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An Empirical Evaluation of the Usefulness of Non-GAAP Accounting Measures in the Real Estate Investment Trust Industry

THOMAS D. FIELDS
J. L. Kellogg Graduate School of Management, Northwestern University, Evanston IL 60208-2002

SRINIVASAN RANGAN
University of California-Davis, Davis, CA 95616-8609

S. RAMU THIAGARAJAN
J. L. Kellogg Graduate School of Management, Northwestern University, Evanston, IL 60208-2002

Abstract. We conduct three sets of analyses to compare the usefulness of net income, based on generally accepted accounting principals (GAAP), and the industry-advanced funds from operations (FFO) in the context of the real estate investment trust (REIT) industry. In our first set of tests, we find that FFO is more strongly associated with one-year ahead FFO and one-year ahead operating cash flows than is net income. Conversely, we find that net income explains more variation in one-year ahead net income and current stock price than does FFO. Second, in support of the claim that some REITs manipulate FFO, we document that young REITs and REITs that are likely to access capital markets are more likely to manage FFO. Third, we find that, for a sample of firms that disclose current value information, both net income and FFO fail to reflect holding gains or losses on unsold properties in a timely manner. Overall, our analyses suggest that the REIT industry's claim that FFO is more useful than net income is premature because the superiority of one measure over the other is highly contextual.

For several years, real estate investment trusts (REITs) and security analysts have questioned the usefulness of net income for investors' decisions (Edmunds, 1982; National Association of Real Estate Investment Trusts (NAREIT), 1991).[1] Under current generally accepted accounting principles (GAAP), net income is calculated under the assumption that the values of income-producing properties, the principal assets of REITs, diminish over time. Consequently, net income does not reflect holding gains on unsold properties. Additionally, it includes a periodic charge for depreciation even for properties that have appreciated. Because real estate values have risen considerably in certain years, the non-recognition of unrealized holding gains together with inclusion of a depreciation charge has caused net income to understate profitability in these years. Further, because the depreciation charge reduces the reported book value of properties on the balance sheet, historical cost book value has been criticized as a poor measure of the economic worth of these properties (Arnold and Goscicki, 1995; Zani, 1993).[2] The concerns with net income and book value have led industry analysts and real estate firms to allege that the historical cost model has impaired the ability of investors to value real estate firms and hence reduced these firms' access to capital markets (Brenner, 1984, p. 34; Tishman Realty & Construction Co. Prospectus, 1977, p. 68).

Disenchanted with the GAAP-based measure of profitability, REITs report a supplemental measure of profitability called funds from operations (FFO). FFO is generally calculated by adjusting net income for depreciation and amortization, certain other non-cash accruals, and certain non-recurring items (e.g., gains and losses on debt restructuring). Because it excludes the depreciation charge, REITs and industry analysts' claim that, in periods of appreciating values, FFO understates performance less than does net income. Further, because it excludes some of the non-recurring components of net income, FFO potentially captures the more permanent component of net income. These features have led the advocates of FFO to advance it as a measure of performance that is superior to net income (NAREIT, 1995; Weingarten Realty Investors, 1995, Form 10-K, p. 15). Indeed, reporting FFO is so widespread that security analysts who follow REITs frequently forecast FFO instead of net income.

Although FFO is widely regarded in the REIT industry as a more useful measure of performance than net income, industry analysts frequently express concerns about the manner in which it is calculated and reported. One of the principal concerns relates to the fact that REITs are not consistent in terms of the nature of items they remove from net income to derive FFO. The lack of consistency in FFO calculation has caused some REITs to appear more profitable than others, leading analysts to allege that FFO is manipulated. Analysts have also expressed the concern that REITs frequently do not disclose sufficient information to ascertain how FFO is calculated. Further, FFO is not considered a GAAP measure by either the Financial Accounting Standards Board (FASB) or the Securities and Exchange Commission (SEC) and hence its calculation and presentation is not subject to either consistent rules or an independent audit. The concerns about manipulation, insufficient disclosure, and the absence of an audit have reduced the perceived usefulness of FFO.

Our principal objective is to compare the usefulness of GAAP-based measure of operating performance, net income, with the REIT industry-promoted measure, FFO. To operationalize this comparison, we define usefulness as either value-relevance or ability to predict future performance. Our use of value-relevance as a criterion to evaluate usefulness is based on the assumption that the stock market efficiently prices financial statement information. The FASB's assertion that predictive ability is one of the important attributes of a useful performance measure motivates our second criterion of usefulness (see FASB, 1980).

We conduct three sets of analyses to evaluate the usefulness of net income and FFO. In our first set of analyses, we measure usefulness as the ability to explain cross-sectional variation in one-year ahead performance measures (net income, FFO, and operating cash flows), and the ability to explain cross-sectional variation in stock prices. Our results, based on a sample of 77 REITs (201 firm-years) from the 1991–1995 period, indicate that FFO explains significantly more variation in one-year ahead FFO and one-year ahead operating cash flows than does net income. We also find that net income explains significantly more variation in one-year ahead net income than does FFO. Further, net income also explains more variation in stock prices than does FFO; however, the differences in explanatory power are not substantial. Overall, our analysis does not provide unambiguous evidence regarding the superiority of net income over FFO or vice versa; rather, our conclusions vary according to the dependent variable employed. Thus, the REIT industry's claim that FFO is more useful than net income is premature because the superiority of one measure over the other is highly contextual.

Because net income, unlike FFO, includes certain non-current accruals, we examine whether these accruals have explanatory power for stock prices incremental to that of FFO. To the extent these accruals mitigate timing problems associated with FFO, one would expect that they make net income more informative. Our results indicate that two non-cash accruals, depreciation and asset writedowns, are significantly negatively related to stock prices. Hence, we conclude that, at least in the REIT industry, non-working capital accruals improve the ability of net income to mitigate timing problems associated with cash flows.

While FFO is widely accepted as a useful measure of operating performance, as discussed earlier, some industry analysts question its reliability. Specifically, these analysts allege that some REITs manage FFO upward in an attempt to appear more profitable. In our second set of tests, we investigate this claim by examining whether REITs use a revenue accrual called straight-line rents to manipulate FFO upward in response to factors that prior research has identified as capturing earnings management incentives. We document that REITs that have short trading histories and that have poor free cash flows tend to manipulate FFO upward. Because young firms and firms with poor free cash flows are highly likely to access capital markets in the near future, we conclude that the need for external financing may cause REITs to manipulate FFO upward.

As a supplement to GAAP-based historical cost financial statements, some real estate firms have voluntarily disclosed the appraised values of their assets and liabilities. Appraised values, also referred to as current values by these firms, are the management's year-end estimates of the amounts at which the properties of the firm are realizable and liabilities of the firm are payable. Current value financial statements, unlike historical cost financial statements, explicitly reflect holding gains and losses on unsold properties and outstanding liabilities. Consequently, proponents of these supplemental financial statements regard them as providing more timely information than historical cost measures such as net income or FFO. However, the calculation of current values involves either estimating unobservable future cash flows or identifying the values of similar assets that may not be readily available. Because of the subjectivity inherent in current value estimates, analysts have expressed concerns about their reliability.

In our third set of tests, we examine the value-relevance of net income and FFO in the presence of information on current value of properties for a sample of 12 real estate firms (63 firm-years) that voluntarily report current value data from the years 1984–1995. Because neither net income nor FFO explicitly reflects holding gains or losses on unsold properties, we expect current value information to have explanatory power for stock prices after controlling for these historical cost numbers. To examine this issue, we regress stock prices on net income (or FFO), book value of equity, dividends, and the difference between current and book value of properties.[3] We find that, despite the perceived lack of reliability of current values, the coefficient on the difference between current and book value of properties is statistically and economically significant. Additionally, we find that for our sample of current value reporters, FFO has greater explanatory power for stock prices than does net income.

Besides being very pertinent to the debate in the REIT industry about the usefulness of FFO as a performance measure, our study also contributes to three strands of research in accounting. First, our findings add to a growing body of research that evaluates the relevance

of non-GAAP financial measures in specific industries (e.g., Amir and Lev, 1996). Second, by providing evidence on the value-relevance of current value of properties we contribute to the recent literature on the stock market's valuation of fair values of non-financial assets (Barth and Clinch, 1998; Easton, Eddey, and Harris, 1995). Third, we contribute to research on the pricing of non-current accruals (e.g., Dechow, 1994; Jennings et al., 1996) by documenting that depreciation and asset writedowns are associated with stock prices in the real estate industry.

In a contemporaneous study, Vincent (1998) also compares the stock market's valuation of various operating performance measures reported by REITs. Our paper is similar to Vincent in that we also compare the relative information content of FFO and net income in their abilities to explain stock prices. In addition, we compare how well these two measures explain future operating performance, present evidence on the value-relevance of the components that reconcile net income and FFO. We also document that some REITs manage FFO in response to earnings management incentives, and examine the stock market's valuation of net income and FFO in the presence of information that relates to holding gains or losses on unsold properties.

