Earnings, Cash Flows, and Ex Post Intrinsic Value of Equity

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ABSTRACT: We reexamine the relative importance of earnings and operating cash flows in equity valuation. In contrast to previous studies that use stock returns (Dechow 1994) or future operating cash flows (Barth et al. 2001), we use ex post intrinsic value of equity as the criterion for comparison. We determine ex post intrinsic value of equity by discounting future dividends over a three-year horizon and market price at the end of the horizon by industry cost of equity. The advantage of the ex post intrinsic value measure over stock returns is that it is not contaminated by the stock market’s fixation on reported earnings (Sloan 1996). Also, unlike finite horizon future operating cash flows, ex post intrinsic values better reflect the magnitude, timing, and uncertainty of investors’ future cash flows (SFAC No. 1, FASB 1978). Our results suggest that accrual-based earnings dominate operating cash flows as a summary indicator of ex post intrinsic value.

Keywords: earnings; cash flows; value relevance; intrinsic value; deflator.

Data Availability: All data used in the study are available from public sources.

I. INTRODUCTION

A fundamental question in accounting is the relative ability of accrual-based earnings and cash flows to predict a firm’s ability to generate future cash flows. However, despite extensive research, the relative superiority of cash flows versus earnings as summary predictors of future cash flows remains largely unresolved.1 We contribute to this important debate by examining the relative ability of earnings and cash flows in explaining ex post intrinsic value of equity. We determine ex post intrinsic values using the dividend

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1 It is less controversial that both accruals and operating cash flows provide incremental information beyond each other. For example, both accruals and operating cash flows have incremental information content in explaining stock returns (Rayburn 1986; Bowen et al. 1987; Ali 1994) and future operating cash flows (Barth et al. 2001; Burgstahler et al. 1999).

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discount model. As inputs to the model we use ex post (future) dividends over a three-year horizon and market value at the end of the forecast horizon as terminal value and discount these payoffs using industry cost of equity. Our ex post intrinsic value approach overcomes limitations with extant methods using stock price/returns (e.g., Dechow 1994) or future operating cash flows (e.g., Barth et al. 2001). Consistent with FASB’s claim (SFAC No. 1, FASB 1978, para. 44), we show that accrual-based earnings dominate operating cash flows in explaining ex post intrinsic value.

Prior research adopts two different approaches to investigate the relative importance of earnings and cash flows for equity valuation. Several studies examine the relative ability of earnings and cash flows in predicting future operating cash flows over finite horizons (often just one year). While some of the earlier studies under this genre (Greenberg et al. 1986; Bowen et al. 1986) document mixed results, recent studies (e.g., Barth et al. 2001; Burgstahler et al. 1999) unambiguously document the superiority of operating cash flows over earnings in predicting future operating cash flows over varying horizons. However, the use of a finite set of operating cash flows as a surrogate for firm value (i.e., investors’ future cash realizations) has certain limitations. Operating cash flows are not value attributes because they ignore investments in operating assets—the appropriate value attribute is free cash flows (Copeland et al. 2000). More importantly, a finite set of future cash flows does not capture a large proportion of the firm’s intrinsic value that is represented by the terminal value (Palepu et al. 2000).

Another set of studies (e.g., Dechow 1994) examine the ability of stock price as a proxy for fundamental equity value and document that earnings are superior to cash flows in explaining contemporaneous stock prices or returns. An implicit assumption in such studies is that stock prices accurately reflect future-cash-flow information contained in current earnings and current operating cash flows. However, evidence in Sloan (1996) suggests that stock market participants appear to fixate on current earnings without considering the differential persistence of its accrual and cash flow components. Thus, it is not clear whether the superior explanatory power of earnings (vis-à-vis cash flows) for returns arises because of the ability of earnings to better reflect value-relevant information or because of the stock market’s fixation on bottom line earnings.

We adopt a different approach to examine this important question. Specifically, we examine the relative ability of earnings and cash flows in explaining ex post intrinsic values. We measure ex post intrinsic value by using the dividend discount model. Since the purpose of our study is to evaluate the predictive ability of earnings and cash flows, we use ex post realizations of dividends as inputs to the valuation models (e.g., Penman and Sougiannis 1998) rather than their ex ante expectations (e.g., Francis et al. 2000). Using ex ante expectations such as analyst forecasts to determine intrinsic value may not be appropriate because analysts also appear to fixate on current earnings (Bradshaw et al. 2001). To capture payoffs beyond the three-year horizon, we estimate terminal value using market value at

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2 The primary thrust of Barth et al. (2001) is to show that components of earnings are informative in predicting future operating cash flows. However, they report that “Similar to Burgstahler et al. (1998), for our large sample of firms we find that current cash flow has more predictive ability for future cash flows than current aggregate earnings. However, we leave to future research clear resolution of the mixed findings of prior research.”

3 Both Barth et al. (2001) and Burgstahler et al. (1999) examine the ability of earnings and cash flows in predicting discounted ex post operating cash flows. Additionally, Barth et al. (2001) also estimate terminal values by extrapolating terminal cash flows at an assumed growth rate. However, their discounted measures are not indicative of intrinsic value for two reasons. First, they discount operating cash flows and not free cash flows, and, hence, ignore investments. Second, their terminal value measures are mere extrapolations of the terminal operating cash flows. Thus, their terminal values do not add any new information beyond that already present in the finite stream of ex post cash flows.
the end of the horizon. Since the anomalous pricing of the accrual and cash flow components of earnings does not persist beyond two years (Sloan 1996; Xie 2001), the intrinsic value measure—unlike current returns or stock price—are unlikely to be biased by market mispricing (see Aboody et al. 2002). Furthermore, unlike examining a finite set of future cash flows, ex post intrinsic values accurately measure the future cash flow realizations of investors. Thus, the ex post intrinsic value methodology overcomes inference problems associated with both the future-operating-cash-flows and stock-price/returns methodologies.

We conduct our analysis using data available post-1987 in the Compustat database for which ex post intrinsic values can be determined. We use both undeflated and deflated (using shares outstanding and total assets as alternative deflators) specifications to examine the relation between earnings, operating cash flows and intrinsic value. Results from undeflated and shares outstanding-deflated (per-share) specifications unambiguously document the superiority of earnings over operating cash flows in explaining ex post intrinsic values. Specifically, $R^2$s from models with earnings as the independent variable are significantly higher than $R^2$s from models with cash flows as the independent variable. However, total-assets-deflated results present inference problems because coefficient estimates for the relation between intrinsic values (or market values) and both earnings and cash flows are negative. The anomalous negative coefficients arise because of the large proportion of negative earnings/operating cash flows in our sample. We address this problem by replicating our analyses on a subsample of firms with only positive realizations of earnings and operating cash flows. Results from this subsample suggest that current earnings dominate operating cash flows in explaining ex post intrinsic values.

While the ex post intrinsic-value method clearly addresses problems with the future-operating-cash-flows-prediction approach, it is less obvious whether our methodology is able to differentiate and overcome problems associated with using contemporaneous stock price/returns as the prediction criterion. For example, the estimated intrinsic value measures are significantly correlated with current market values. Consequently, it is not certain that ex post intrinsic values are uncontaminated by mispricing of current accruals and operating cash flows, since we use three-year-ahead stock price for determining terminal values. Therefore, we conduct additional analyses to ensure that our results are not contaminated by accruals’ mispricing and that our approach is distinct from the stock-returns’ approach. Specifically, we show that our results hold in the third of the sample with the largest deviations between market value and intrinsic value. We also show that for firms with extreme accruals, i.e., where accruals mispricing is most likely, the extent to which earnings dominates cash flows is substantially lower when intrinsic value is the dependent variable than when market value is the dependent variable, suggesting that the bias in stock prices arising from mispricing of accruals is largely ameliorated when intrinsic values are used.

