported earnings, and zero otherwise; *BM* (nook-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *EV* (earnings volatility) is calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

***, **,* Significant at the 1%, 5% and 10% levels, respectively (one-sided in Panels A-B and two-sided in Panels C-D).

Table 7.
Further Analysis Based on Loss-Avoidance Earnings Threshold

Sample Period: 1990-2000

Panel A: **Univariate Tests of Hypotheses H1a and H1b Using 2% Constant Growth Rate**

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	73	73	73	146	72	72	72	144
DCF1	0.462	0.480	-0.018	0.471	0.579	0.586	-0.006	0.583
RIM1	0.366	0.457	-0.091***	0.411	0.463	0.549	-0.086	0.506***
DCF1–RIM1	0.096***	0.023	0.073***	0.060***	0.117***	0.037*	0.080*	0.077

Panel B: **Multivariate Tests of Hypotheses H1a and H1b Using 2% Constant Growth Rate**

Model: $DIFF1 = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE$

		Valuation Benchmarks			
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	Sign	Coefficient Est.	t-Statistics	Coefficient Est.	t-Statistics
Intercept	+	0.0231	0.53	0.0523	0.96
SUSPECT	–	-0.0637	-1.84**	-0.0758	-1.86**
BM		0.1298	2.04**	0.0938	1.15
EV		0.0008	1.40*	-0.0004	-0.47
ES		-0.2312	-0.61	-0.0832	-0.19
Std_ROE		0.0616	1.34*	0.1450	1.90**
Ajusted R2		0.0516		0.0231	
N		146		144	

Panel C: **Univariate Tests of Hypothesis H2 Using Price-Based Terminal Values**

	Valuation Benchmarks							
	(1). Current Stock Price				(2). Ex Post Intrinsic Value			
	(1a). Normal	(1b). Suspect	(1c). = (1a)–(1b)	(1d). Sample	(2a). Normal	(2b). Suspect	(2c). = (2a)–(2b)	(2d). Sample
N	73	73	73	146	72	72	72	144
DCF2	0.264	0.241	0.024	0.252	0.731	0.826	-0.095	0.778
RIM2	0.264	0.240	0.024	0.252	0.730	0.825	-0.095	0.778
DCF2–RIM2	0.000**	0.000	0.000	0.000**	0.001***	0.001**	0.000	0.001***

Table 7.
Further Analysis Based on Loss-Avoidance Earnings Threshold

Panel D: **Multivariate Tests of Hypotheses H2 Using Price-Based Terminal Values**
Model: $DIFF2 = a_0 + a_1 SUSPECT + a_2 BM + a_3 EV + a_4 ES + a_5 Std\_ROE$

		Valuation Benchmarks			
	Predicted	(1). Current Stock Price		(2). Ex Post Intrinsic Value	
Variables	**Sign**	**Coefficient Est.**	**t-Statistics**	**Coefficient Est.**	**t-Statistics**
Intercept	ns	-0.0006	-2.77***	0.0002	0.41
SUSPECT	ns	0.0000	-0.06	0.0000	0.16
BM		0.0013	4.25***	0.0009	1.55*
EV		0.0000	-0.45	0.0000	-1.04
ES		0.0025	1.35*	-0.0033	-1.03
Std_ROE		0.0003	1.54*	0.0007	1.25
Ajusted R2		0.1015		0.0021	
N		146		144	

Ex post intrinsic value in Column 2 of all four panels = the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

In Panels A-B, absolute percentage-prediction errors for each firm-year observation under RIM1 (or DCF1) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (1) (or Equation (2)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel B, "*DIFF1*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM) where terminal value is calculated using a 2% constant growth rate.

In Panels C-D, absolute percentage-prediction errors for each firm-year observation under RIM2 (or DCF2) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (3) (or Equation (4)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panel D, "*DIFF2*" is defined as the difference in absolute percentage-prediction errors for each combination of firm-year observation and valuation model, i.e., (APE_DCF – APE_RIM) where terminal value is calculated using VL target price forecasts.

In Panels B and D, "*SUSPECT*" is set equal to one if firms are suspected to have managed their reported earnings, and zero otherwise; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *EV* (earnings volatility) is calculated as the variance of EPS changes over a 5-year period immediately preceding the annual report date; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

***, **,* Significant at the 1%, 5% and 10% levels, respectively (one-sided in Panels A-B; two-sided in Panels C-D).

Table 8.
Further Univariate Analysis Based on Alternative Definitions of Normal Firms

Sample Period: 1990-2000
Normal Firms: Not matched against Suspect firms.

