Stock Market Information and REIT Earnings Management*

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ABSTRACT

This paper investigates the interaction between stock price movement and REIT earnings management. We examine whether information generated from stock price volatility influences managers' incentives to engage in earnings management. We first test if stock investors are able to detect earnings management by examining whether REITs that are suspected of engaging in earnings management have fundamental values less closely tracked by their stock prices. Consistent with the efficient markets hypothesis, we find that suspected earnings-management firms do not appear to be more mispriced than others. We further inquire into the feedback effect of stock market trading activity on earnings management. Using idiosyncratic volatility as a measure of private information embedded in stock price, we find that negative real earnings management, which allows REITs to circumvent the mandatory dividend payout requirement, is associated with greater information embedded in REIT stock prices. Our result implies that information contained in stock price volatility motivates REIT managers to more actively avoid regulatory costs.

1 Introduction

The influence of stock investors on corporate decisions has stimulated considerable scrutiny in the corporate finance literature. Stock investors express their view of a firm's future prospects via stock trading. As one of the bonding and monitoring mechanisms described by Fama and Jensen (1983), "stock prices are visible signals that summarize the implications of internal decisions for current and future net cash flows. This external monitoring exerts pressure to orient a corporation's decision process toward the interests of residual claimants."[1] Consistent with the *monitoring role* of stock investors, many empirical studies document that stock prices react to corporate decisions.[2] In general, abnormal stock returns tend to be positive when decisions made by managers are aligned with shareholders' interest, and negative if otherwise.

In addition to the monitoring role of stock investors, recent studies also suggest that stock investors may have an *information role*. Private information regarding firm fundamental values is capitalized into stock prices via stock trading. This information, which might be previously unknown to managers, is revealed via stock trading patterns and can impact managerial decision-making. In other words, stock prices change in response to management decisions and from actively generated information. The monitoring and information roles of stock investors combine to promote corporate decisions that maximize shareholder's wealth.

While numerous studies show that investor trading activity impacts corporate decisions, the effects on earnings management have received limited attention.[3] We fill this gap by focusing on the interaction between stock price movement and earnings management to resolve two questions: Are stock investors able to detect earnings management and understand its consequence? And, more importantly, how do changes in stock prices affect manager incentives to perform earnings management? Our research questions are important for a number of reasons. Studying the connection between stock price movement and earnings management

poses a more rigorous test on the efficient market hypothesis. Unlike most other corporate decisions, such as investment and financing activities, earnings management decisions are not publicly announced. Thus, to discover earnings management, stock investors need to have substantial knowledge about accounting standards, tax rules, and the company's underlying business activities. Moreover, because earnings management often involves complicated inter-temporal tradeoffs, it is challenging to understand the implication of earnings managements on current and future firm performance. Thus, by studying earnings management, we test investor ability to synthesize and price information.

Investor ability to price earnings management impacts the incentives for management to engage in earnings manipulation. If earnings management is indiscernible to investors, then information asymmetries may arise and hinder efficient corporate decisions. For instance, the desire for higher share prices may push managers to sacrifice growth potential in order to boost current earnings. If investors do not detect this manipulation, then they are unable to perform their monitoring and information roles, creating a source of market incompleteness. On the other hand, if the stock market is efficient, then informed investors will see through earnings management and correctly price shares. Thus, the incentive for managers to deceive investors via overstated earnings may be removed.[4]

The answers to these research questions may differ with respect to the types of earnings management. Thus, we focus on earnings management in two different dimensions. First, earnings may be manipulated in positive and negative directions. While inflated earnings appear to be a more common issue covered by academic research and news media, negative earnings management may also exist. In addition, earnings manipulation can occur through *accruals management* and *real earnings management* (REM). Each possesses distinct features that may impact investors differently and trigger asymmetric responses. Thus, we study both dimensions to gain a comprehensive understanding of managers' motivation to obscure true economic performance.