Our study makes the following contributions to the literature. First, we provide further evidence on an important question that has remained unresolved in the prior literature. We show that, consistent with FASB’s claim, earnings are superior predictors of investors’ future cash flow realizations than are operating cash flows. Second, several researchers have used and continue to use a finite set of future operating cash flows as proxies for future cash flow expectations of investors (e.g., Barth et al. 2001; Kim and Kross 2005). We argue that

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4 The anomalous negative relationship is present for our deflated specifications even when we use stock prices as our dependent variable. The reason for these anomalous results is as follows. Note that the relation between negative earnings and price is anomalous and negative (e.g., Jan and Ou 1995; Collins et al. 1999). Deflation induces firms with negative earnings or cash flows to assume large weights in the regression, which results in negative coefficients for the entire sample (of both positive and negative earnings). We provide a detailed technical discussion of this issue in the Appendix.
drawing inferences from using such a finite horizon of future payoffs can be problematic, and propose an alternative method—using \textit{ex post} intrinsic values—that is theoretically and operationally superior.\textsuperscript{5} Third, our method is immune to short-term mispricing by the stock markets that could contaminate tests based on contemporaneous stock price/returns (also see Aboody et al. 2002). Finally, our study makes an important methodological contribution with respect to deflation. Prior research (e.g., Easton 1998; Brown et al. 1999) suggests deflation as a potential remedy to scale bias inherent in levels regressions. We show that deflation \textit{per se} can introduce coefficient bias in price-earnings regressions especially when a significant proportion of negative earnings observations is present.

The paper proceeds as follows. In the next section, we outline the debate on the relative importance on earnings and cash flows and motivate our \textit{ex post} intrinsic value approach. Section III describes the measurement of variables and the sample. Section IV presents findings from preliminary analyses and Section V presents our main findings using \textit{ex post} intrinsic value measures. In Section VI we conduct several additional analyses to differentiate our results from that using stock prices/returns. Section VII concludes.

\section*{II. MOTIVATION}
\textbf{The Cash Flows versus Earnings Debate}

The accrual concept forms the cornerstone of modern accounting. Accounting standard-setters maintain the superiority of accrual-based earnings over cash flows, as a \textit{summary} indicator of the firm’s financial performance. For example, the FASB’s Statement of Accounting Concepts (SFAC) No. 1 (FASB 1978, para. 44) asserts: “Information about an enterprise’s earnings based on accrual accounting generally provides a better indication of enterprise’s present and continuing ability to generate favorable cash flows than information limited to the financial aspects of cash receipts and payments.” Accrual-based earnings is hypothesized to overcome both timing and mismatching problems inherent in cash flows, thus making it a more relevant summary indicator of a firm’s value and financial performance (Dechow 1994). However, accruals are also fraught with measurement error due to the assumptions underlying the determination of accruals and the discretion allowed under Generally Accepted Accounting Principles (GAAP). This often evokes strong criticism and suspicion from many economists and financial analysts on the relevance of earnings for valuation (e.g., Copeland et al. 2000). Given this debate, one of the most important questions in accounting and financial analysis is the role of accruals in generating a summary indicator of firm value or performance. As Schipper (1989) observes: “one of the central questions confronted by practicing professional accountants and academic accountants [is] the influence and importance of accounting accruals in arriving at a summary measure of financial performance.” Our paper is an attempt to offer evidence pertinent to this important question.

Several studies directly test FASB’s assertion regarding accrual accounting’s superiority by examining the relative abilities of earnings and operating cash flows for predicting a firm’s future operating cash flows. While some of the earlier studies (Greenberg et al. 1986; Bowen et al. 1986) document mixed results, recent studies (for example, Barth et al. 2001; 5 For example, we show that inferences regarding the superiority of earnings versus cash flows reverse depending on whether future operating cash flows or future earnings is the predictive criterion. To further buttress our argument, we also reexamine the results of Kim and Kross (2005) and find (results not reported) that the temporal increase in earnings’ correlation with one-period ahead operating cash flows that they document reverses when intrinsic values are used as the predictive criterion. Results of this analysis are available from the authors upon request.
Burgstahler et al. 1999) use a more accurate measure of operating cash flows (direct operating cash flow measures under SFAS No. 95) over much larger samples and unambiguously document the superiority of operating cash flows over earnings in predicting future operating cash flows.

The motivation for using future operating cash flows as the predictive criterion arises from the primary objective of financial reporting, which is the prediction of the magnitude, timing, and uncertainty of prospective future cash flows (SFAC No. 1, FASB 1978, para. 37). However, the use of short-horizon future operating cash flows as the predictive criterion is problematic for several reasons. First, according to FASB, the primary objective of financial reporting is the prediction of future cash receipts to users of accounting information. The prediction of the firms’ cash flows assumes importance only because users’ cash inflows are related to the firms’ ability to generate cash (FASB 1978, para. 37). 6 From the perspective of equity investors, for example, the overarching objective of financial reporting is to provide information that helps them determine the present value of all future cash receipts from their investments in firms’ equity—i.e., dividends and proceeds from sale of stock—which is parsimoniously represented by the intrinsic value of the firm’s equity. Second, while operating cash flows may be correlated with intrinsic value, there are at least two reasons why a finite set of future operating cash flows is an inappropriate substitute for the firms’ intrinsic value. First, a finite set of future cash flows measures only a small portion of a firm’s intrinsic value. A significant fraction of firm value is determined by the terminal value even when the forecast horizon is as long as ten years (Palepu et al. 2000; Copeland et al. 2000). Second, operating cash flows are not value attributes. This is because operating cash flows ignore investments in operating assets; the appropriate value attribute is free cash flows (Copeland et al. 2000). Finally, as we show later in this paper, inferences reverse when the predictive criterion is switched to future earnings. That is, earnings outperform operating cash flows in predicting future earnings. Since neither future earnings nor future operating cash flows are strictly value attributes—but both have been used in extant research as ad hoc predictive criteria—the contradictory results make it difficult to draw unambiguous inferences regarding the relative superiority of earnings and cash flows in predicting investors’ future cash flows.7

An alternative approach to examining the relative superiority of earnings versus cash flows is through the use of stock prices (returns) to proxy for investors’ expectations about future cash flows. For example, Dechow (1994) documents that accrual-based earnings are superior to cash flows in explaining cross-sectional variation in stock returns over various horizons. Stock prices are estimates of intrinsic value and therefore parsimoniously aggregate investors’ future cash flow expectations. Therefore, the stock-price (returns) approach is free of problems that arise when examining the association with finite-horizon future

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6 That the prediction of cash flows to the enterprise is derived from the more fundamental objective of prediction of cash flows to the investors (or creditors) is evident from paragraph 37 of FASB’s Statement of Financial Accounting Concepts (SFAC) No. 1, which states: “Financial reporting should provide information to help present and potential investors and creditors and other users in assessing the amounts, timing, and uncertainty of prospective cash receipts from dividends or interest and the sale, redemption, or maturity of securities or loans. The prospect for those cash receipts are affected by an enterprise’s ability to generate enough cash to meet its obligations when due and its other cash operating needs, to reinvest in operations, and to pay cash dividends and may also be affected by perceptions of investors and creditors generally about that ability, which affect market prices of the enterprise’s securities. Thus financial accounting should provide information to help investors, creditors and others assess the amounts, timing and uncertainty of prospective cash inflows to the related enterprise” (FASB 1978, para. 37).

7 Barth et al. (2001) and Kim and Kross (2005) are examples of papers that use future operating cash flows, while Ou and Penman (1989) and Dhaliwal et al. (1999) are examples of papers that use future earnings.
operating cash flows. A maintained assumption under this approach is that the stock market is efficient and appropriately incorporates the economic implications of accrual and cash flow components of earnings. However, evidence in Sloan (1996) and Xie (2001) suggests that the stock market fixates on accounting earnings and, hence, fails to fully incorporate the differential future-cash-flow implications of the accrual and cash flow components of earnings. In light of this evidence, unambiguous inferences regarding the relative superiority of earnings versus cash flows in predicting future cash flows are not possible when using stock price (returns) as the predictive criterion.8

Dechow (1994) controls for possible market mispricing by also using an alternative returns measure that includes future returns to evaluate the relative importance of earnings and cash flows. However, she reports the future-returns’ analysis merely as a sensitivity test and much of the related discussion is relegated to a footnote in her paper (Dechow 1994, footnote 16). This sensitivity analysis has not been appreciated by subsequent researchers who continue to view the earnings/cash flows debate as largely unresolved. For example, Barth et al. (2001, 30) observe: “Prior research provides evidence that share prices fail to reflect accurately the differential persistence of accruals and cash flows ... this evidence calls into question the use of share prices as a proxy for expected future cash flows when examining the predictive ability of accruals and cash flows.”9

**Ex Post Intrinsic Value Approach**

We investigate the relative ability of the two summary measures, earnings and cash flows, in explaining **ex post** intrinsic value of equity. **Ex post** intrinsic value is the present value of all future payoffs to the equity investor. Specifically, it is measured as the present value of future three years of dividends and a terminal dividend captured by the stock price at the end of three years. The use of intrinsic values simultaneously overcomes problems inherent in using future operating cash flows or stock returns as the predictive criteria. By incorporating future dividends and stock price at the end of the horizon, the intrinsic value measure provides a more accurate measure of the users’ (investors’) future cash flow realization than a finite horizon of future operating cash flows. Using **ex post** market values rather than estimated terminal values has several advantages. First, **ex post** market values accurately portray the future payoffs to an investor. Second, **ex post** market value is devoid of **ad hoc** assumptions (such as terminal year payoffs and perpetual growth rates) that are necessary in estimating terminal values. Third, terminal values that extrapolate from the finite series of earnings (or cash flows) will suffer from the same limitations as the finite-horizon payoffs’ prediction models, since the terminal values are mere projections of the information contained in the finite payoffs.10 While it is possible that market prices at the end of the forecast horizon may be incorrectly priced, such mispricing is unlikely to

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8 Subsequent evidence in Thomas and Zhang (2002) and Desai et al. (2004) suggest that the accrual/cash flow mispricing identified by Sloan (1996) is unlikely due to functional fixation on earnings. However, as long as markets incorrectly price accruals and cash flows, irrespective of the underlying reason, use of stock price can lead to incorrect inferences.