The rest of this paper is organized as follows. In Section 1, we describe the evolution and status of financial reporting standards for FFO and current value disclosures, and compare these measures with net income. The sample selection procedure and variable definitions for our tests comparing the usefulness of net income and FFO are presented in Sections 2 and 3, respectively. In Section 4, we present tests comparing the usefulness of net income and FFO and in Section 5 we investigate the manipulation of FFO. Our tests of the valuation of net income and FFO in the presence of current value disclosures are discussed in Section 6. Section 7 contains our conclusions.

1. Financial Reporting in the Real Estate Industry

1.1. Funds from Operations

In 1991, the National Association of Real Estate Investment Trusts issued its first definition of FFO in an industry white paper (NAREIT, 1991).[4] NAREIT defined FFO as net income, computed in accordance with generally accepted accounting principles, plus depreciation and amortization, and adjusted for gains/losses from debt restructuring and sale of properties, and income/loss related to unconsolidated partnerships and joint ventures. Because FFO is calculated by adding back depreciation to net income, NAREIT believes that in periods of appreciating property values FFO understates profitability less than does net income. Further, because FFO excludes certain non-recurring items (e.g., gains and losses on debt restructuring) from net income, it potentially captures the more permanent component of net income.

NAREIT's objective in issuing the white paper was to promote uniformity in the calculation and disclosure of FFO in the real estate industry. Further, it hoped that investors and analysts would value REITs based on FFO rather than net income. Before 1991, a few REITs had begun to disclose FFO in their annual reports. Since 1991, reporting FFO has become a pervasive practice in the REIT industry, and its use as a performance measure is

so widespread that security analysts who follow REITs frequently forecast FFO instead of net income. For example, First Call Corporation, a Boston-based corporation that collects and distributes analyst forecasts, compiles FFO forecasts rather than net income forecasts for REITs.

In 1995, NAREIT issued a second white paper that contained a revised definition of FFO (NAREIT, 1995). The important changes in the new definition were that the add-back of amortization of deferred financing fees and the add-back of depreciation on non-real estate assets were discouraged. NAREIT encouraged its member firms to implement these changes in fiscal periods beginning in 1996.[5]

Notwithstanding the widespread acceptance of FFO in the REIT industry, analysts and practitioners criticize it for several reasons. First, because real estate properties do decline in value in some years, the exclusion of depreciation from FFO causes it to overstate profitability in those periods (see Hawkins, 1998). Second, several REITs do not provide sufficient disclosures to enable financial statement users to determine how FFO is calculated (Martin, 1995; Vinocur, 1995). Consequently, users cannot independently replicate the FFO calculation from published GAAP-based financial statements. Martin (1995), for example, quotes an analyst at Morgan Stanley as stating that, "In the absence of disclosure, it's tough to know whether or not to get excited about a stock" (p. 113). In support of this assertion, we find that for several of the REITs in our sample, disclosures in annual reports were insufficient to reconcile FFO and net income numbers.[6]

Third, analysts perceive FFO as being susceptible to manipulation. This perception stems from the fact that FFO numbers are not considered to be GAAP aggregates by either the SEC or the FASB and are therefore not audited. In the absence of an official definition, REITs have substantial discretion over the types of items that they exclude from net income to derive FFO. Consequently, analysts suspect and allege that some REITs use this discretion to inflate FFO in an attempt to increase their stock prices.

Perhaps the most widely cited example of discretion over FFO numbers relates to a revenue recognition method called straight-lining of rental income (see Templin, 1996, for example). To understand this method, consider a REIT that has a multiple-year lease of its rental property. Typically, multiple-year leases contain an escalation clause that guarantees increases in rental revenue over the lease term. Under the straight-lining method, REITs estimate the total revenue from the lease and allocate it equally over the lease term instead of accruing rental revenues as they are received or become due. Essentially, the straight-lining method smooths the underlying cash inflows over the lease term. Because rental revenues increase over the lease term, the straight-lining method causes the revenues in the earlier years of the lease to be larger than what they would have been in the absence of straight-lining. The difference between the rental revenue recorded on a straight-line basis and the revenue that would have been recorded in its absence is called "straight-line rents." The behavior of straight-line rent accruals over the term of the lease parallels that of deferred tax accruals. Like deferred taxes, the straight-line rent accrual is positive in the early years of the lease and reverses in the later years. Further, like deferred taxes, as long as the REIT is growing, increases in straight-line rents in later years offset the reversal of straight-line rents in those years causing the straight-line accrual to be positive most of the time. While the straight-line rent accrual is always included in net income, as required by GAAP,

some REITs chose to subtract it from net income when they calculate FFO, and others do not. Because the former group of REITs appears to have lower FFO than the latter group, analysts have expressed the concern that some REITs manipulate their reported FFO.[7]

In our inspection of REIT annual reports, we find cross-sectional variation in whether or not certain other accruals besides straight-line rents are adjusted from net income to derive FFO. These include the addback of amortization of commissions paid to leasing agents, amortization of tenant improvement costs, and amortization of deferred financing costs. However, in our empirical work, we do not analyze the behavior of these other accruals. We focus on the straight-line rent accrual because these other accruals do not occur with sufficiently high frequency and are smaller in magnitude.

1.2. Current Value Reporting

Current value financial statements are disclosures that are intended to supplement historical cost financial statements. In its proposed statement of position on current value reporting, the American Institute of Certified Public Accountants (AICPA) defines current value as, "the estimated value of a reporting entity's assets and liabilities based on the entity's intent and ability to realize asset values and settle liabilities" (AICPA, 1995).[8] Because all assets and liabilities in current value financial statements are essentially marked to market, these statements reflect estimated holding gains and losses on unsold properties and unpaid liabilities that are not explicitly reflected in historical cost financial statements. Therefore, current values are regarded by industry analysts and real estate firms as providing more timely information than historical cost numbers such as net income and FFO.[9]

Currently, there are no authoritative pronouncements to guide real estate firms in the preparation of current value reports and these reports are not required disclosures.[10] Notwithstanding the absence of mandatory reporting, over the last two decades, a few real estate firms have voluntarily issued current value financial statements. In 1976, Rouse & Co. became the first publicly owned company in the U.S. to report current values of its properties in its financial statements filed with the SEC (Schwarzbach and Vangermeersch, 1991). Subsequently, a few other firms followed suit and included current value financial statements in their public filings. Most of these firms present current value balance sheets side-by-side with historical cost balance sheets. To reconcile the two balance sheets, the shareholder's equity section of the current value balance sheet contains a line item termed "revaluation equity" that equals the difference between current value estimates of all assets and liabilities and the corresponding historical cost numbers. In addition, the footnotes to the financial statements contain a discussion of the purpose of current value financial statements, how such values were derived, and the caveat that current values do not necessarily equal the value at which the real estate assets can be liquidated or paid for. Current value information is *either* compiled by an independent appraisal firm *or* compiled by the top management and then reviewed by the appraisal firm. In the latter case, the financial statements typically include an opinion on the accuracy of the management's estimate.

Despite its perceived relevance, current value data are likely to be unreliable for at least two reasons. First, appraisers who estimate or review current values are likely to suffer from cognitive biases arising from recency effects and over-confidence that other professionals

such as security analysts are known to exhibit. Second, current value estimates are a product of management's intentions and judgements, and appraisers could be pressured to accept these estimates. Consequently, these estimates have the potential to be optimistic or conservative. The perceived lack of reliability of current values is illustrated in an article by Dorfman (1990) who cites one analyst, discussing Trammel Crow Real Estate Investors, as stating that, "they appraise the properties at about $13 a share. I estimate its value at $2.80 a share."

Determination and disclosure of current values require that firms incur out-of-pocket costs. These costs include expenses incurred to prepare current value financial statements, compensation paid to appraisal firms to certify that current value information is reasonably fair, and time spent by top management in monitoring and evaluating the appraisal process. Other less direct costs include potential increases in real estate assessments, leading to higher property taxes. Additionally, depending on the level of sophistication of a firm's investors and analysts, firms have to spend time and money educating them about the relevance of current value information.

We expect that real estate firms will disclose current values only when the expected benefits of disclosure exceed the costs discussed above. Our search of the National Automated Accounting Research system (NAARS) database reveals that only twelve firms disclosed current value of properties in their financial statements in the years 1984–1995. Because we observe very few real estate firms disclosing current values, we suspect that the costs of current value reporting must outweigh its benefits for most firms in the real estate industry. In other words, it is very likely that these firms constitute a non-random sample and self-select to disclose. We account for this self-selection bias when we examine the market valuation of net income and FFO in the presence of current value information.

1.3. Summary

In summary, net income, the accountant's bottom line measure of profitability, is criticized because (i) it does not include holding gains on unsold properties, and (ii) it includes a charge for depreciation even in periods when property values rise. Consequently, it understates profitability in periods of property appreciation. As a supplementary measure, most firms in the REIT industry disclose FFO. Because REITs calculate FFO by adding back depreciation to net income, FFO understates profitability less than does net income in periods of property appreciation. However, like net income, it does not reflect holding gains on unsold properties. Further, the exclusion of depreciation from FFO causes it to overstate profitability in periods of declining property prices. Besides the above-mentioned measurement problems, analysts also criticize FFO as being susceptible to manipulation. Specifically, some REITs are alleged to have manipulated their FFO upward by exercising discretion, among other things, over a revenue accrual called straight-line rents.