Panel A: **Tests of Hypotheses H1a-H1b Using 2% Constant Growth Rate**

Panel A1: Suspect Group = Loss or Earnings-Decline Avoiders

	Valuation Benchmarks					
	(1). Current Stock Price			**(2). Ex Post Intrinsic Value**		
	Normal	**Suspect**	**Sample**	**Normal**	**Suspect**	**Sample**
N	5,303	478	5,781	5,303	478	5,781
DCF1	0.391	0.410	0.392	0.822	0.503	0.795
RIM1	0.337	0.409	0.343	0.734	0.489	0.714
DCF1–RIM1	0.054***	0.001	0.050***	0.087**	0.014	0.081**

Panel A2: Suspect Group = Earnings-Decline Avoiders

	Valuation Benchmarks					
	(1). Current Stock Price			**(2). Ex Post Intrinsic Value**		
	Normal	**Suspect**	**Sample**	**Normal**	**Suspect**	**Sample**
N	5,380	401	5,781	5,380	401	5,781
DCF1	0.392	0.393	0.392	0.819	0.482	0.795
RIM1	0.339	0.398	0.343	0.732	0.471	0.714
DCF1–RIM1	0.054***	-0.005	0.050***	0.087**	0.012	0.081**

Panel A3: Suspect Group = Loss Avoiders

	Valuation Benchmarks					
	(1). Current Stock Price			**(2). Ex Post Intrinsic Value**		
	Normal	**Suspect**	**Sample**	**Normal**	**Suspect**	**Sample**
N	5,698	83	5,781	5,698	83	5,781
DCF1	0.391	0.509	0.392	0.798	0.613	0.795
RIM1	0.341	0.471	0.343	0.716	0.579	0.714
DCF1–RIM1	0.050***	0.038*	0.050***	0.082**	0.035	0.081**

Table 8.
Further Univariate Analysis Based on Alternative Definitions of Normal Firms

Panel B: Tests of Hypothesis H2 Using Price-Based Terminal Values

Panel B1: Suspect Group = Loss or Earnings-Decline Avoiders

	Valuation Benchmarks					
	(1). Current Stock Price			(2). Ex Post Intrinsic Value		
	Normal	**Suspect**	**Sample**	**Normal**	**Suspect**	**Sample**
N	5,303	478	5,781	5,303	478	5,781
DCF2	0.236	0.184	0.232	0.954	0.706	0.933
RIM2	0.236	0.184	0.232	0.954	0.706	0.933
DCF2–RIM2	0.000***	0.000	0.000***	0.000	0.000	0.000

Panel B2: Suspect Group = Earnings-Decline Avoiders

	Valuation Benchmarks					
	(1). Current Stock Price			(2). Ex Post Intrinsic Value		
	Normal	**Suspect**	**Sample**	**Normal**	**Suspect**	**Sample**
N	5,380	401	5,781	5,380	401	5,781
DCF2	0.236	0.176	0.232	0.953	0.673	0.933
RIM2	0.236	0.176	0.232	0.953	0.673	0.933
DCF2–RIM2	0.000***	0.000	0.000***	0.000	0.000	0.000

Panel B3: Suspect Group = Loss Avoiders

	Valuation Benchmarks					
	(1). Current Stock Price			(2). Ex Post Intrinsic Value		
	Normal	**Suspect**	**Sample**	**Normal**	**Suspect**	**Sample**
N	5,698	83	5,781	5,698	83	5,781
DCF2	0.232	0.233	0.232	0.933	0.918	0.933
RIM2	0.232	0.232	0.232	0.933	0.918	0.933
DCF2–RIM2	0.000***	0.000	0.000***	0.000	0.000	0.000

Ex post intrinsic value in Column 2 of both panels = the sum of future dividends over a three-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

In Panels A1-A3, absolute percentage-prediction errors for each firm-year observation under RIM1 (or DCF1) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (1) (or Equation (2)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

In Panels B1-B3, absolute percentage-prediction errors for each firm-year observation under RIM2 (or DCF2) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (3) (or Equation (4)) and the chosen valuation benchmark (i.e., current stock price or *ex post* IV measure), scaled by the latter.

***, **,* t-tests on the difference in means across valuation models, significant at the 1%, 5% and 10% levels, respectively (one-sided in Panels A1-A3; two-sided in Panels B1-B3).