9 Kim and Kross (2005, 754) also motivate the use of future operating cash flows by noting that share prices may be inefficient.

10 For example, Barth et al. (2001) also use discounted **ex post** operating cash flows in some of their tests, with terminal value computed by extrapolating terminal cash flows at an assumed growth rate. However, such an approach adds little beyond the use of finite future cash flows because the terminal value is a linear projection of information contained in the finite cash flows. Results presented in Table 2 provide support for this argument. Moreover, such an approach represents a significant departure from traditional valuation models that discount free cash flows as opposed to operating cash flows.
be associated with current period cash flows and earnings. This is because we use three-years-ahead market values and the anomaly identified by Sloan (1996) does not persist beyond two years.\footnote{We also conduct several additional tests that suggest that using intrinsic values reduce biases stemming from market mispricing of accruals. See Section VI.} In this manner, the ex post intrinsic value approach also overcomes limitations with the stock price/returns approach.

We need, however, to acknowledge certain limitations of the ex post intrinsic value approach. First, we need to caution that using intrinsic value as the predictive criterion is superior to that using future operating cash flows only from the perspective of the equity investor. Arguably, the equity investor constitutes the most important class of users of financial statements. However, as Holthausen and Watts (2001) point out, equity investors are not the only user group. For example, creditors are an important class of users and their information needs may differ from that of investors. Since intrinsic values mirror the cash receipts of investors, we do acknowledge that our results may not necessarily apply to information needs of other types of users. For example, current and future operating cash flows may be useful to creditors by providing information about default risk, in a manner that is independent of its ability to map into the intrinsic value of equity. Second, since we use three-year-ahead market value for the terminal value, a reader may argue that the ex post intrinsic value measure is not entirely independent of accruals’ mispricing. Finally, the intrinsic value approach is especially problematic when earnings and cash flows are negative. Because the valuation relation is unclear when the performance measures are negative, the relative superiority of earnings and cash flows can be examined only in the positive quadrants of the two performance measures.

III. METHODOLOGY, SAMPLE, AND DESCRIPTIVE STATISTICS

Intrinsic Value Measurement

To determine intrinsic value we use the fundamental valuation equation, the dividend discount model (DDM) originally proposed by Preinreich (1938). As Ohlson (1989) shows, assuming the no-arbitrage condition, we get the following identity:

$$P_t = \frac{d_{t+1}}{1 + \delta} + \frac{1}{1 + \delta}E(P_{t+1})$$

where $P_t$ is the stock price at time $t$, $d_{t+1}$ represents dividend at period $t+1$, $\delta$ is 1 plus the discount rate, and $E$ is the market expectation operator at time $t$. This expression represents the price of a stock for an investor with a one-period horizon. Iteratively substituting for forward prices, we obtain the following finite-horizon expression for price:

$$P^N_t = \sum_{i=1}^{N} \frac{d_{t+i}}{1 + \delta} + \frac{1}{1 + \delta}E(P_{t+N})$$

where $N$ is the number of years in the finite horizon. Note that the above finite-horizon expression can be extended to an infinite horizon to generate the popular dividend discount formulation.

To derive a measure of ex post intrinsic value we replace expected dividends and price in the finite period formulation by their respective ex post realizations:
IV_N = \sum_{i=1}^{N} \rho^{-i}(d_{i,t}) + \rho^{-N}(P_{t+N}).

(3)

As in Penman and Sougiannis (1998), we compute \textit{ex post} intrinsic values (IV) using a three-year horizon. Dividends are defined as the sum of common dividends (Compustat data item 21) and cash distributions from stock repurchases (change in Compustat data item 226). We compute dividends on a per-share basis using shares outstanding (Compustat data item 25) that are adjusted for stock splits and stock dividends. For stock prices we use fiscal-year-end stock price obtained from Compustat (data item 199). While our primary tests use a three-year horizon, we replicate all our analyses using a five-year horizon and find qualitatively similar results.

We estimate discount rates using the following industry cost of equity (see Francis et al. 2000):

\[ \rho - 1 = r_f + \beta[E(r_m) - r_f] \]

(4)

where \( r_f \) is a one-month treasury bill rate, and \( \beta \) is systematic risk for the industry to which a firm belongs. We compute industry betas by averaging firm-specific betas for all sample firms in each two-digit SIC codes. Firm-specific betas are calculated using daily returns data over fiscal year \( r-1 \). As with prior research (Francis et al. 2000; Copeland et al. 2000), we use 6 percent as the market risk premium \( E(r_m) - r_f \).

We acknowledge that estimating discount rates is susceptible to measurement error. Accordingly, in separate sensitivity analysis, we use the following alternative measures of discount rates: (1) firm-specific discount rates (rather than industry averages); (2) industry average discount rates measured with 3 percent market risk premium, instead of 6 percent; and (3) constant rates of 10 percent and 12 percent. Our results (not reported) are qualitatively similar using these alternative discount rates.

Sample and Descriptive Statistics

We compute intrinsic values for a sample of all available firms in the 2004 Compustat database for the period 1988–2000. We restrict the analysis to this time period for two reasons. First, operating cash flow measures using balance sheet information are known to suffer from significant measurement error (Hribar and Collins 2002). Therefore, we confine our analysis to firm-years starting from 1988 when SFAS No. 95 reported operating cash flow information became available. Second, at least three subsequent years of data are required to compute intrinsic values—this limits our sample to years 2000 and earlier. We delete all firm-years with negative book value of equity and delete firm-years where any of the key variables are in the extreme 1 percent of their respective distributions. Our final sample consists of 45,395 firm-year observations representing 7,840 distinct firms. Finally, our sample also includes the market downturn that occurred around 2000. As a sensitivity check we replicate our results excluding 2000 and find qualitatively similar results.

12 Since we use \textit{ex post} realizations of market value at the end of the forecast horizon, intrinsic value measures using alternative approaches such as the residual income model will be algebraically identical. However, empirical estimates will be different largely because of errors in measuring inputs to the models. For example, in determining the intrinsic value using the residual income model, measurement error in earnings arises because reported net income does not strictly adhere to clean surplus. As a sensitivity check, we also consider intrinsic values calculated using the residual income model and our inferences are unchanged.

13 Note that our sample sizes vary because of different deflators. While we have 45,395 observations for the undeflated specification, the Per-Share specification has 44,943 observations and the total-assets-deflated specification has 45,020 observations.
Table 1, Panel A provides descriptive information regarding the dependent and independent variables. For our empirical analysis we consider both undeflated and deflated (separately by shares outstanding [Compustat data item 25] and total assets [Compustat data item 6]) specifications. Hence, we report descriptive statistics in both undeflated and deflated forms. Earnings \((EARN)\) is defined as income before extraordinary items (Compustat data item 123). Operating cash flow \((OCF)\) is defined as net cash flow from operating activities (Compustat data item 308) obtained from the cash flow statement adjusted for extraordinary items and discontinued operations (Compustat data item 124). Table 1 reports that the mean and median \(EARN\) are lower than that of \(OCF\) in both deflated and undeflated forms mainly because of depreciation and amortization. We compute the undeflated market value of equity \((MKTV)\) as the fiscal year-end price per share (Compustat data item 199) multiplied by shares outstanding (Compustat data item 25). To be comparable, we convert