As a supplement to historical cost numbers, over the years, a few firms in the real estate industry have voluntarily reported current value financial statements. In contrast to net income and FFO, current value disclosures explicitly reflect estimates of holding gains and losses on unsold properties and unpaid liabilities. However, as is the case with FFO, analysts perceive current values as being unreliable.

2. Sample

Using the Center for Research in Security Prices (CRSP) tapes and Moody's manuals, we identified an initial sample of 198 real estate firms (CRSP SIC codes 6500 to 6599, 6798, and 6799). To be included in our initial sample, we require that the firm is not a real estate mortgage firm and that the firm has returns data on the CRSP tapes for at least one day during the period 1991–95. We select 1991 as the first year of our study because NAREIT issued its first definition of FFO in that year. We choose 1995 as the last year of study because several REITs adopted the revised NAREIT definition in 1996; consequently, FFO numbers in 1996 many not be comparable with those from 1991–1995.

From the initial sample of 198 firms, we eliminated 48 firms whose 10-Ks described them as being land development firms, firms with only equity holdings in real estate companies (similar to mutual funds), real estate brokers, and firms with operations outside of the United States. We mailed requests for annual reports to the remaining 150 firms and obtained responses from 99 firms. Of these firms, 87 reported FFO. Because our sample period has five years, with 87 firms, the maximum sample size possible is 435 firm-years. After excluding firm-years in which a change in fiscal year occurred, firm-years with missing financial statement data, and years in which firms were not publicly traded throughout the year, we obtain a final sample of 77 firms and 201 firm-years. Henceforth, we call these 201 firm-years the FFO sample. The firms in our FFO sample manage five types of properties: apartments, retail properties, hospitals, industrial properties, office buildings, or a combination of these.

3. Variables and Descriptive Statistics

3.1. Variable Definitions

The principal variables of interest for the FFO sample are net income (NI) and FFO. We hand-collected information on the two measures from annual reports and 10-Ks. While NI is always disclosed as a line item on the income statement, the location of FFO on the annual report varies across firms. After examining all the annual reports, we identified five classes of items that firms exclude from NI to derive FFO: depreciation and amortization (DEP), gain or loss on sale of properties (GL), writedowns of real estate (WRE), extraordinary items (EI), and other items (OTHER). Of the five items, GL, WRE, and EI each uniquely measure a single underlying construct.[11] In contrast, both DEP and OTHER are calculated by adding together multiple revenue or expense items. In particular, DEP includes depreciation of tangible assets, amortization of intangibles, amortization of deferred financing costs, and the parent's share of depreciation and amortization of unconsolidated subsidiaries. The other aggregate adjustment, OTHER, includes equity income, stock compensation expense, straight-line rents, and additional miscellaneous items. For a few firms, we could not identify all of the adjustments that would reconcile NI to FFO. We include the reconciliation differences for these firms in OTHER.

In our empirical work, we also examine operating cash flows (OCF), a measure closely related to FFO. REIT annual reports typically state that FFO is not intended as a substitute

for OCF, suggesting that the two measures contain information incremental to each other. In our inspection of annual reports we find three sources of differences between FFO and OCF: (i) changes in accounts receivable, inventories, and accounts payable, (ii) changes in working capital accounts such as restricted cash balances and funds held for non-owned properties, and (iii) other accruals such as equity income, stock compensation, and straight-line rents. Because these three types of adjustments represent an amalgam of items that include revenue accruals, expense accruals, and transfers of cash, we do not offer any ex ante predictions about the relative information content of OCF and FFO.[12]

3.2. Descriptive Statistics

Panel A of Table 1 presents the distributional features of some of the independent variables used in our regression tests for the FFO sample. All variables are deflated by the number of shares outstanding as of four months after the fiscal year end. The mean NI per share is \$0.93 and the mean FFO per share is \$1.71. Of the items that reconcile NI and FFO, DEP is the largest with a mean of \$0.80 per share. Compared to DEP, the mean values of EI, GL, WRE, and OTHER are quite small and range from −\$0.02 per share to \$0.09 per share. Inspection of the distributions of these four items reveals that WRE and EI have relatively few non-zero values and that these non-zero values are concentrated in the tails.

In Panel B of Table 1, we report Spearman correlations among the independent variables employed in our regressions. The correlation between NI and FFO is 0.71 and significant at the 1% level. The stong but less than perfect correlation between the two measures suggests that they share significant common variation but possess certain unique characteristics. For GL, WRE and OTHER, the sign of the correlations with NI are in the expected direction. Higher gains and losses (GL), higher other adjustments (OTHER), and lower writedowns (WRE) all lead to higher net income. The significant positive correlation between DEP and NI indicates that higher depreciation expense is associated with higher net income. Although this appears counter-intuitive at first glance, partial correlations (not reported) indicate that this positive correlation is caused largely by a size effect. Firms with high levels of sales per share have both higher DEP per share and higher NI per share; the correlation between DEP and NI, after controlling for the effect of sales per share, is −0.25. The significant positive correlation between FFO and DEP is also partially attributable to a size effect.

4. Comparing the Usefulness of Net Income and Funds from Operations

The FASB, in its Statementof Financial Accounting Concepts No. 2, suggests that predictive ability is an important attribute of the relevance of financial information (FASB, 1980). Therefore, we expect users of financial statements to favor the performance measure that is better able to explain future performance. With this objective in mind, we compare the usefulness of net income and FFO based on their abilities to explain cross-sectional variation in one-year ahead of FFO, one-year ahead net income, and one-year ahead operating cash flows (OCF). Similar analyses are conducted in Bowen, Burgstahler, and Daley (1986), and

Table 1. Descriptive statistics for REITs that report funds from operations.

Panel A: Distributional characteristics

Variable	Minimum	First quartile	Median	Mean	Third Quartile	Maximum	Standard Deviation
NI	−1.94	0.54	0.90	0.93	1.35	2.78	0.72
FFO	−0.07	1.08	1.68	1.71	2.23	4.48	0.83
DEP	0.06	0.46	0.76	0.80	1.05	3.36	0.48
EI	−1.38	0.00	0.00	−0.02	0.00	0.67	0.17
GL	−0.15	0.00	0.00	0.09	0.05	1.43	0.25
WRE	0.00	0.00	0.00	0.05	0.00	1.56	0.23
OTHER	−1.26	0.00	0.00	−0.02	0.00	0.37	0.12

Panel B: Spearman Correlations

	NI	FFO	EI	DEP	GL	WRE
FFO	0.71*					
EI	−0.06	−0.18**				
DEP	0.23*	0.73*	−0.13***			
GL	0.24*	0.02	0.06	−0.04		
WRE	−0.23*	−0.16**	0.09	−0.07	0.07	
OTHER	0.26*	0.19*	−0.17**	0.15**	−0.13***	−0.12

Note: Descriptive statistics are based on annual data for a sample of 77 REITs from the 1991–1995 period. We retained 201 firm-years in which the 77 REITs were traded throughout the year, did not experience a fiscal year change, and had complete financial statement data required for our tests.
Variable Definitions:

NI = Net Income per share
FFO = Funds from operations per share
EI = Extraordinary items per share
DEP = Depreciation and amortization per share
GL = Gain or loss on sale of properties per share
WRE = Asset writedown per share
OTHER = Other adjustments per share

* Denotes correlations significant at the 1% level.
** Denotes correlations significant at the 5% level.
*** Denotes correlations significant at the 10% level.

Greenberg, Johnson, and Ramesh (1986), among others, in the context of manufacturing firms.[13]

We triangulate our one-year ahead prediction results with tests of association of net income and FFO with stock prices. Because stock prices reflect information beyond the next year, our tests using stock prices as the dependent variable are broader and have the ability to capture the information contained in net income or FFO about future performance if such information is reflected in periods beyond one year. Because the two sets of dependent variables, future operating performance and stock prices, differ in the nature of information they reflect ex ante, we do not expect that they provide consistent answers about which performance measure is superior. Nevertheless, we believe that reporting both sets of

results helps provide a more complete understanding of the relative abilities of net income and FFO.

We use the Vuong test (Vuong, 1989) to compare the abilities of NI and FFO to explain cross-sectional variations for each of the four dependent variables, one-year ahead NI, one-year ahead FFO, one-year ahead OCF, and stock price. While the Vuong test compares the relative abilities of NI and FFO to explain stock prices, it does not explain the source of the differences in relative abilities. To address this second issue we examine whether the accrual adjustments that reconcile NI and FFO are associated with stock prices.