We use a sample of Real Estate Investment Trusts (REITs) to study these questions. The use of REIT data enables a richer understanding of our research questions due to the potential payoffs associated with positive and negative earnings management. For example, the mandatory dividend payout requirement of REITs creates an incentive to report lower profits. To maintain their favorable tax status, REITs must pay out 90 percent of their taxable income.[5] Manipulating income downward reduces the required dividend payout. Edelstein, Liu, and Tsang (2007) find that REITs often employ earning-reducing manipulations to meet this regulatory dividend constraint. However, the motivation for REIT managers to undertake such an action remains unclear, and so does its implications on shareholder wealth. If reducing dividends exacerbates agency problems such as empire building and perquisite consumptions, then negative earnings management could harm shareholders. Alternatively, if cash is retained as financial slack and used for investment in positive net present value (NPV) projects, then firm value may rise due to a decline in regulatory costs. The efficient market hypothesis implies that stock investors can foresee the consequences of such actions. Therefore, if negative earnings management harms shareholders' interest, then it should be limited by their monitoring activity. On the other hand, if negative earnings management are used to decrease regulatory cost, then it should be promoted.

We turn to the accounting literature for methods of identifying firms that perform accruals management and REM. We examine whether stock investors have sufficient information to price earnings management by comparing a measure of stock-price informativeness, which is defined as the amount of information about future earnings contained in current stock prices, across suspected earnings-management (EM) firms and non-earnings-management (non-EM) firms. If stock investors are unable to identify earnings management, then managers could take advantage of uninformed investors by manipulating current period earnings through deceptive earnings announcements and/or sub-optimal operations. Alternatively, if information about earnings management is captured by investors, then stock-price informativeness

should be similar across all firms. In this case, the market efficiency hypothesis is supported. The monitoring role and information role of investors should promote earnings management practices that maximize shareholders' interest and discourage ones that do not.

Our empirical results confirm the efficient market hypothesis: we find that stock price informativeness is not systematically different between suspected EM firms and non-EM firms. This result is robust for two different stock price informativeness measures, and indicates that investors appear to detect and price earnings management. No evidence suggests that significant information asymmetry is attributable to earnings management. Hence, the monitoring and information roles of investors are likely to be effective and lead to earnings being reported in a way that maximizes shareholders' wealth.

We further inquire into the feedback effects of information embedded in stock price volatility on earnings management. We examine the association between earnings management and information embedded in stock prices to see if this information can in fact influence earnings management. We adopt idiosyncratic stock return volatility as a measure of private information contained in stock prices. Greater idiosyncratic volatility represents more private information being capitalized into stock prices. With greater transparency and scrutiny, the monitoring and information functions of investors should be stronger. If earnings management is positively correlated with idiosyncratic volatility, it is more likely to be aligned with shareholders' interest. A negative relation implies that earnings management adversely affects shareholders' interest and may be limited via either more effective monitoring or better information.

We find that idiosyncratic stock return volatility has a strong positive correlation with negative REM. This result supports the hypothesis that negative REM may increase firm value through greater retained earnings to overcome future financial constraints. Negative REM reduces regulatory costs by providing a back door for REITs to circumvent the mandatory

payout requirements.

To our knowledge, no prior study has examined the relation between stock price volatility and positive and negative earnings management. Our study contributes to the literature in multiple dimensions. First, we contribute to the finance literature examining market efficiency by showing that stock price volatility is not associated with greater information asymmetry. Instead, stock investors are aware of earnings management and its consequence, and the monitoring and information roles of investors induce earnings manipulation to be performed in a way that is aligned with shareholders' interest.

Second, our study also contributes to the accounting and finance literature by examining the interaction between stock price movement and negative earnings management. In contrast to previous earnings management literature, we provide evidence that negative earnings management may in fact benefit REIT shareholders.