<table>
<thead>
<tr>
<th>Variable</th>
<th>Deflator</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>(OCF)</td>
<td>Un deflate ($ m)</td>
<td>84.85</td>
<td>6.51</td>
<td>255.12</td>
<td>5.52</td>
</tr>
<tr>
<td></td>
<td>Per-Share</td>
<td>1.43</td>
<td>0.79</td>
<td>2.10</td>
<td>1.64</td>
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<tr>
<td></td>
<td>Total Assets</td>
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<td>0.13</td>
<td>−1.92</td>
</tr>
<tr>
<td>(EARN)</td>
<td>Un deflated ($ m)</td>
<td>41.75</td>
<td>3.68</td>
<td>129.22</td>
<td>4.99</td>
</tr>
<tr>
<td></td>
<td>Per-Share</td>
<td>0.66</td>
<td>0.49</td>
<td>1.23</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>Total Assets</td>
<td>0.01</td>
<td>0.04</td>
<td>0.14</td>
<td>−2.78</td>
</tr>
<tr>
<td>(MKTV)</td>
<td>Un deflate ($ m)</td>
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<td>111.38</td>
<td>2404.48</td>
<td>5.41</td>
</tr>
<tr>
<td></td>
<td>Per-Share</td>
<td>16.15</td>
<td>11.50</td>
<td>15.03</td>
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</tr>
<tr>
<td></td>
<td>Total Assets</td>
<td>1.43</td>
<td>0.91</td>
<td>1.55</td>
<td>2.87</td>
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<tr>
<td>(IV)</td>
<td>Un deflated ($ m)</td>
<td>875.58</td>
<td>91.58</td>
<td>2508.34</td>
<td>5.62</td>
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<tr>
<td></td>
<td>Per-Share</td>
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<tr>
<td></td>
<td>Total Assets</td>
<td>1.37</td>
<td>0.76</td>
<td>1.81</td>
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</table>

Panel B: Pearson Correlation Statistics

<table>
<thead>
<tr>
<th>(Corr (MKTV, IV))</th>
<th>Un deflate</th>
<th>Per-Share</th>
<th>Deflated by Total Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.87</td>
<td>0.70</td>
<td>0.52</td>
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</table>

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14 Regressions using undeflated variables are well known to cause scale and heteroscedasticity problems (Easton and Sommers 2003). Because we compare the explanatory power between two regression specifications, any scale and heteroscedasticity effects apply to both equations and, hence, we argue that the relative bias should be minimal. Nonetheless, we consider several alternative deflators to ensure robustness of our findings. In addition to the reported Per-Share and total assets deflation we also consider deflation by book value and lagged market value and find that results are qualitatively similar to results obtained for the total assets deflation.
the per-share intrinsic values into dollar amounts by multiplying per-share intrinsic values with current shares outstanding (for the undeflated analysis). The mean of market value ($MKTV$) is similar to that of the intrinsic value ($IV$), while the medians of $MKTV$ are higher than those of the intrinsic values for all three deflators. Panel B presents correlations between market values and intrinsic values. While the market values and intrinsic values are highly correlated for the undeflated specification ($\rho = 0.87$), the correlation is much lower ($\rho = 0.70$ and 0.52) when the variables are deflated.

IV. PRELIMINARY ANALYSES

Initially, we present evidence on the relative explanatory power of earnings and operating cash flows for contemporaneous market values, future operating cash flows, and future earnings. Largely, this analysis is similar to that in prior research such as Dechow (1994), Barth et al. (2001), and Burgstahler et al. (1999). Nevertheless, we present these results for the following reasons. First, we are able to verify whether our results are consistent with those in previous research. Second, we show that inferences reverse when we alternatively use future operating cash flows and future earnings as predictive criterion. Finally, the contemporaneous market value analysis allows us to identify and describe certain peculiarities in our data that create inference problems in our total-assets-deflated models. This issue is important because similar data problems occur when using intrinsic values.

Explanatory Power for Market Value of Equity

Panel A of Table 2 reports the explanatory power of pooled undeflated, per-share, and total-assets-deflated regressions of contemporaneous market value on earnings and operating cash flows. In undeflated and per-share regressions, the $R^2$ of $EARN$ (undeflated = 69.7 percent; per-share = 39.9 percent) are significantly higher than that of $OCF$ (undeflated = 64.3 percent; per-share = 33.8 percent) and the Vuong (1989) statistics for the differences are significant at the 1 percent level. We also estimate regressions separately for each year and find that earnings have significantly higher explanatory power (Vuong statistic significant at the 10 percent level or better) in at least 10 out of the 13 years examined (reported in square brackets in the table).

In the total-assets-deflated models, notice that the coefficients on earnings and cash flows are negative, which is contrary to expectation. This makes the explanatory power from these models non-interpretable. The anomalous negative coefficients for both $CFO$ and $EARN$ in the total-assets-deflated specification underscores a basic problem with our full sample regressions. As discussed earlier, our sample contains a significant proportion (about 25 percent) of negative realizations of $EARN$ and $OCF$. Negative earnings (or cash flows) create both theoretical and empirical problems in price-earnings (or price-cash flow) regressions.

Theoretically, the price-earnings relation is unspecified for negative earnings. For example, in Hayn’s (1995) liquidation-option framework, earnings are unrelated to price when earnings are below the level where the liquidation option is triggered and linearly increasing after that level. Since it is reasonable that firms with negative earnings or cash flows are more likely to trigger the liquidation option than positive earnings/cash flow firms, Hayn’s (1995) framework suggests that the price-earnings (or price-cash flow) relation is flat in the negative quadrant and increasing in the positive quadrant. Empirically, however, market value is anomalously negatively related to earnings when firms report losses (Jan and Ou 1995; Collins et al. 1999).}

\[15\] Burgstahler and Dichev (1997) make similar predictions using an adaptation option argument.
### TABLE 2

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Undeﬂated</th>
<th></th>
<th></th>
<th>Per-Share</th>
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<th>Deflated by Total Assets</th>
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<td>Explanatory Power</td>
<td>Vuong Statistic</td>
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<td>Vuong Statistic</td>
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<td>$OCF_t$</td>
<td>$EARN_t$</td>
<td></td>
<td>$OCF_t$</td>
<td>$EARN_t$</td>
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<td><strong>Panel A: Market Value of Equity</strong></td>
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<td>All Firm-Years</td>
<td>64.30%</td>
<td>69.69%</td>
<td>6.10*</td>
<td>33.78%</td>
<td>39.89%</td>
<td>12.36*</td>
<td>3.14%</td>
<td>1.34%</td>
<td>11.85*</td>
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<td>Firm years with positive $EARN$ and $OCF$</td>
<td>63.81%</td>
<td>72.22%</td>
<td>9.37*</td>
<td>31.23%</td>
<td>47.40%</td>
<td>27.73*</td>
<td>3.14%</td>
<td>1.34%</td>
<td>11.85*</td>
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<td><strong>Panel B: Future Operating Cash Flows</strong></td>
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<tr>
<td>All Firm-Years—One-Year-Ahead $OCF$</td>
<td>84.22%</td>
<td>67.32%</td>
<td>15.11*</td>
<td>55.42%</td>
<td>31.89%</td>
<td>26.75*</td>
<td>39.55%</td>
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<td>18.09*</td>
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<td>(1.00)</td>
<td>(1.76)</td>
<td>[13]</td>
<td>(0.86)</td>
<td>(1.12)</td>
<td>[13]</td>
<td>(0.77)</td>
<td>(0.61)</td>
<td>[13]</td>
<td>(0.77)</td>
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<td>All Firm-Years—Two-Years-Ahead $OCF$</td>
<td>79.15%</td>
<td>63.09%</td>
<td>13.88*</td>
<td>46.21%</td>
<td>28.06%</td>
<td>21.67*</td>
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<td>(1.05)</td>
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<td>(1.20)</td>
<td>[13]</td>
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<td>[12]</td>
<td>(0.79)</td>
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<td>All Firm-Years—Three-Years-Ahead $OCF$</td>
<td>75.17%</td>
<td>60.85%</td>
<td>13.56*</td>
<td>39.48%</td>
<td>22.97%</td>
<td>21.04*</td>
<td>17.58%</td>
<td>13.09%</td>
<td>8.52*</td>
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<tr>
<td>(1.11)</td>
<td>(1.97)</td>
<td>[13]</td>
<td>(0.96)</td>
<td>(1.25)</td>
<td>[13]</td>
<td>(0.89)</td>
<td>(0.71)</td>
<td>[11]</td>
<td>(0.89)</td>
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<td>All Firm-Years—Discounted $OCF$</td>
<td>83.51%</td>
<td>68.90%</td>
<td>15.68*</td>
<td>55.18%</td>
<td>35.92%</td>
<td>27.77*</td>
<td>27.00%</td>
<td>19.12%</td>
<td>17.64*</td>
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</table>