4.1. Tests of Relative Information Content for One-Year Ahead Performance

To compare the ability of NI and FFO to explain one-year ahead NI, FFO, and OCF we estimate the following pooled regressions for the 1991–1995 period[14]:

$$Y_{t+1} = \alpha_0 + \alpha_1 \, \mathrm{NI}_t \tag{1}$$

$$Y_{t+1} = \beta_0 + \beta_1 \, \mathrm{FFO}_t \tag{2}$$

where

$$\begin{aligned} \mathrm{NI}_t &= \text{Net income for year } t, \\ \mathrm{FFO}_t &= \text{Funds from operations for year } t, \\ Y_{t+1} &= \mathrm{NI}_{t+1}, \mathrm{FFO}_{t+1}, \text{ or } \mathrm{OCF}_{t+1}, \text{ and} \\ \mathrm{OCF}_{t+1} &= \text{Operating cash flows for year } t+1 \text{ (Compustat \# 308)} \end{aligned}$$

To reduce heteroscedasticity, we deflate all variables by the number of shares outstanding at the end of the fourth month after the fiscal year end. Further, to account for the effects of autocorrelation in the error structure and any remaining heteroscedasticity, we report standard errors and two-sided p-values based on the procedure described in Gallant (1987, p. 533).[15]

Table 2 reports the results of estimating Eq. (1) and Eq. (2). The first column reports the regression of one-year ahead NI on current NI. The coefficient on current NI is 0.73 and is significant at the 1% level. The coefficient implies that if NI increases by one standard deviation ($0.72, last column in Panel A of Table 1), one-year ahead NI will increase by $0.53. The second column reports the regression of one-year ahead NI on current FFO. The coefficient on current FFO is 0.52, and implies that a one standard deviation increase in FFO ($0.83) will be associated with a $0.43 increase in subsequent NI. Further, Table 2 indicates that NI explains 54.9% of the variation in one-year ahead NI, which is significantly greater than that explained by FFO (34.4%). The Vuong test statistic equals 3.41 and is significant at the 1% level. Thus, compared to FFO, net income has more explanatory power for next year's net income.

The third and fourth columns of Table 2 report the regressions of FFO_{t+1} on NI_t and FFO_t, respectively. The results indicate that FFO has significantly more explanatory power for future FFO than does net income. The Vuong test statistic equals 6.38 and is significant

Table 2. Explaining future performance using net income and funds from operations.

Dependent variable =	NI_{t+1}		FFO_{t+1}		OCF_{t+1}	
Independent Variables	1	2	3	4	5	6
Intercept	0.33 (6.29, 0.00)	0.13 (1.42, 0.16)	0.90 (10.23, 0.00)	0.18 (2.37, 0.02)	1.04 (11.00, 0.00)	0.11 (1.56, 0.00)
NI_t	0.73 (14.66, 0.00)		0.84 (9.34, 0.00)		0.80 (8.38, 0.00)	
FFO_t		0.52 (9.04, 0.00)		0.95 (17.78, 0.00)		1.00 (22.05, 0.00)
Adjusted R^2	54.9%	34.4%	55.5%	84.5%	39.9%	77.9%
Vuong statistic (p-value)	3.41 (0.00)		6.38 (0.00)		7.09 (0.00)	

Note: We estimate the following pooled cross-sectional regressions for a sample of 201 firm-years from the period 1991–1995:

$$Y_{t+1} = \alpha_0 + \alpha_1 NI_t$$
$$Y_{t+1} = \beta_0 + \beta_1 FFO_t$$

where

NI_t = Net income for year t,
FFO_t = Funds from operations for year t,
Y_{t+1} = NI_{t+1}, FFO_{t+1}, or OCF_{t+1}, and
OCF_{t+1} = Operating cash flows for year $t+1$ (Compustat # 308).

We deflate all variables by the number of shares outstanding four months after the fiscal year end. The numbers beneath the coefficient estimates are t-statistics and two-tailed p-values based on the heteroscedasticity and serial correlation consistent standard errors calculated according to the procedure in Gallant (1987). The Vuong statistic compares the explanatory power of regressions in adjacent columns that have the same dependent variable. See Table 1 for variable definitions.

at the 1% level. The estimated coefficients of the two variables (0.84 and 0.95) are both significant at the 1% level. These coefficients indicate that a one standard deviation increase in current NI (FFO) is associated with an increase in future FFO of \$0.60 (\$0.79) respectively. The final two columns report the results where the dependent variable is future OCF. In explaining future OCF, we find that current FFO dominates current net income, similar to the results in columns 3 and 4.[16]

The finding that net income is superior to FFO in explaining future net income is not surprising given that net income, in contrast to FFO, contains accruals such as depreciation that are likely to recur in next year's net income. What we find interesting is the result that FFO has more explanatory power than does net income for future cash flow measures. Indeed, in results not reported in tables here, OCF also dominates net income in terms of explanatory power for future FFO and future OCF. Thus, our results suggest that assertions by FASB (1980, 1981), that net income provides better forecasts of future cash flows than do current cash flows, are not valid for the REIT industry. Additionally, we find (but do

not report) that current FFO is significantly better than current OCF in explaining future FFO and is weakly better than current OCF in explaining future OCF. This suggests that the accrual adjustments that are contained in FFO, but excluded from OCF, improve FFO's relative ability to explain future cash flows.

4.2. Tests of Relative Information Content for Contemporaneous Stock Prices

We next compare net income and FFO on their abilities to explain contemporaneous security prices. We employ price models becasue Kothari and Zimmerman (1995) report that they yield earnings response coefficients that are economically more meaningful than those obtained from return models. Additionally, price models improve the power of our tests relative to return models because we have 201 observations to estimate price models whereas we have only 125 observations to estimate return models. However, price models are more likely to reject tests of heteroscedasticity and/or model misspecification than return models. Consequently, as a robustness check, we also compare FFO and net income on their ability to explain annual stock returns.

Easton, Harris, and Ohlson (1992) propose that when earnings have both permanent and transitory components, the current value of net income and book value of equity, respectively, capture these components in a price regression. Further, Ohlson (1995, p. 670, Eq. (7)) formally shows that price should be expressed as a linear function of net income, book value, and dividends. Accordingly, we include the end-of-the-year book value of equity and dividends as explanatory variables for stock prices, in addition to NI (FFO). Specifically, we estimate the following pooled regressions for the 1991–1995 period using ordinary least squares:

$$P_t = \alpha_0 + \alpha_1 \,\mathrm{NI}_t + \alpha_2 \,\mathrm{BV}_t + \alpha_3 \,\mathrm{DIV}_t \tag{3}$$

$$P_t = \beta_0 + \beta_1 \,\mathrm{FFO}_t + \beta_2 \,\mathrm{BV}_t + \beta_3 \,\mathrm{DIV}_t \tag{4}$$

where

P_t = Price per share on the announcement date of annual NI and FFO,
BV_t = End of year book value of equity per share (Compustat # 60), and
DIV_t = Dividends per share (Compustat # 21).[17]

We measure price at the date of announcement of annual earnings because both FFO and NI are first publicly available on that date. Before we discuss our results, we wish to emphasize that our tests do not allow us to compare the timeliness of net income and FFO. That is, the above regressions allow us to asses *whether* information in the performance measures is reflected in stock prices, but will not allow us to assess *when* such information is incorporated in stock prices.

Table 3 compares the ability of FFO and net income to explain variation in stock prices. As in Table 2, we report heteroscedasticity and autocorrelation consistent standard errors

Table 3. Explaining stock prices using net income and funds from operations.

Independent variables	1	2	3
Intercept	5.11	3.21	5.57
	(5.44, 0.00)	(3.18, 0.00)	(5.58, 0.00)
FFO_t		2.64	6.33
		(4.46, 0.00)	(5.38, 0.00)
NI_t	4.14		
	(5.45, 0.00)		
DEP_t			−6.86
			(−5.19, 0.00)
EI_t			−1.86
			(−1.63, 0.10)
GL_t			−0.36
			(−0.39, 0.70)
WRE_t			−1.92
			(−1.81, 0.07)
$OTHER_t$			12.70
			(4.42, 0.00)
BV_t	0.21	0.24	0.23
	(2.16, 0.03)	(2.22, 0.03)	(2.77, 0.00)
DIV_t	5.93	6.62	4.38
	(6.10, 0.00)	(6.47, 0.00)	(4.36, 0.00)
Adjusted R^2	61.3%	57.8%	68.0%
Vuong statistic[a] (p-value)	1.55 (0.12)		
F-statistic[b] (p-value)			13.12 (0.00)
F-statistic[c] (p-value)			14.82 (0.00)

Note: We estimate the following pooled cross-sectional regressions for a sample of 201 firm-years from the period 1991–1995:

$$
\begin{aligned}
P_t &= \alpha_0 + \alpha_1 \mathrm{NI}_t + \alpha_2 \mathrm{BV}_t + \alpha_3 \mathrm{DIV}_t \\
P_t &= \beta_0 + \beta_1 \mathrm{FFO}_t + \beta_2 \mathrm{BV}_t + \beta_3 \mathrm{DIV}_t \\
P_t &= \gamma_0 + \gamma_1 \mathrm{FFO}_t + \gamma_2 \mathrm{DEP}_t + \gamma_3 \mathrm{EI}_t + \gamma_4 GL_t \\
&\quad + \gamma_5 \mathrm{WRE}_t + \gamma_6 \mathrm{OTHER}_t + \gamma_7 \mathrm{BV}_t + \gamma_8 \mathrm{DIV}_t
\end{aligned}
$$

For the first two regressions, P_t is the price per share at the announcement of annual earnings for the year and for the third regression, P_t equals the price per share four months after the fiscal year end date. BV is the book value of equity (Compustat # 60) and DIV is annual dividends (Compustat # 21). We deflate all independent variables by the number of shares outstanding at the date on which price is measured. See Table 1 for other variable definitions. The numbers beneath the coefficient estimates are t-statistics and two-tailed p-values based on the heteroscedasticity and serial correlation consistent standard errors calculated according to the procedure in Gallant (1987).