Finally, we contribute to the real estate literature by addressing the ongoing debate of whether or not equity securitization of real estate portfolios through the REIT structure adds value by allowing information regarding portfolio management investment decisions to be processed more efficiently. We show that negative earnings management, which provides flexibility for REITs to choose their dividend payout ratio, appears to be consistent with shareholders' interest. The positive correlation between negative earnings management and idiosyncratic stock return volatility implies that REIT stock prices are informative. As a result, we show that stock price volatility enhances managerial efficiency.

Our paper is organized as follows. Section 2 develops the research hypotheses in a greater detail. Section 3 describes the data used in the empirical analysis. Section 4 discusses the various proxies used for determining the presence of earnings management. Section 5 describes the procedure used to estimate embedded information in stock prices. Section

6 addresses the question of whether investors can detect earnings management. Section 7 follows by answering the question of how stock price movements impact earnings management. Section 8 discusses various robustness checks and concluding remarks are presented in section 9.

2 Hypotheses Development and Background

2.1 Earnings Management

According to Healy and Wahlen (1999), "earnings management occurs when managers use judgment in *financial reporting* and in *structuring transactions* to alter financial reports to either mislead some stake holders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."[6] Several motivations may drive earnings management. First, earnings management may affect stock prices. It maybe the case that the manager/entrepreneur intends to take advantage of uninformed shareholders. Overstating earnings may bring higher proceeds in initial public offers (IPOs) (Teoh, Welch, and Wong, 1998a), seasoned equity offers (SEOs) (Teoh, Welch, and Wong, 1998b), and stock financed acquisitions (Teoh, Wong, and Rao 1998). On the other hand, "modest" earning reports reduce cash outlays for management buyouts (DeAngelo, 1988) and stock repurchases (Gong, Louis and Sun, 2007). Moreover, earnings management may also help managers meet analyst forecasts (Burgstahler and Eames (2006)). In general, information asymmetry appears to be the key that drives earnings management. However, agency cost is not the only reason behind earnings manipulation. Rather, as Bolton, Scheinkman and Xiong (2005) point out, earnings manipulation can be a result of conflict between current and new shareholders. This argument is supported by a series of studies that show that traditional corporate governance devices, such as concentrated ownership and smaller boards, are associated with more earnings management (Yu, 2005).

Second, earnings management may also impact contractual outcomes, such as management's incentive to maximize their compensation. For example, managers are more likely to defer realization of revenue when there is a cap to their compensation.[7] In addition, Dechow and Sloan (1991) find that CEOs often reduce research and development expenditure to boost income during their final year in office. Other empirical evidence indicates that managers use earnings management to avoid the violation of debt covenants.[8]

Finally, earnings management may allow firms to increase regulatory benefits or to decrease regulatory costs. For example, a number of studies show that banks that are close to minimum capital requirements overstate loan loss provisions, understate loan write-offs, and recognize abnormal realized gain on securities portfolios. Also, firms that are vulnerable to anti-trust investigation, adverse political consequences, or facing tax issues may have an incentive to appear less profitable.[9]

One of the central debates in the earnings management literature is whether or not investors are able to see through earnings management. Much of the evidence seems to suggest that investors are not "fooled" by earnings management. For example, Hand (1993) finds that firms have tax incentives to adopt LIFO during periods with increasing input prices and stock investors appear to comprehend this intention by positively pricing firms' unexpected LIFO tax benefits. Also, evidence suggests that stock investors interpret "abnormal" accruals more cautiously than "normal" accruals.[10] From the shareholders' perspective, "abnormal" accruals are likely a reflection of earnings manipulation. However, other empirical studies point out that investors may be unable to perfectly understand earnings management. The poor long-run performance of firms with overstated earnings before IPOs and SEOs seems to support this view.[11]

Earnings management is segregated into two types, accruals management and real earnings management (REM), based on whether or not firm economic activities are affected.