(continued on next page)
### TABLE 2 (continued)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Undeflated</th>
<th>Per-Share</th>
<th>Deflated by Total Assets</th>
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</thead>
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<td></td>
<td>Explanatory Power</td>
<td>Vuong Statistic</td>
<td>Explanatory Power</td>
</tr>
<tr>
<td><strong>Panel C: Future Earnings</strong></td>
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<td></td>
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<tr>
<td>All Firm-Years—One-Year-Ahead <em>EARN</em></td>
<td>51.26%</td>
<td>60.72%</td>
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<td></td>
<td>(0.42)</td>
<td>(0.90)</td>
<td>[9]</td>
</tr>
<tr>
<td>All Firm-Years—Two-Years-Ahead <em>EARN</em></td>
<td>37.65%</td>
<td>42.93%</td>
<td>4.14*</td>
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<tr>
<td></td>
<td>(0.41)</td>
<td>(0.86)</td>
<td>[8]</td>
</tr>
<tr>
<td>All Firm-Years—Three-Years-Ahead <em>EARN</em></td>
<td>31.80%</td>
<td>35.14%</td>
<td>3.38*</td>
</tr>
<tr>
<td></td>
<td>(0.42)</td>
<td>(0.86)</td>
<td>[6]</td>
</tr>
<tr>
<td>All Firm-Years—Discounted <em>EARN</em></td>
<td>60.87%</td>
<td>64.54%</td>
<td>3.63*</td>
</tr>
</tbody>
</table>

*, ** Statistical significance at the 0.01 and 0.05 levels, respectively.

*Sample comprises all firm-years in the 2004 Compustat database with available data: 45395, 44943, and 45020 firm-years for the undeflated, per-share, and total-assets-deflated specifications, respectively.

*OCF* represents operating cash flows (Compustat data item 308 – Compustat data item 124); *EARN* represents income before extraordinary items (Compustat data item 123); and *MKTV* represents market value of equity (Compustat data item 199 * Compustat data item 25). The deflators, shares outstanding and total assets, are Compustat data items 25 and 6, respectively. Discounted *OCF (EARN)* are computed as the discounted *OCF (EARN)* for each of the future three years and terminal values derived by assuming the realized four-years-ahead *OCF (EARN)* as a perpetuity. The discount rate used is the two-digit SIC industry cost of capital.

*Coefficient estimates are presented in parenthesis. All coefficients are significant at the 0.01 level (two-tailed).

*Numbers in brackets represent the number of years the Vuong (1989) statistic is significant at the 10 percent level when 13 annual regressions are estimated.*
Because the relation between stock prices and earnings/cash flows depends on whether earnings/cash flows are positive or negative, pooling negative and positive earnings/cash flows will bias the coefficients on earnings/cash flows downward. Stated differently, our full sample results reported in Panel A, Table 2 are biased because we force the coefficients on negative and positive realizations of OCF and EARN to be the same. This bias depends on (1) the frequency of negative earnings/cash flows observations relative to positive earnings/cash flows observations and (2) the variance of negative observations relative to positive observations (see the Appendix for proof). This misspecification is more severe for the total-assets-deflated specification because the relative variance of negative earnings (cash flows) is proportionally higher for the total-assets-deflated specification than either the undeflated or per-share specifications.

One way to address this problem is to allow positive and negative quadrants of earnings/cash flows to have different coefficients. While this approach takes into account the differential slopes for negative and positive values of EARN and OCF, it is still not correctly specified because the coefficients in the negative quadrant are anomalously negative. Therefore, as an alternative, we restrict our sample to observations with positive earnings (or operating cash flows). While this ensures that the models are properly specified, it limits the generality of inferences.16

Results from regressions of market value on only positive realizations of OCF and EARN are reported in Panel A of Table 2. For completeness, we present results both for deflated and undeflated specifications. At the outset, we note that the coefficients on both EARN and OCF are positive in all three (i.e., undeflated, per-share, and total-assets-deflated) specifications, which suggests that all models are properly specified. We next examine patterns in explanatory power. There is little improvement in the explanatory power of EARN and OCF in the undeflated specification—the R²s for EARN and OCF are 72.2 percent and 63.8 percent, respectively, and the difference is significant at the 1 percent level. However, the R²s improve considerably for the per-share and total-assets-deflated specifications. More important, the improvement in explanatory power is more pronounced when the explanatory variable is EARN. Specifically, the R²s for EARN are 47.4 percent (31.9 percent) and OCF are 31.2 percent (8.5 percent) for the per-share (total-assets-deflated) model and the differences in explanatory power between EARN and OCF are statistically significant at the 1 percent level across both deflators. In by-year analysis, EARN significantly outperforms OCF (at the 10 percent level of significance) in all of the 13 years examined for the per-share and the total-assets-deflated models. Overall, our results relating to contemporaneous market value are broadly consistent with prior research that documents the superiority of earnings over operating cash flows in explaining contemporaneous stock returns (e.g., Dechow 1994).17

Explanatory Power for Future Operating Cash Flows and Earnings

We next investigate the relative predictive ability of earnings and operating cash flows for both future operating cash flows and future earnings. We use future operating cash flows and earnings as alternative predictive criteria because both variables have been used...
in the literature to evaluate value relevance, although neither variable is a value attribute. For example, Barth et al. (2001) and Burgstahler et al. (1999), among others, use future operating cash flows as the predictive criterion. Alternatively, Ou and Penman (1989), Sloan (1996), Aboody et al. (1999), and Dhaliwal et al. (1999), among others, use future earnings as the predictive criterion.

Results from examining the predictive ability of the two summary measures for future operating cash flows and future earnings are presented in Panels B and C of Table 2, respectively. As with prior work we consider one-, two-, and three-periods-ahead earnings and operating cash flows as the dependent variables. Finally, as in Barth et al. (2001), we also examine measures of pseudo intrinsic values generated by extrapolating the three years of future operating cash flows (or earnings).\textsuperscript{18} Once again, we report results from both undeflated and deflated (per-share and total assets) specifications.

From Panel B of Table 2 it is evident that operating cash flows better predict future operating cash flows than current earnings, consistent with prior research. This result obtains across one-, two-, and three-periods-ahead operating cash flows. However, when the prediction criterion is future earnings rather than future operating cash flows, the results are reversed. Specifically, for all horizons and specifications the explanatory power of $EARN$ is significantly greater than that of $OCF$ at the 5 percent level (see Panel C of Table 2). Unlike the market-value specification, the anomalous negative coefficient does not arise when we use future operating cash flows/earnings as the dependent variable. This is probably because, unlike market values that are truncated at zero, future earnings or cash flows can have negative realizations.

In summary, the preliminary results regarding the relative value relevance of earnings and operating cash flows do not provide unambiguous answers. Most important, the results reverse when the prediction criterion is switched from future operating cash flows to future earnings, i.e., while current cash flows better predict future cash flows, current earnings better predict future earnings. These contrasting results arise because of the correlation structure between current accruals and future cash flows and between current accruals and future earnings.\textsuperscript{19}

\textbf{V. EX POST INTRINSIC VALUE ANALYSIS}

We next present results of our primary analyses using ex post intrinsic values as the predictive criterion. Panel A of Table 3 reports the relative explanatory powers of operating cash flows (or earnings as the case may be) and terminal values, which is extrapolated from the cash flow (or earnings) time-series. We refer to these as pseudo intrinsic values because theoretically discounting operating cash flows (or earnings) does not produce intrinsic values.\textsuperscript{18}

Specifically, earnings will better predict future earnings than operating cash flows when accruals (that are added to cash flows to obtain earnings) are positively correlated with future earnings. Similarly, cash flows will better predict future cash flows than earnings when current accruals are negatively correlated with future cash flows. Unreported results reveal that current accruals are positively (negatively) correlated with future earnings (future operating cash flows). While the positive correlation between accruals and future earnings is intuitive, the negative correlation between accruals and future cash flows is counterintuitive and requires elaboration. First, it is important to note that accruals are positively related to future cash flows after controlling for current cash flows (e.g., Sloan 1996). This result is consistent with the intuition that accruals incrementally reflect future cash flow effects in a timely manner. How does one then explain the unconditional negative correlation between accruals and future cash flows? This happens because of two important correlations. First, current cash flows are strongly positively correlated with future cash flows. Second, as reported in past research (e.g., Subramanyam 1996; Dechow et al. 1998), accruals are strongly negatively correlated with current operating cash flows. This negative correlation arises because accruals smooth transitory fluctuations in cash flows. The combined effect is that accruals are unconditionally negatively correlated with future cash flows (even though they are positively correlated after controlling for current cash flows).
### TABLE 3