[a] The Vuong statistic in column 1 compares the explanatory power of the regressions reported in columns 1 and 2.

[b] This F-statistic is a joint test of the null hypothesis that coefficients of DEP, EI, GL, WRE, and OTHER all equal zero.

[c] This F-statistic is a joint test of the null hypothesis that each of the coefficients of DEP, EI, GL, WRE, and OTHER are equal in magnitude to that of FFO.

and two-sided *p*-values. Column 1 of Table 3 reports the regression of stock price on NI, BV, and DIV. The coefficient on NI is 4.14 and is significant at the 1% level. This coefficient estimate implies that if NI increases by one standard deviation ($0.72, last column in Panel A of Table 1), stock price increases by $2.98. The second column reports the regression of price on FFO, BV, and DIV. The coefficient on FFO is 2.64 and implies that a one-standard deviation increase in FFO ($0.83) will be associated with a $2.19 increase in share price. Further, the model including FFO explains 57.8% of the variation in price, which is less than the 61.3% explained by the model including NI. However, the Vuong test statistic is 1.55 with an associated two-tailed *p*-value of 0.12, suggesting that the explanatory power of the two models is not very different.

In results not reported in tables here, we find that our conclusions are unchanged when we estimate Eq. (3) and Eq. (4) on a year-by-year basis. As an additional robustness check, we estimate univariate regressions of annual stock returns on each of NI and FFO. We measure stock returns by compounding daily returns over the one-year period ending on the date annual NI and FFO are announced. Consistent with the price regressions, we find that NI has more explanatory power for stock returns than does FFO. However, again, the difference in explanatory power is not statistically significant at the 10% level based on a Vuong test. Overall, the evidence indicates that net income explains prices better than does FFO, but only marginally so.[18]

4.3. Information Content of Accrual Adjustments for Contemporaneous Stock Prices

While the tests of relative information content compare FFO and net income with respect to their ability to explain stock prices, they do not help us understand the source of the differences in relative abilities. To address this second issue, we examine whether the accrual adjustments that reconcile net income and FFO are associated with stock prices.

The principal source of difference between NI and FFO is DEP. We expect DEP will be negatively correlated with stock prices for two reasons. First, buildings that are not well managed decline in value because of wear and tear, and DEP is likely to reflect this wear and tear, albeit imperfectly. Second, our sample is drawn from the years 1991–95; during the early part of this period, real estate prices declined significantly for most property types and in most geographical regions (Fisher, 1994). Besides DEP, the other accrual adjustment pertinent to our study is writedowns of real estate (WRE). WRE reflects the recognition by the management of the reduction in the value of the properties. Because reduction in the market value of the properties implies reduced rental income in the future, we expect WRE to be negatively related to stock prices.[19]

We also examine the value-relevance of gains or losses on debt extinguishment (EI) and property sales (GL). Because they are infrequent and peripheral to the main business of the real estate firms, GL and EI are likely to have a one-time effect on earnings and dollar-for-dollar impact on the market value of equity, in a simple setting. However, if GL and EI are recorded to smooth net income they will be negatively correlated with future operating cash flows and, in an efficient market, negatively correlated with the market value of equity. Hence, on average, we expect the coefficient on each of these two variables to be less than

one. The final component of NI, OTHER, is an amalgam of several revenues and expenses and hence we do not predict the sign of the coefficient on this variable.

To test our predictions, we estimate the following model:

$$P_t = \gamma_0 + \gamma_1 \mathrm{FFO}_t + \gamma_2 \mathrm{DEP}_t + \gamma_3 \mathrm{EI}_t + \gamma_4 \mathrm{GL}_t + \gamma_5 \mathrm{WRE}_t + \gamma_6 \mathrm{OTHER}_t + \gamma_7 \mathrm{BV}_t + \gamma_8 \mathrm{DIV}_t \quad (5)$$

Because information about the accrual adjustments is not available until the 10-K filing date, we use the price four months after the fiscal year end as the dependent variable in Eq. (5). Column 3 of Table 3 presents the results of estimating Eq. (5). The results indicate that the accrual adjustments collectively have significant explanatory power for stock prices. The F-test to test the null hypotheses that coefficients on the accual adjustments are jointly equal to zero is 13.12 and significant at the 1% level. Table 3 also reports that the F-statistic to test the null hypothesis that the coefficients on the accrual adjustments equal that on FFO is 14.82 (p-value = 0.00). Thus, the results indicate that the separate disclosure of the components of net income–FFO and the accrual adjustments is informative. As expected, depreciation has a significant negative coefficient, implying that higher depreciation expense is associated with lower stock prices. Write-downs of property values are also negatively associated with firm value, implying that the market perceives these discretionary accruals as informative about future performance. Both EI and GL are negatively related to stock prices. While the coefficient on EI is significantly different from zero at the 10% level, the coefficient on GL is not statistically different from zero.

In summary, we find that two accrual adjustments that reconcile net income and FFO, depreciation and writedowns of real estate, are negatively related to stock prices. Real estate industry analysts have claimed that the depreciation charge causes net income to understate profitability, and is hence uninformative. Our results suggest that, at least for the years 1991–1995, DEP has information content for stock prices. While FFO is a useful measure of performance as indicated by its correlation with stock prices, the accrual adjustment reflected in net income but not in FFO are incrementally informative.[20]

5. Evidence on Manipulation of FFO

In this section, we examine whether the discretion that REITs exercise over the straight-line accrual is related to factors that prior research has used to capture incentives for manipulation. In this manner, we provide evidence on the claim that FFO is manipulated and hence is unreliable.

From our sample of 77 firms (201 firm-years), we identify 44 firms (104 firm-years) that disclose in their footnotes that they use the straight-line method of revenue recognition. We focus on these 44 firms in the ensuing analysis. We do not consider the remaining firms as they either do not disclose their revenue recognition method or because they do not use the straight-line method and accrue rents when due.[21] Of the 104 firm-years that use the straight-line method, 78 firm-years do not subtract the straight-line rent accrual from net income and the remaining firm-years do subtract the straight-line rent accrual. We label the former as “aggressive” firm-years and the latter as “conservative” firm-years.

In our empirical analysis, we employ a binary choice model to examine whether aggressive and conservative firms differ systematically. Specifically we use probit maximum likelihood to estimate the following model:

$$D_t = \beta_0 + \beta_1 \,\mathrm{ROA}_t + \beta_2 \,\mathrm{DEBT}_t + \beta_3 \,\mathrm{FCF}_t + \beta_4 \,\mathrm{AGE}_t \tag{6}$$

where

D = Dummy variable that equals 1 for aggressive firms and 0 for conservative firms,

ROA = Net income deflated by total assets (Compustat items 172/6),

DEBT = Long term debt scaled by the sum of long term debt and the book value of equity (Compustat items $9/(9 + 216)$),

FCF = Operting cash flows less investing cash flows less dividends deflated by total assets (Compustat items $(308 - 311 - 21)/6)$), and

AGE = Number of years of trading on a stock exchange.

Firms with lower profitability have greater incentives to manipulate FFO upward for capital market or compensation reasons. Hence, we expect a negative coefficient on ROA, our proxy for profitability. Dechow, Sloan, and Sweeney (1996) document that firms are likely to access capital markets in the future, as indicated by financial constraints, are more frequently involved in SEC enforcement actions alleging earnings manipulation. Consistent with Dechow, Sloan, and Sweeney we use free cash flows of the firm (FCF) as a measure of financial constraints and predict a negative coefficient on FCF. Since we expect that younger firms are more likely to access capital markets in the near future, we predict a negative coefficient on AGE as well. Lastly, we expect that firms with high levels of debt are more likely to manipulate FFO upward, either because they wish to avoid debt covenant violations (Watts and Zimmerman, 1986) or because they are likely to access equity markets to retire their debt and increase their debt capacity.

Table 4 reports the coefficient estimates of Eq. (6) as well as the associated elasticities computed at the mean values of the independent variables as suggested by Judge et al. (1988). The overall explanatory power of the model, as indicated by the pseudo R^2, is 15.5%. As expected, the coefficient on ROA is negative; however, it is not significant at the 10% level. The coefficient on FCF is also negative and significant at the 1% level with an elasticity estimate of -1.12. The elasticity implies that a 1% decrease in FCF increases the likelihood of aggressiveness by about 1.1%. The coefficient on AGE is negative as predicted and significant at the 10% level implying that younger firms are more likely to manipulate their FFO upward than are older firms. Contrary to our prediction, the coefficient on DEBT is not positive; however, the coefficient is not significant at the 10% level. Overall, within the sample of REITs that use the straight-line method of revenue-recognition, we find predictable variation in whether or not straight-line rents are subtracted to calculate FFO. Financially cash-constrained firms and young firms that are more likely to visit capital markets tend to be more aggressive in their FFO calculations. Hence, our results are consistent with claims by certain analysts that REITs use straight-line rents to manipulate FFO.