Accruals management does not alter a firm's economic activities, it only involves choosing accounting methods that disguise profitability. REM occurs when managers mask true economic performance operationally. While both types affect book income (income reported to shareholders), the special tie between taxable income (income reported to U.S. Internal Revenue Services (IRS)) and REIT dividend payment differentiates the capital market consequences of these two forms of earnings manipulation. Specifically, accruals management represents managerial bias that results when managers opportunistically exercise discretion in applying accounting rules. As suggested by recent accounting research, tax rules allow managers less discretion in determining taxable income than GAAP allows in determining book income. Thus, accruals management mainly affects book income, and to a lesser degree, taxable income (Heflin and Kross, 2005). Since REIT mandatory dividend payout is determined by taxable income, accruals management may not be as effective as REM in reducing dividend payout.

2.2 Stock Market Information

As defined by Tobin (1982), a functionally efficient stock market should facilitate efficient resource allocation by capitalizing all information into security prices. Existing literature indicates that an efficient stock market may promote efficient resource allocation through two distinct channels. First, as articulated by Fama and Jensen (1983), the stock market serves as one of the bonding and monitoring mechanisms that limits agency problem. Stock prices react positively to events that are beneficial to shareholders' interest and negatively to events that are not. The incentive for obtaining high stock prices should motivate managers to make decisions that are aligned with shareholder's interest. Obviously, the effectiveness of this monitoring function strongly relies on the assumption that stock investors are sufficiently informed, and that they can comprehend the implications of those events on their wealth. An array of empirical studies show that stock prices react to various corporate decisions in a way that is consistent with this monitoring function. For example, stock prices are sensitive

to capital structure changes (Jensen, 1986), changes in board composition and structure (Yermack, 1996; Fich and Shivdasani, 2006, and Feleye, 2007), and the sale of assets (Lang, Poulsen, and Stulz, 1995).

In addition to its monitoring role, several recent studies suggest that the stock market may also promote efficient corporate decisions via its information role. For example, Dow and Gorton (1997) and Subrahmanyam and Titman (1999) suggest that information embedded in stock price movements provide managers with additional feedback about their firm. Chen, Goldstein, and Jiang (2007) find that more private information embedded in stock prices is associated with greater firm responsiveness to investment opportunities. Their result implies that stock trading is useful and conveys private information that is previously unknown to managers.

We investigate the aggregate impact of stock price volatility on earnings management. If stock price movements simply reflect noise trading, then it is hard to establish any meaningful relation between stock price movements and earnings management. Durnev, Morck, Yeung and Zarowin (2003) show that stock price volatility is not just a reflection of random noises, rather, it reflects information about firm fundamentals. That is, firms with more private information embedded in their stock prices have their future earnings more closely forecasted by current stock prices. Other related studies include Morck, Yeung and Yu (2000), who indicate that nations with superior protection on investors' private property rights promote informed arbitrage. Thus, more private information is embedded in stock prices in those countries. In general, capital allocations appear to be more efficient when greater information is impounded into stock prices. Empirical evidence supporting this view exists at country-, industry-, as well as firm-level (see Wurgler (2000), Durnev, Morck, and Yeung (2004), and Ambrose and Lee (2008)). Finally, more embedded information also leads to a stronger linkage between CEO turnover and firm performance (DeFond and Hung, 2004).

If firms are different in terms of the amount of information embedded in their stock prices, it is then reasonable to expect the monitoring and information function of the stock market to be stronger for firms with more embedded private information. This is because investors are equipped with more information to analyze the implication of corporate decisions, and feedback of this information through stock trading may help managers make better decisions. Thus, greater stock market information should be negatively correlated with earnings management if it is detrimental to shareholders' interest, and should be positively correlated with it, otherwise.