<table>
<thead>
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<th>Dependent Variable&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Undeflated</th>
<th>Per-Share</th>
<th>Deflated by Total Assets</th>
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<td>Explanatory Power</td>
<td>Vuong Statistic</td>
<td>Explanatory Power</td>
</tr>
<tr>
<td></td>
<td>OCF&lt;sub&gt;t&lt;/sub&gt;</td>
<td>EARN&lt;sub&gt;t&lt;/sub&gt;</td>
<td></td>
</tr>
<tr>
<td>Panel A: All Firms Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>58.12%</td>
<td>62.18%</td>
<td>4.87*</td>
</tr>
<tr>
<td></td>
<td>(7.50)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>(15.31)</td>
<td>[9]&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td>Panel B: Only Firm Years with Positive EARN and OCF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>57.90%</td>
<td>64.56%</td>
<td>7.90*</td>
</tr>
<tr>
<td></td>
<td>(7.44)</td>
<td>(15.61)</td>
<td>[12]</td>
</tr>
</tbody>
</table>

*<sup>a</sup>, **<sup>b</sup> Statistical significance at the 0.01 and 0.05 levels, respectively.
<sup>a</sup>Sample comprises all firm-years in the 2004 Compustat database with available data: 45395, 44943, and 45020 firm-years for the undeflated, per-share, and total-assets-deflated specifications, respectively.
<sup>b</sup>OCF represents operating cash flows (Compustat data item 308 – Compustat data item 124); EARN represents income before extraordinary items (Compustat data item 123); and IV represents intrinsic value using the dividend discount model for a three-year horizon with market value of equity at the end of the third year as terminal value. The discount rate used is the two-digit SIC industry cost of capital. The deflators, shares outstanding and total assets, are Compustat data items 25 and 6, respectively.
<sup>c</sup>Coefficient estimates are presented in parenthesis. All coefficients are significant at the 0.01 level (two-tailed).
<sup>d</sup>Numbers in brackets represent the number of years the Vuong (1989) statistic is significant at the 0.10 level when 13 annual regressions are estimated.
cash flows (OCF) and earnings (EARN) for the ex post intrinsic value measure (IV). We once again present results for undeflated, per-share, and total-assets-deflated specifications. In the undeflated and per-share regressions, the $R^2$s for EARN are significantly higher than those for OCF—$R^2$s for EARN (OCF) are 62.2 percent (58.1 percent) for the undeflated specifications and 27.7 percent (26.3 percent) for the per-share specifications, and both differences are significant at the 1 percent level. By-year analysis indicates that EARN is superior to OCF in explaining IV for 9 (8) out of 13 years for the undeflated (per-share) specification. The results from the total-assets-deflated specification are mixed, with extremely low explanatory power (less than 1 percent). However, as indicated earlier, these results are non-interpretable because coefficients on the EARN and OCF are negative. Accordingly, we repeat our analysis after deleting all observations with negative EARN and OCF.

In Panel B of Table 3, we report explanatory power of regressions with OCF and EARN respectively as the explanatory variables for a subsample containing observations with only positive values for both OCF and EARN. The undeflated results are similar to that in Panel A—the explanatory power of EARN is significantly higher than that of OCF. While the per-share results are directionally and statistically similar to that in Panel A, the magnitude by which EARN dominates OCF is much larger (OCF = 23.0 percent and EARN = 31.1 percent). Finally, unlike Panel A, EARN generates significantly higher $R^2$s than OCF (OCF = 7.9 percent and EARN = 18.8 percent) even for the total-assets-deflated specification. Also, in all of the 13 years examined, EARN’s explanatory power is higher than OCF’s across both undeflated and deflated specifications.

We also examine whether there is significant variation in our results based on industry membership. For this purpose, we replicate our analysis by major industry classes based on the industry classification adopted in Barth et al. (2001). Unreported results reveal no systematic pattern in the relative importance of earnings and cash flows across industries. OCF does not generate statistically higher $R^2$s for any of the industries examined. EARN generates statistically higher $R^2$s for all industries with the exception of agriculture, extractive industries, pharmaceuticals, and utilities. We conjecture that EARN is not able to dominate OCF in these industries for the following reasons: (1) agriculture and extractive industries are characterized by extremely long-lived assets, which could reduce earnings’ value relevance because depreciation is not economically relevant; (2) the regulatory nature of utilities could cause earnings to be less informative; and (3) high R&D intensity in the pharmaceutical industry makes earnings similar to cash flows because of R&D write-offs.

Overall, our results are consistent with the relative superior ability of earnings vis-à-vis operating cash flows in explaining ex post intrinsic value. Given the consistent results obtained across various specifications we believe that our results provide unambiguous evidence on the relative superiority of accrual-based earnings as a summary measure that reflects expected future cash flows to investors.

**VI. ADDITIONAL ANALYSES**

We have argued that the ex post intrinsic value approach abstracts from inference problems arising from market mispricing related to accruals when stock price (returns) is used as the predictive criterion. However, the use of future stock prices to calculate terminal value results in high correlation between our ex post intrinsic value measures and current stock prices. This raises two concerns: (1) empirically, are our results using intrinsic values distinct from those using stock price (or returns); and (2) does our approach adequately control for accruals’ mispricing? We address these concerns by conducting additional tests described below.

*The Accounting Review, March 2007*
Mechanical Correlation between Intrinsic Values and Market Values

Theoretically, the intrinsic value measure captures a construct that is sufficiently different from stock price. However, this does not imply that intrinsic values empirically capture a construct that is different from stock price. Indeed, intrinsic value measures are highly correlated with market values in their undeflated and per-share form, although the correlation is lower after total-assets deflation (see Panel B of Table 1). Therefore, it is reasonable to question whether our results provide any additional insights beyond that provided by stock returns’ research.

To demonstrate that we are documenting an economic phenomenon that is distinct from that documented by prior studies, we show that our results obtain even when we consider firms where the intrinsic values and stock prices are sufficiently different. In particular, we partition our sample into two subsamples (HIGH and LOW) representing the top third and bottom third of the distribution of the absolute value of valuation errors—defined as the absolute value of the difference between current market value and ex post intrinsic value scaled by current market value (Francis et al. 2000). We then document that the superiority of EARN over OCF is present even in the subsample with high valuation errors.

Panel A of Table 4 reports descriptive statistics on the valuation errors. The mean valuation error ranges from 63 percent to 69 percent, while the median valuation error is between 45 percent and 47 percent. These statistics are comparable to those reported by Francis et al. (2000).20 In unreported results, we find that the signed valuation error is on average negative, consistent with Penman and Sougiannis (1998), indicating that our intrinsic value measures are generally larger than price because of the large ex post returns during the bull market years covered by our sample.

Table 4, Panel B reports correlation between market values and intrinsic values for the third of our sample with the highest absolute errors (HIGH) and that with the lowest absolute valuation errors (LOW). The correlation between market values and intrinsic values are generally lower for the HIGH group than the LOW group. For the undeflated specification, the correlation between MKTV and IV for the HIGH group is 0.62, which is significantly lower than that for the LOW group of 0.98. For deflated measures, the correlations are dramatically different between HIGH and LOW groups. Specifically, the correlation is 0.97 (0.97) for the LOW group compared to 0.49 (0.24) for the HIGH group using per-share (total-assets-deflated) variable. This evidence does suggest that ex post intrinsic values are sufficiently different from market values in the HIGH valuation error group.

We next present results of regression of intrinsic value measures on EARN and OCF for the subsample of firms in the HIGH valuation error group (Table 4, Panel C). For brevity, we discuss results relating to specifications that only consider firm observations with positive cash flows and earnings. We find that earnings dominate cash flows in all specifications (the differences in R²’s are significant unanimously at the 1 percent level and for a majority of the years examined). These results suggest that our full sample results are not attributable to the high correlation between market values and intrinsic values. Rather, these results imply that earnings are superior to cash flows in predicting ex post intrinsic values, which are a distinctly different economic construct from market values.

20 The large valuation errors may raise concern regarding the high measurement error in the IV estimates. However, because intrinsic values are measured ex post, the valuation errors do not really measure the extent of estimation error in IV. Rather, they are monotonically related to the magnitude of (absolute) future returns. In unreported analysis we find that the average absolute three-year future returns for our sample is 55 percent, which is comparable to the extent of absolute valuation errors.