Table 4. Binary Probit model of likelihood of conservative or aggressive FFO reporting.

Independent variables	Predicted sign	Coefficient estimate	Elasticity
Intercept		2.73	0.78
		(3.78, 0.00)	
ROA	−	−11.08	−3.19
		(−1.34, 0.18)	
DEBT	+	−1.21	−0.35
		(−1.51, 0.13)	
FCF	−	−3.91	−1.12
		(−3.09, 0.00)	
AGE	−	−0.42	−0.12
		(−1.87, 0.06)	
Pseudo R^2		15.5%	

Note: We model discretion by REITs over a revenue accrual called straight-line rents. We define firm-years that do not subtract the straight-line rent accrual from net income as aggressive firms and the firm-years that subtract the straight-line rent accrual as conservative firms. Of the 104 firm-years employed in our analysis, 78 are aggressive firm-years and 26 are conservative firm-years.

We use probit maximum likelihood to estimate the following model:

$$D_t = \beta_0 + \beta_1 \,\mathrm{ROA}_t + \beta_2 \,\mathrm{DEBT}_t + \beta_3 \,\mathrm{FCF}_t + \beta_4 \,\mathrm{AGE}_t$$

where

D = Dummy variable that equals 1 for aggressive firms and 0 for conservative firms,

ROA = Net income deflated by total assets (Compustat items 172/6),

DEBT = Long term debt scaled by the sum of long term debt and the book value of equity per share for year t (Compustat items $9/(9 + 216)$),

FCF = Operating cash flows less investing cash flows less dividends deflated by total assets (Compustat items $(308 - 311 - 22)/6$), and

AGE = Number of years of trading on a stock exchange.

The numbers in parentheses are t-statistics and associated two-sided p-values. The elasticity measure equals the increase in the probability of aggressive reporting, given a one-unit increase in the corresponding independent variable. All elasticities are evaluated at the mean values of the independent variables. The pseudo R^2 is calculated as $1 - (\mathrm{LnL} \,/\, \mathrm{LnL}_0)$ where LnL is the log likelihood and LnL_0 is the log likelihood with only the intercept term.

Given our evidence of systematic differences in the characteristics of the aggressive and conservative firms, the questions we turn to are (a) whether these firms differ in terms of subsequent operating performance and (b) whether the stock market prices them differently. If aggressive firms manipulate FFO to hide poor underlying performance, one would expect that they have poorer subsequent performance and, in an efficient market, lower stock prices than conservative firms. To test these predictions, we include the dummy variable for whether or not a firm is aggressive, D_t, as an additional explanatory variable for future NI in Eq. (2), and for stock prices in Eq. (4)[22]:

$$\mathrm{NI}_{t+1} = \beta_0 + \beta_1 \mathrm{FFO}_t + \beta_2 D_t \tag{7}$$

$$P_t = \beta_0 + \beta_1 \mathrm{FFO}_t + \beta_2 \mathrm{BV}_t + \beta_3 \mathrm{DIV}_t + \beta_4 D_t \tag{8}$$

Because D_t is itself an endogenous variable, we employ two-stage least squares to jointly estimate each of these two equations with Eq. (6), the equation for the likelihood of aggressive reporting.

In results not reported, we find that the coefficient on D_t in Eq. (7) equals -1.61 with a t-statistic of -3.54 (p-value = 0.00). Thus, aggressive firms record significantly lower future net income after controlling for the effect of current FFO. Additionally, we find that the coefficient on D_t in Eq. (8) equals -14.77 with a t-statistic of -3.21 (p-value = 0.00) indicating that aggressive firms have lower stock prices than do conservative firms. Thus, it appears that the stock market (a) recognizes that conservative FFO reporters deliberately subtract the straight-line rent accrual from net income and (b) values them higher than it values aggressive reporters.

6. Valuation of Net Income and FFO in the Presence of Current Value Disclosures

In this section, we present evidence on the market valuation of net income and FFO for a sample of real estate firms that voluntarily disclosed data on the current values of their assets and liabilities. Unlike net income and FFO, current values reflect estimated holding gains and losses on unsold properties and outstanding liabilities in a timely manner. To the extent current values reliably incorporate these holding gains and losses, and net income or FFO fail to do so, we expect current values to have information content for stock prices beyond that contained in NI or FFO. However, if investors perceive current value data as being highly unreliable, we should not observe a significant relation between current values and stock prices.

We identify twelve firms that report current value balance sheets in their financial statements, via an exhaustive search of the NAARS library of LEXIS-NEXIS service and the Dow Jones News Text Library of the Dow Jones Company. Our sample consists of 63 firm-years that span the years 1984–1995. Because eleven out of the twelve firms do not disclose FFO in their annual reports, we construct an FFO measure for these firms using data from the Compustat tapes. Specifically, we define FFO* as:

$$\mathrm{FFO}^* = \mathrm{NI} + \mathrm{MI} + \mathrm{DEP} - \mathrm{EI} - \mathrm{EQUITY}$$

where

NI = Net income (Compustat 172),
MI = Minority Interest (Compustat 44),
DEP = Depreciation and Amortization (Compustat 14),
EI = Extraordinary Items and Discontinued Operations (Compustat 48),

and

EQUITY = Equity income (Compustat 55).

To study the market valuation of NI (or FFO*) after controlling for current value information, we estimate the following pooled regressions:

$$P_t = \alpha_0 + \alpha_1 \mathrm{NI}_t + \alpha_2 \mathrm{BV}_t + \alpha_3 \mathrm{DIV}_t + \alpha_4 \mathrm{DIFF}_t \tag{9}$$

$$P_t = \beta_0 + \beta_1 \mathrm{FFO}_t^* + \beta_2 \mathrm{BV}_t + \beta_3 \mathrm{DIV}_t + \beta_4 \mathrm{DIFF}_t \tag{10}$$

where,

P_t = Price per share measured at the 10-K date, and
DIFF_t = Difference between current and historical cost of properties per share.

We measure price at the 10-K date because current value information is first publicly available at this date for most firm-years in our sample. DIFF_t is the variable of principal interest in the ensuing analysis. It captures cumulative holding gains or losses on unsold properties that are not explicitly measured and reflected in the historical cost system represented by NI (or FFO*) and BV. We focus on current value data for properties because a substantial proportion of the difference between historical cost and current value balance sheets is attributable to properties. However, in results not reported in tables, our conclusions are unchanged when we include the differences between current value and historical cost for other assets and liabilities as additional explanatory variables.

In Panel A of Table 5, we report descriptive statistics on the variables employed in our regressions as well as certain other characteristics of the current value sample. The median NI is 24 cents per share and the median FFO* is 98 cents per share. A comparison of these medians with those of the FFO sample in Table 1 indicates that the current value firm-years are far less profitable than are the FFO sample firm-years. DIFF has a median of $18.37 per share and ranges from 42 cents per share to $51.40 per share. Thus, positive cumulative unrealized holding gains are pervasive in our sample. While this suggests that our sample firms' properties have experienced appreciation, it is also consistent with optimistic reporting of current values by these firms.

Panel A also reports descriptive statistics on the ratio of price per share to the current value of shareholder's equity per share. Because the current value of equity is the management's estimate of the net worth of the firm, this ratio is a summary measure of the market's perception of the reliability of current value data. For example, if the market believes that the current value accurately measures the true underlying value of the firm, then this ratio

Table 5. Market valuation of net income and FFO in the presence of current value information.

Panel A: Distributional characteristics

Variable	Minimum	First quartile	Median	Mean	Third quartile	Maximum	Standard Deviation
P	0.81	3.00	17.06	8.50	24.00	91.50	20.32
NI	−6.49	−0.59	0.24	0.05	0.33	5.62	1.72
FFO*	−3.78	0.12	0.98	0.51	1.31	7.36	1.73
BV	−12.85	0.36	3.90	2.38	5.27	31.04	8.20
DIV	0.00	0.00	0.45	0.58	0.72	2.40	0.70
DIFF	0.42	5.63	18.37	13.89	31.93	51.40	14.40
P/C	0.09	0.42	0.58	0.53	0.76	1.58	0.30

Panel B: Regressions of price per share on various variables ($n = 61$)

Independent variables	1	2	3	4	5	6
Intercept	8.45	4.44	1.09	−0.16	6.13	6.45
	(5.56, 0.00)	(3.69, 0.00)	(0.49, 0.62)	(−0.10, 0.92)	(1.17, 0.24)	(1.34, 0.18)
NI	8.93		5.38		5.80	
	(5.31, 0.00)		(3.08, 0.00)		(4.01, 0.00)	
FFO*		9.82		6.40		7.02
		(8.22, 0.00)		(5.15, 0.00)		(5.07, 0.00)
BV	0.13	0.26	0.63	0.66	0.60	0.62
	(0.34, 0.73)	(1.18, 0.24)	(1.79, 0.08)	(3.31, 0.01)	(2.38, 0.17)	(3.03, 0.00)
DIV	9.53	3.31	6.20	2.89	6.22	2.61
	(6.02, 0.00)	(2.16, 0.03)	(5.13, 0.00)	(2.13, 0.04)	(4.43, 0.00)	(1.58, 0.11)
DIFF			0.46	0.36	0.41	0.29
			(5.70, 0.00)	(3.55, 0.00)	(4.43, 0.00)	(3.00, 0.00)
MILLS					−2.08	−2.80
					(−1.02, 0.30)	(−1.44, 0.15)
Adjusted R^2	82.63%	86.7%	88.63%	89.7%	88.62%	89.9%