2.3 REIT Industry

In our analysis, we utilize data on REITs to examine the role of stock market volatility on earnings management. REITs are constrained by a minimum dividend payout policy (at least 90 percent of taxable income). This special feature is crucial to our study for two reasons. First, this mandatory dividend payout policy results in REITs paying out a much larger percentage of their earnings than regular firms. This may imply that REITs are more likely to have insufficient financial slack, a valuable input when external financing is costly. For example, equity financing may be costly because of the asymmetric information problem characterized by Myers and Majluf (1984). In addition, debt financing may also be undesirable due to the risk-shifting or debt overhang problems.[12] Thus, to avoid being deprived of financial slack, it may be optimal for REITs to manage their earnings downward.

On the other hand, the mandatory payout policy also requires that REITs frequently return to the capital market to raise external funds. This process provides outside investors with additional opportunities to collect information. According to Easterbrook (1984), existing equity investors suffer from the problem of collective action and often impose too little monitoring on managers. Thus, frequently raising new capital subjects managers' performance to regular scrutiny from new investors, who are immune from the collective action

problem. This recurrent evaluation should motivate managers to reduce organizational inefficiency in order to collect the highest price for their new instruments. Thus, one would expect more meaningful and influential information to be embedded in stock trading and improve REIT organizational efficiency.

2.4 Research Hypotheses

We conduct two tests in this study. First, we examine whether earnings management generates information asymmetry. We approach this problem by comparing stock-price informativeness between suspected EM firms and non-EM firms. In a frictionless financial market, current stock returns should reflect future earnings. We measure stock-price informativeness based on the explanatory power of future earnings on current stock return, where greater explanatory power indicates that stock prices track firm fundamentals more closely. Because earnings management is likely to obscure a firm's true economic performance and, therefore, create obstacles for its shares to be correctly valued, we expect EM firms, ceteris paribus, to exhibit lower stock informativeness than non-EM firms.

Second, we examine if greater market information leads to more or less earnings management. Following previous literature, we use idiosyncratic stock return volatility as a measure of embedded information. Then we regress our earnings management measures on idiosyncratic stock return volatility while controlling for other factors that may impact earnings management. We examine this relation separately for positive earnings management and negative earnings management to capture the potentially different motivations behind them.

Putting these tests together enables us to pinpoint three hypotheses concerning motivations for REIT managers to engage in earnings management. First, if earnings management generates asymmetric information, then a positive relationship between inflated earnings and embedded information implies managers face pressure to meet misguided market expectations. Thus, a REIT manager, aiming to maximize his own interests, has an incentive to be

"bombastic" in order to maximize his compensation or secure his job. We call this *agency cost hypothesis*.

Second, based on the potential monitoring function of stock investors, we formulate the *monitoring hypothesis*. Yu (2007) finds that analyst coverage serves as an external monitoring device that reduces earnings management. We are interested in whether or not embedded information in stock prices has a similar function. If so, we would expect that EM firms are not systematically mispriced, and stock market information reduces earnings management (both positive and negative). Implication of this hypothesis are two-fold. First, stock investors are informed and able to incorporate earnings management into stock prices. Second, market scrutiny improves accounting transparency.

Finally, greater embedded information may be associated with negative REM. This relationship is more likely when earnings management does not create significant information asymmetry. If stock investors are unaware of earnings management, then managers may be penalized for understating firm performance. However, if information asymmetry is low, then information transmitted via trading activity may motivate managers to more actively reduce regulatory costs via "modest earnings reports" that allow for more flexibility on dividend policy. Thus, this *regulatory cost hypothesis* implies that stock-price informativeness should not be systematically different between EM and non-EM firms, and negative REM should be positively correlated with embedded information. As illustrated in Table 1, each of these hypotheses yield testable predictions about the potential differences in stock-price informativeness between EM firms and non-EM firms as well as the relation between stock market information and earnings management.