The Accounting Review, March 2007
TABLE 4

Panel A: Distribution of Valuation Errors

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<th>Variable</th>
<th>Deflator</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Skewness</th>
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<td>Per-Share</td>
<td>0.69</td>
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<td>1.18</td>
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<td>Total Assets</td>
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<td>0.45</td>
<td>0.77</td>
<td>3.48</td>
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Panel B: Pearson Correlation between Intrinsic Value and Market Value

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<th>Total Assets</th>
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<tbody>
<tr>
<td>All Firm Years</td>
<td>0.87</td>
<td>0.70</td>
<td>0.52</td>
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<tr>
<td>LOW ERROR</td>
<td>0.98</td>
<td>0.97</td>
<td>0.91</td>
</tr>
<tr>
<td>HIGH ERROR</td>
<td>0.62</td>
<td>0.49</td>
<td>0.24</td>
</tr>
</tbody>
</table>

(continued on next page)
Panel C: Regression of $IV$ for the HIGH ERROR Group\(^c\)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Explanatory Power</th>
<th>Vuong Statistic</th>
<th>Explanatory Power</th>
<th>Vuong Statistic</th>
<th>Explanatory Power</th>
<th>Vuong Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Un deflate</td>
<td>Per-share</td>
<td>Deflated by Total Assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Firms Years</td>
<td>$OCF_t$, $EARN_t$</td>
<td>$OCF_t$, $EARN_t$</td>
<td>$OCF_t$, $EARN_t$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$IV$</td>
<td>36.28%</td>
<td>42.92%</td>
<td>16.11%</td>
<td>17.61%</td>
<td>0.02%</td>
<td>0.01%</td>
</tr>
<tr>
<td></td>
<td>(9.03)(^d)</td>
<td>(19.00)</td>
<td>(5.92)</td>
<td>(9.33)</td>
<td>(0.25)</td>
<td>(0.16)</td>
</tr>
<tr>
<td>Only Firm Years with Positive $EARN$ and $OCF$</td>
<td>37.01%</td>
<td>47.31%</td>
<td>16.08%</td>
<td>22.80%</td>
<td>5.80%</td>
<td>13.45%</td>
</tr>
<tr>
<td></td>
<td>(8.37)</td>
<td>(18.57)</td>
<td>(5.79)</td>
<td>(14.21)</td>
<td>(8.20)</td>
<td>(13.45)</td>
</tr>
</tbody>
</table>

*, ** Statistical significance at the 0.01 and 0.05 levels, respectively.

\(^{a}\) Sample comprises all firm-years in the 2004 Compustat database with available data: 45395, 44943, and 45020 firm-years for the undeflated, per-share, and total-assets-deflated specifications, respectively.

\(^{b}\) Valuation error ($ERROR$) is defined as the absolute value of the difference between current market value of equity ($MKTV$) and ex post intrinsic value measure ($IV$) scaled by current market value of equity ($MKTV$). HIGH (LOW) ERROR represents observations in the top (bottom) third of firm observations ranked on the basis of valuation error.

\(^{c}\) $OCF$ represents operating cash flows (Compustat data item 308 – Compustat data item 124); $EARN$ represents income before extraordinary items (Compustat data item 123); and $IV$ represents intrinsic value using the dividend discount model for a three-year horizon with market value of equity at the end of the third year as terminal value. The discount rate used is the two-digit SIC industry cost of capital. The deflators, shares outstanding and total assets, are Compustat data items 25 and 6, respectively.

\(^{d}\) In Panel C, coefficient estimates are presented in parenthesis. All coefficients are significant at the 0.01 level (two-tailed).

\(^{e}\) Numbers in brackets represent the number of years the Vuong (1898) statistic is significant at the 10 percent level when 13 yearly regressions for $IV$ are estimated.
Accruals Mispricing and Ex Post Intrinsic Values

For our approach to overcome problems with the stock-price (returns) methodology, it is important that our intrinsic value measures are not affected by accruals mispricing. Recall that we use three-years-ahead market values as terminal values in our intrinsic value computation. We maintain that three-years-ahead market values used in computing intrinsic values are unlikely to be contaminated by mispricing of current accruals or cash flows. This is because abnormal returns associated with the accruals mispricing do not appear to persist for more than two years after the earnings announcement (Sloan 1996). Nevertheless, we explore the extent to which our intrinsic-value-based results are affected (or unaffected) by mispricing of current accruals.

We conduct two tests to offer evidence in support of this argument. First, we estimate the time-series persistence of the accrual component of earnings. If current accruals are highly correlated with future accruals, then it is possible that future prices may indirectly reflect mispricing related to current accruals. In unreported results, we find the autoregression coefficient from regressing three-year-ahead accruals on current accruals is just 0.17. Thus, only 17 percent of accruals persist beyond three years, suggesting that the likelihood of this indirect link is small.

Next, a comparison of regression results in Table 2, Panel A and Table 3 reveals that the magnitude of the superior explanatory power of EARN over OCF is substantially larger when market value is the dependent variable than when ex post intrinsic value is the dependent variable (these results are particularly pronounced for the deflated specifications). This suggests that the results using stock prices do reflect some measure of accrual mispricing that is not present in those using intrinsic values.

To further explore the effect of accrual mispricing on the intrinsic-value-based tests (relative to that on the market-value-based tests), we perform the following analysis. We form ten portfolios based on accruals (deflated by total assets), as in Sloan (1996). We then separately group firms in the two extreme accrual deciles (EXTREME partition) and the two middle deciles (MIDDLE partition). Given Sloan’s results, accruals’ mispricing is expected to occur mainly in the EXTREME partition and, hence, market values should be more spuriously correlated with EARN in this partition. Accordingly, if intrinsic values are uncontaminated by accruals mispricing, the superiority of EARN over OCF in explaining market values should be more pronounced than superiority of EARN over OCF in explaining intrinsic values for firms in the EXTREME partition. As a corollary, since significant accruals mispricing is unlikely to occur in the MIDDLE partition, the relative superiority of EARN over OCF in explaining market values should be no different than that in explaining intrinsic values in the MIDDLE partition.

Table 5 reports R²s for 2 × 2 regressions of MKTV and IV on EARN and OCF separately for the EXTREME and MIDDLE partitions under various alternative specifications (pooled and subsample of firms with positive OCF and EARN) and deflators (undeflated, per-share, and total assets). The results in Table 5 are consistent with ex post intrinsic value measure being influenced less by the effects of accruals’ mispricing. For the EXTREME partition, where the accruals’ mispricing is more likely, there are striking differences in the relative superiority of EARN over OCF in explaining MKTV versus in explaining IV. For example, in the pooled regressions, the explanatory power of EARN is higher than that of OCF by 13.88 percent (18.32 percent) for the undeflated (per-share) specifications when MKTV is the dependent variable, but only 0.61 percent (4.95 percent) when IV is the dependent

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21 We do not claim that future stock prices used in determining terminal values are correctly priced. It is likely that future stock prices misprice the cash flow and accrual components of earnings at that point in time.
### TABLE 5
Differences in Explanatory Power of Cash Flows and Earnings for Market Value and Ex Post Intrinsic Value Measures for Partitions Based on Extreme and Middle Accrual Portfolios\(^a,b,c\)

<table>
<thead>
<tr>
<th></th>
<th>Pooled</th>
<th>Only Firm-Years with Positive EARN and OCF</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIDDLE</td>
<td>EXTREME</td>
<td>MIDDLE</td>
<td>EXTREME</td>
</tr>
<tr>
<td></td>
<td>MKTV</td>
<td>IV</td>
<td>MKTV</td>
<td>IV</td>
</tr>
<tr>
<td>Undelated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARN</td>
<td>74.44%</td>
<td>66.01%</td>
<td>43.24%</td>
<td>26.78%</td>
</tr>
<tr>
<td>OCF</td>
<td>72.82%</td>
<td>62.58%</td>
<td>29.36%</td>
<td>26.17%</td>
</tr>
<tr>
<td>Difference</td>
<td>1.62%</td>
<td>3.43%</td>
<td>13.88%</td>
<td>0.61%</td>
</tr>
<tr>
<td>Per-Share</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARN</td>
<td>35.70%</td>
<td>26.08%</td>
<td>26.18%</td>
<td>13.71%</td>
</tr>
<tr>
<td>OCF</td>
<td>41.18%</td>
<td>28.92%</td>
<td>7.86%</td>
<td>8.76%</td>
</tr>
<tr>
<td>Difference</td>
<td>-5.48%</td>
<td>-2.84%</td>
<td>18.32%</td>
<td>4.95%</td>
</tr>
<tr>
<td>Deflated by Total Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARN</td>
<td>1.78%</td>
<td>0.02%</td>
<td>4.82%</td>
<td>0.42%</td>
</tr>
<tr>
<td>OCF</td>
<td>1.73%</td>
<td>0.02%</td>
<td>5.50%</td>
<td>0.92%</td>
</tr>
<tr>
<td>Difference</td>
<td>0.05%</td>
<td>0.00%</td>
<td>-0.68%</td>
<td>-0.50%</td>
</tr>
</tbody>
</table>

\(^a\) Sample comprises all firm-years in the 2004 Compustat database with available data: 45395, 44943, and 45020 firm-years for the undelated, per-share, and total-assets-deflated specifications, respectively.