Note: Our sample consists of 12 firms (63 firm-years) that include current value balance sheets in their annual reports during the years 1984–1995. To study the information content of current value data after controlling for net income (or FFO), book value of equity and dividends, we estimate the following pooled regressions:

$$P_t = \alpha_0 + \alpha_1 \mathrm{NI}_t + \alpha_2 \mathrm{BV}_t + \alpha_3 \mathrm{DIV}_t + \alpha_4 \mathrm{DIFF}_t$$
$$P_t = \beta_0 + \beta_1 \mathrm{FFO}^*_t + \beta_2 \mathrm{BV}_t + \beta_3 \mathrm{DIV}_t + \beta_4 \mathrm{DIFF}_t$$

where P_t is the price per share measured in the 10-K date, NI is the net income per share, BV is the book value of equity per share, DIV is the dividends per share, and $DIFF_t$ is the difference between current and historical cost of properties per share. FFO* is defined to equal NI + MI + DEP − EI − EQUITY (see text for Compustat numbers for the items used to calculate FFO*). In Panel A, we report the distributional characteristics of the variables employed in the above regressions. P/C is the ratio of price per share to current value of equity per share. Panel B reports regression results. The variable MILLS is defined in the text of the paper. The numbers in parentheses are t-statistics and two-tailed p-values based on heterscedasticity and autocorrelation consistent standard errors calculated using the procedure described in Gallant (1987).

should be greater than or equal to one. The median price to current value per share is 0.58, indicating that the market discounts the disclosed current value by about 40 percent, on average.

In Panel B of Table 5, we report ordinary least-squares estimates of Eq. (9) and Eq. (10) in the third and fourth columns. In the first and second columns, we report estimates of the two equations excluding the DIFF variable for comparison with earlier results. As we do with the results in Tables 2 and 3, we report heteroscedasticity and autocorrelation-consistent standard errors and p-values. In the first column, the coefficient on NI equals 8.93 and is significant at the 1% level. Surprisingly, the coefficient on BV is not significantly different from zero. Together, NI, BV, and DIV explain 82.6% of the variation in price per share. When we substitute FFO for NI, the explanatory power of the model increases to 86.7%. Thus, for the current value sample, based on adjusted R^2, FFO appears to be more informative about stock prices than is net income.

The results in the third and fourth columns indicate that, as expected, DIFF has incremental explanatory power for stock prices after controlling for NI (or FFO), BV, and DIV. The coefficient on DIFF is positive and significant at the 1% level in both Eq. (9) and Eq. (10). If information in DIFF is relevant and highly reliable then an increase in DIFF should have a dollar-for-dollar impact on stock prices. If, however, the stock market perceives DIFF as an unreliable measure, then its coefficient should be significantly less than one. We find that the F-test of the restriction that the coefficient on DIFF is equal to one is rejected at the 1% level for both Eq. (9) and Eq. (10). Thus, although DIFF is significantly associated with stock prices, it is perceived as an unreliable measure. Interestingly, the coefficients on both NI and FFO drop by roughly one-third when DIFF is included. However, both variables remain statistically significant at the 1% level. Further, while the intercept is positive and statistically significant at the 1% level in columns 1 and 2, it is statistically indistinguishable from zero when DIFF is included.[23]

We conduct a series of robustness checks (results not reported in tables) to ensure that the above results are not sensitive to model specification. Our conclusions remain unchanged when we include the differences between current value and historical cost for other balance sheet assets and liabilities as additional explanatory variables, employ price at the earnings announcement date as the dependent variable, or estimate the regressions in first-difference form. To check whether stock prices reflect firm-specific information in DIFF, as opposed to market-wide movements in property values, we include a measure of market-wide changes in property values. Specifically, we include the percentage change in the NCREIF property price index, as an additional explanatory variable in Eq. (9) and Eq. (10).[24] Our results are unaffected by the inclusion of this variable. Finally, our conclusions are also invariant to the inclusion of the other components of NI besides FFO (i.e., DEP, EI, and EQUITY) as additional explanatory variables in the regression reported in column 4.

Because current values are voluntary disclosures, firms that disclose them are not likely to constitute a random sample from the population of real estate firms. Consequently, the estimates of Eq. (9) and Eq. (10) could potentially suffer from selectivity bias. To address this possibility, we adopt the two-stage procedure proposed by Heckman (1979). In the first stage, we use a binary probit formulation to model the probability of disclosing current values as a function of three variables. We expect that firms whose market values are

furthest from their book values, in absolute terms, are more likely to perceive themselves as being misvalued and hence more likely to disclose current values. We expect that less profitable firms are more likely to perceive themselves as being undervalued and hence more likely to disclose current values. Lastly, larger firms have a greater number of properties; hence, investors are likely to find it more difficult to estimate the current values of these firms. Consequently, we expect larger firms to be more likely to disclose current values. To measure the three variables, we use the decile rank of the absolute value of the market-to-book ratio (MB), the decile rank of NI deflated by total assets (ROA), and log of total assets (SIZE). Decile ranks of both market-to-book ratios and net income deflated by assets are calculated based on their respective cross-sectional distributions for all real estate firms at the end of each year. The probit model is estimated for a pooled sample consisting of the 61 firm-years in the current value sample (coded 1) and 2,822 firm-years of real estate firms that did not disclose current values in the years 1984–1995 (coded 0).[25] In the second stage, we use ordinary-least-squares to estimate Eq. (9) and Eq. (10) for the current value sample alone, including a variable (MILLS) to capture the probability of disclosure of current values (the inverse mills ratio obtained from the first-stage estimation).[26]

The final two columns of Panel B report the selectivity bias-adjusted estimates of Eq. (9) and Eq. (10). The coefficient on DIFF remains positive and statistically significant at the 1% level for both equations. Thus, it appears that DIFF is a significant explanatory variable for stock prices even after accounting for the non-random nature of the current value sample.

Overall, the results in Table 5 indicate that the difference between the current value of properties and the book value of properties is a significant explanatory variable for stock prices after controlling for NI (or FFO), book value of equity, and dividends. These results imply that both net income and FFO fail to capture a value-relevant piece of information, holding gains or losses on unsold properties. Additionally, we find that for our sample of current value reporting firms, FFO has more explanatory power for stock prices than does net income.

7. Conclusions

We conduct three sets of analyses to compare the usefulness of traditional GAAP-based net income and the industry-advanced funds from operations in the context of the real estate investment trust industry. In our first set of tests, we compare the two measures in terms of their ability to explain subsequent operating performance and contemporaneous stock prices. We find that FFO is more strongly associated with one-year ahead FFO and one-year ahead operating cash flows than is net income. This result suggests that assertions by the FASB that net income is a better predictor of future cash flows than FFO do not hold in the real estate investment trust industry. Conversely, we find that net income explains more variation in one-year ahead net income and current stock price than does FFO; however, the difference in explanatory power for stock price is not statistically significant. Overall, our analysis suggests that an uni-dimensional comparison of net income and FFO is of limited use, as the superiority of one measure over other is highly contextual.

In our second set of tests, we document that REITs exercise over a revenue accrual called straight-line rents in response to incentives to manage earnings. Specifically, we find that

younger firms and firms with poor free cash flows, both of which have a higher need for external financing, are more likely to manage FFO. Hence, our results are consistent with claims by certain anlaysts that REITs use straight-line rents to manipulate FFO.

In our third set of tests, for the limited sample of firms that disclose current values, we examine the value-relevance of net income and FFO in the presence of information on current value of properties. We find that, despite the perceived lack of reliability of current values, the difference between current and book value of properties is associated with stock prices. Thus, it appears that both net income and FFO fail to reflect a value-relevant piece of information, holding gains or losses on unsold properties, in a timely manner.

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Notes

1. REITs are real estate firms whose dividends are taxed at the individual level alone, and not at the corporate level provided they satisfy certain conditions. Fass, Schaff and Zief (1996) provide a detailed discussion of the conditions that a real estate firm must satisfy to qualify as a REIT. Before 1990, most REITs were passive investment vehicles whose properties were managed by external advisors. Post-1990 REITs differ from pre-1990 REITs in that they are fully integrated operating companies that can be characterized as 'management plays' rather than as passive conduits of investors' capital.
2. Real estate values, defined as the sum of the value of land and buildings, could be higher than historical cost book values less accumulated depreciation for two reasons. First, both land and building values depend primarily on location rather than on use or age, and will hence increase if the location becomes more desirable. Second, buildings or land improvements, if properly maintained, can have useful lives that far exceed the allocation period typically used for financial reporting purposes (ranging from twenty to forty years).
3. We are not aware of any prior research that examines the stock market valuation of disclosed current values in a regression framework that includes net income, book value of equity, and dividends as explanatory variables for stock prices. Palmon and Seidler (1978) document the absence of a significant stock price reaction to the release of current value financial statements by six real estate firms in 1977. Damodaran and Liu (1993) study 77 announcements of appraised value of properties by 54 firms that were reported in the *Realty Stock Review* in the 1982–89 period. Similar to Palmon and Seidler they find that the mean abnormal stock return at the date of the public announcement of current value data is not different from zero. However, they find that current value information is positively associated with abnormal stock returns over the period beginning with the month of appraisal and ending on the date of public announcement of appraised values.
4. NAREIT is an industry organization whose members are primarily publicly traded REITs and individuals that share an interest in the REIT industry. Its principal activities include lobbying Congress to enact favorable REIT legislation, working with the Internal Revenue Service and the Securities Exchange Commission (SEC)

to seek more flexible regulatory rules affecting REITs, producing and publishing information to educate the industry and its investor community, and promoting the REIT investment vehicle among institutions and individuals.