\(^b\) Table compares explanatory power of regressions where MKTV or IV are regressed on OCF or EARN, separately for EXTREME and MIDDLE accrual partition. EXTREME accrual partition represents firm-years where accruals (deflated by total assets) are in the highest or lowest deciles of the distribution of accruals for that year, while firm-year observations in the middle two deciles are included in the MIDDLE partition. Accruals are defined as EARN minus OCF. The number of observations for the EXTREME (MIDDLE) partitions for the pooled sample are 9071 (9082), 8977 (8990), and 8994 (9006) firm-years for the undelated, per-share, and total-assets-deflated specifications, respectively. The number of observations for the EXTREME (MIDDLE) partitions for the subsample with only positive earnings and cash flows are 2500 (7434), 3340 (7102), and 2570 (7690) firm-years for the undelated, per-share, and total-assets-deflated specifications, respectively.

\(^c\) OCF represents operating cash flows (Compustat data item 308 – Compustat data item 124); EARN represents income before extraordinary items (Compustat data item 123); MKTV represents market value of equity (Compustat data item 199 * Compustat data item 25); and IV represents intrinsic value using the dividend discount model for a three-year horizon with market value of equity at the end of the third year as terminal value. The discount rate used is the two-digit SIC industry cost of capital. The deflators, shares outstanding and total assets, are Compustat data items 25 and 6, respectively.
variable (note that total-assets-deflated regressions are not interpretable for the pooled analysis). Similar results obtain for regressions that considers only firm-years with positive EARN and OCF. For the MIDDLE partition, where there is less likelihood of mispricing, we do not find consistent evidence that EARN’s superior explanatory power vis-à-vis OCF is more pronounced for MKTV than for IV regressions. These results suggest that a significant portion of the superior explanatory power of EARN vis-à-vis OCF in the MKTV regressions is attributable to the stock market’s mispricing of accruals, but that this bias is substantially ameliorated when IV is used as the dependent variable.

We acknowledge that the above analysis does not completely rule out market’s mispricing of accruals as a possible explanation for our findings, but it does demonstrate the benefits from using the ex post intrinsic value approach relative to the stock returns approach.

VII. CONCLUSION

The objective of our study is to examine the relative importance of earnings and operating cash flows in equity valuation. We document that earnings are superior to cash flows in explaining ex post intrinsic values. This evidence supports the FASB’s assertion that accrual-based earnings is superior to cash flows in providing information about users’ future cash flows (SFAC No. 1, FASB 1978, para. 44).

The salient feature of our study is the use of ex post intrinsic value of equity to examine this question. We believe that the ex post intrinsic value approach that we adopt contributes to this debate by providing unambiguous evidence about the superiority of earnings over operating cash flows as a summary indicator of fundamental equity value. Unlike stock returns, intrinsic values are not contaminated by the stock market’s fixation on reported earnings and the consequent mispricing of the accruals’ and cash flow components of earnings (Sloan 1996). Also, the intrinsic value measure that we use captures the present value of all future cash receipts to the investors and, hence, provides a more formal and comprehensive measure of fundamental equity value than a finite horizon of future operating cash flows used in prior research. In this sense, the intrinsic value approach is a more direct test of the FASB’s assertion that accrual earnings are superior to cash flows in predicting users’ future cash flows.

Our study is subject to the following caveats. First, ex post intrinsic value measures are not completely independent of stock prices, because we use future (three-years-ahead) stock prices when determining terminal values. Therefore, our approach could be criticized for being contaminated by the accrual anomaly. While we acknowledge this criticism, we note that the anomalous mispricing of accruals does not persist beyond two years (Sloan 1996). Hence, the possibility of three-years-ahead prices being contaminated by mispricing of current accruals is unlikely. Also, additional analyses suggest our intrinsic-value method does substantially mitigate the effects of accruals’ mispricing. Second, the superiority of intrinsic value as the predictive criterion applies only when one takes a valuation perspective from the equity investors’ standpoint. It is possible that the information needs of other users, e.g., creditors and debtholders, differ from those of equity investors. Hence, our results may not necessarily generalize to a broad class of users of accounting information.

APPENDIX

In this Appendix, we discuss why we get anomalous negative coefficients when we regress market value (or intrinsic value) on earnings (or cash flows) after we deflate our variables by a scale proxy, such as shares outstanding, book value, or total assets.
Recall that past research has shown that while positive earnings are reliably positively associated with market values, the relationship between price and negative earnings (losses) is anomalously negative (e.g., Jan and Ou 1995; Collins et al. 1999). This anomalous negative association between market values and negative earnings will bias the coefficient in a pooled regression of market values on earnings that has both negative and positive values of earnings, i.e., the “pooled” coefficient. Below, we rigorously demonstrate that the extent of this bias will depend on the weight that the negative observations have on influencing the pooled coefficient.

Let us consider the equation of the form:

\[ Y = a_0 + a_1X + \varepsilon \]  

where \( Y \) is market value of equity and \( X \) is earnings (or cash flows). Estimating Equation (i) assumes identical coefficients for both positive and negative realizations of \( X \). However, prior research suggests that the coefficient for negative realizations of \( X \) is negative, while it is positive for positive realizations of \( X \). To examine the implications of restricting the same coefficient on both positive and negative realizations of \( X \), we can rewrite Equation (i) as a structural (stacked) equation of the form:

\[ (Y_1, Y_2)' = (X_1, X_2) (b_1, b_2)' + (\varepsilon_1, \varepsilon_2)' \]  

where \( X_1 \) represents positive observations of \( X \) and \( X_2 \) represents negative observations of \( X \). For simplicity, let us assume that this Equation (ii) is estimated in “deviation from means” form (to avoid intercept effects). Then, \( b_1 = (X_1'X_1)^{-1} X_1'Y_1 \) and \( b_2 = (X_2'X_2)^{-1} X_2'Y_2 \) (see, Johnston 1984, 209–210). However, in fitting the restricted model where \( b_1 = b_2 = a_1 \), the coefficient, \( a_1 \), is \( (X_1'X_1 + X_2'X_2)^{-1} (X_1'Y_1 + X_2'Y_2) \). Note that, in difference form, \( X'Xs \) are scalars and denote variances. Through algebraic manipulation we can represent \( a_1 \) as a linear combination of \( b_1 \) and \( b_2 \):

\[ a_1 = b_1 * (X_1'X_1)/(X_1'X_1 + X_2'X_2) + b_2 * (X_2'X_2)/(X_1'X_1 + X_2'X_2), \]

that is:

\[ a_1 = b_1 * (\sigma_1^2)/\sigma_X^2 + b_2 * (\sigma_2^2)/\sigma_X^2. \]

Thus, the pooled coefficient will be a weighted average of the coefficients on negative and positive quadrants where the weighting is proportional to their respective variances.

The above discussion demonstrates that the extent to which the negative observations will bias the pooled coefficient depends on the relative variance of the negative observations vis-à-vis the positive observations of earnings. In our sample, the variance for undeflated positive earnings is 21138, while that for negative earnings is 353. Thus, the ratio of variance of negative observations relative to total variance is 1.6 percent. This implies that the weight on negative observations is relatively small. However, for variables deflated by shares outstanding (total assets), the variance of positive earnings observations is 1.03 (0.002), while that for negative observations is 0.48 (0.035). This suggests that the weight on negative earnings observations is 32 percent (95 percent), which is very high relative to the ratios from the undeflated models. Similar variance ratios are obtained for operating
Subramanyam and Venkatachalam

Cash flows. This explains why the bias arising from the presence of negative observations is more pronounced for deflated models.

REFERENCES


Kim, M., and W. Kross, 2005. The ability of earnings to predict future operating cash flows has been increasing—not decreasing. *Journal of Accounting Research* 43: 753–780.