5. In 1991 NAREIT definition specified that depreciation and amortization were to be added back without specifying the types of depreciation and amortization that could be added back. Some real estate firms used this lack of clear guidance to their advantage and added back items such as amortization of deferred financing costs and depreciation of non-real estate assets. NAREIT issued the new definition with the objective of discouraging this practice.
6. Users will not be able to reconstruct FFO from GAAP-based financial statements even if a firm provides a detailed statement reconciling net income and FFO. This is because, in many cases, the reconciling items do not appear elsewhere in the financial statements (e.g., depreciation of real estate assets).
7. The concern that REITs manipulate FFO with straight-line rents led NAREIT to recommend in its 1995 White Paper on FFO that all REITs *disclose* the magnitude of straight-line rent accrual in their financial statements.
8. The two broad approaches used to estimate current values of properties by real estate appraisers and real estate firms are the fair value approach and the discounted cash flow approach. Under the fair value approach, current value estimates are based on recent selling prices of comparable properties. Under the discounted cash flow approach, future cash flows associated with each property are estimated and discounted using a fair rate of return. Downs (1991) and Hodges (1993) review the application of these methods in the real estate industry.
9. Because changes in current value of properties are likely to be correlated with changes in rental income, a portion of the information contained in current values will be contemporaneously reflected in net income and FFO. However, because REITs enter into long-term leases that contain fixed rent clauses or predetermined escalation clauses that do not perfectly anticipate changes in demand for properties, we expect that current value information will contain information beyond that contained in net income or FFO.
10. Searfoss and Weiss (1990) and Swanson and Niswander (1992) review the history of the efforts of the FASB and AICPA to develop standards for current value reporting in the real estate industry. In March 1995, the AICPA issued a proposed statement of position (SOP) entitled, "Reporting by Real Estate Companies of Supplemental Current Value Information" (AICPA, 1995). The SOP would have been applicable to current value information voluntarily reported for fiscal years beginning after December 15, 1995. However, the SOP project was removed from the AICPA's agenda in October, 1996. While we are not cognizant of the circumstances that led to the removal of the project, we suspect that it was removed because of (i) declining property prices in the 1990s that mitigated the lack of relevance of historical cost numbers and (ii) the development and widespread use of FFO as an alternative performance metric.
11. In our sample, extraordinary items represent, in almost all cases, gains or losses on the extinguishment of debt.
12. An additional difference between the two measures arises because of the way some REITs treat the parent's share of depreciation of unconsolidated subsidiaries in calculating FFO. Under GAAP, REITs are required to exclude the parent's share of NI in subsidiaries (equity income) from OCF. To calculate FFO, however, some REITs do not exclude equity income, but instead add back the parent's share of depreciation alone to NI. By doing so, these REITs effectively include parent's share of revenues and non-depreciation expenses in FFO, thus resulting in proportionate consolidation. In these cases, while FFO includes the parent's share of revenues and non-depreciation expenses, OCF does not.
13. A difficulty with restricting ourselves to one-year ahead predictions is that the information contained in current year's NI or FFO need not necessarily be reflected in next year's performance. For example, asset writedowns that are reflected in NI may result in reduced rental income only two or three years following the year of the writedown. However, because explaining variation in two- or three-year ahead NI or FFO greatly reduces the number of observations in our sample and limits the power of our tests, we restrict our analysis to explaining one-year ahead performance.
14. Throughout the paper, to conserve space, we omit the firm-specific subscripts and the error term in the regression specifications.
15. The standard errors based on the Gallant (1987) procedure were calculated using the PROC MODEL statement in SAS. Hamilton (1994, Chapter 10, p. 282–284) contains the exact expression for the form of the variance-covariance matrix used to calculate the standard errors for the regressions. We found that the Durbin-Watson statistic to test for autocorrelation of the residuals ranged from 1.01 to 1.49 for the price regressions and from 1.44 to 1.75 for the prediction of future operating performance regressions. Thus, autocorrelations in residuals were sufficiently large to warrant using the GMM procedure. Besides autocorrelation and heteroscedasticity,

cross-correlation in the residuals could cause the standard errors of our coefficient estimates to be understated. Frees (1995) presents a method for assessing cross-correlation in panel data that involves calculating Spearman correlations for all firm-pairs in the dataset and aggregating these correlations. Unfortunately, we have very few time-series observations (at most 5) and therefore are unable to assess the extent of cross-correlation.

16. In results not reported in tables, we find that these conclusions hold on a year-by-year basis. Although there is some variation in the magnitude of the year-by-year coefficients and a reduction in adjusted R^2 due to smaller sample sizes, the relative rankings of the adjusted R^2 yield conclusions similar to those obtained for the pooled regressions.
17. Two issues related to the specification of Eq. (3) and Eq. (4) are worth noting. First, we believe that including dividends in Eq. (3) and Eq. (4) is especially important to understand the pricing of REITs because of their high tax-motivated dividend distributions. However, we obtain similar results when we exclude dividends as an explanatory variable for prices. Second, because FFO does not include a charge for depreciation whereas BV reflects such a charge, Eq. (4) is not consistent with the clean-surplus assumption in the Ohlson (1995) model. To make Eq. (4) compatible with clean surplus, we add back accumulated depreciation to book value equity and substitute the adjusted book value number for BV. Our conclusions remain unchanged when we estimate this modified regression.
18. We also evaluate the explanatory power of current period OCF for stock prices, relative to that of FFO. We find that OCF has marginally lower explanatory power (adjusted $R^2 = 57.3\%$) than does FFO (adjusted $R^2 = 57.8\%$). Thus, neither of the two measures clearly dominates the other.
19. Prior evidence on the relation between depreciation expense and stock prices for manufacturing firms is mixed. Lipe (1986) finds that annual change in depreciation is associated with lower contemporaneous abnormal stock return for a significant number of firms in his sample. In contrast, Christie (1987) finds that depreciation expense scaled by shares outstanding is unrelated to market value. More recently, Jennings et al. (1996) find that depreciation expense is negatively related to the market value of equity. With respect to writedowns, Francis, Hanna, and Vincent (1996) document that the average stock market reaction for a sample of 674 asset writedown announcements from the years 1988–1992 is negative.
20. We also examined the information content of OCF, beyond that contained in FFO. Specifically, we decomposed FFO into (i) OCF and (ii) DFO, the difference between FFO and OCF, and substituted these two variables for FFO in Eq. (5). We find that the F-statistic to test the equality between OCF and DFO equals 0.09 and is not statistically significant at conventional levels. Thus, decomposing FFO into OCF and DFO does not have information content beyond that contained in FFO alone.
21. Of the remaining 33 firms, 28 firms disclose that they accrue rents as they are received or become due, and five firms do not disclose their revenue recognition method. We believe that the choice of whether or not a firm straight-lines rental income is primarily a function of the type of properties it manages and the length of its rental leases and is not motivated by earnings management. For example, apartment REITs typically have one-year leases and hence do not straight-line rents.
22. Results are unchanged when we include NI instead of FFO on the right-hand side in Eq. (7) and Eq. (8).
23. The drop in the coefficients on NI and FFO when DIFF is included in the regression could be caused by multicollinearity. Belsley, Kuh, and Welsch (1980) state that multicollinearity is a problem when the condition numbers of the matrix of independent variables exceed 20. We find that the condition numbers for the matrix of independent variables in both Eq. (9) and Eq. (10) are less than 9.
24. The NCREIF index is the most widely cited and used measure of changes in commercial property values in the U.S. At the end of 1993, it included 1,568 properties with aggregate appraised value of over $20 billion. Institutional investors such as pension funds own these properties. For a discussion of how this index is constructed, see Fisher (1994).
25. We find, but do not report in tables, that coefficients on all three variables, MB, ROA, and SIZE, have the expected signs and are significant at conventional levels. The pseudo R^2 of the probit model is 20.33%.
26. The inverse mills ratio is calculated for each observation t in the current value sample as $\phi(\alpha' z_t)/\Phi(\alpha' z_t)$ where α is the 3×1 vector of first-stage probit coefficient estimates, z_t is the 3×1 vector of values of independent variables in the probit model for obseration t, ϕ (.) is the estimated probability from the probit model, and Φ (.) is the cumulative probability.

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