3 Data and Sample Selection

We construct our data set starting with all publicly traded REITs covered in the SNL REIT database during the 1990-2006 period.[13] We use stock trading data from CRSP to compute idiosyncratic volatility. We require each REIT to have at least 45 weeks of trading for a given year and accounting data available from either Standard & Poor's annual Compustat tapes or SNL for the estimations of earnings management. To estimate earnings management, we assign each REIT to a property-type group based on its investment focus, and we require each property type to consist of at least 10 observations.[14] To estimate stock-price informativeness, we also require each REIT to have at least six years of accounting data during the sample period. When forming portfolios based on earnings management, we also ensure that each EM portfolio consists of at least 10 observations. Because the SNL REIT sample is small in the early years, we start with year 1996, which allows our analysis to cover years 1999 through 2006.[15] Our final sample contains 655 firm-year observations covering 104 unique REITs.

4 Estimation of Earnings Management

4.1 Accruals Management

Book earnings consist of cash flow and accounting adjustments called accruals. Manager judgment often plays a critical role in determining accruals. Thus, we measure accruals management by focusing on discretionary accruals (DAs), which are estimated using a modified version of the Jones model (Dechow, Sloan, and Sweeney, 1995).[16]

To determine DA, we begin by estimating an annual OLS regression of total accruals (TA) for each REIT property type:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t} \tag{1}$$

where $TA_{i,t}$ is total accruals for REIT i in year t (defined as net income minus cash flow from operations), $\Delta\, REV_{i,t}$ is the change in sales revenues for REIT i from year $t-1$ to year t, and $PPE_{i,t}$ is gross property, plant, and equipment for REIT i in year t. We scale all the variables by the lagged total assets ($A_{i,t-1}$). Using the estimated regression coefficients from (1), we calculate non-discretionary accruals (NDAs) as:

$$NDA_{i,t} \equiv \hat{\alpha_1}\,\frac{1}{A_{i,t-1}} + \hat{\alpha_2}\,(\frac{\Delta\, REV_{i,t}}{A_{i,t-1}} - \frac{\Delta\, AR_{i,t}}{A_{i,t-1}}) + \hat{\alpha_3}\,\frac{PPE_{i,t}}{A_{i,t-1}} \tag{2}$$

where $\Delta\, AR_{i,t}$ is the change in accounts receivables for REIT i from year $t-1$ to year t, and $\hat{\alpha_1}, \hat{\alpha_2}$, and $\hat{\alpha_3}$ are the estimated coefficients. We then compute $DA_{i,t}$ as the difference between $TA_{i,t}$ and $NDA_{i,t}$:[17]

$$DA \equiv \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t} \tag{3}$$

Larger values of $DA_{i,t}$ indicate a higher probability of earnings-increasing manipulation, while firms with smaller $DA_{i,t}$ are more likely managing earnings downward.

4.2 Real Earnings Management (REM)

We use three proxies for REM recognizing that managers are able to manage a company's earnings by manipulating revenues, costs, and sales of assets.[18] Previous studies of earnings management use regression models to estimate normal levels of business activities (e.g. revenue, production cost, and R&D) within an industry. The deviations from these estimated normal levels are then likely the result of real earnings management and, therefore, are used as proxies for REM activities. Thus, we estimate the following linear model:

$$REV_{i,t} = \beta_1\,\frac{1}{A_{i,t-1}} + \beta_2\,\frac{REV_{i,t-1}}{A_{i,t-1}} + \beta_3\,\frac{\Delta\, REV_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \tag{4}$$

where the dependent variable $REV_{i,t}$ is the revenue for REIT i in year t. We express $REV_{i,t}$ as a function of previous year's revenue ($REV_{i,t-1}$) and the change in revenue from the

previous year ($\Delta REV_{i,t-1}$). All variables are scaled by lagged total assets. The abnormal revenue, $ABREV_{i,t}$, is simply the prediction error.

Similarly, we estimate the normal level of expense via the linear model based on revenue generation:

$$COGS_{i,t} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{REV_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \beta_4 \frac{\Delta REV_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \tag{5}$$

where $COGS_{i,t}$ is the cost of goods sold of REIT i in year t, and $REV_{i,t}$ is revenue of current period. We also include the changes in revenue from current and previous years.[19] Thus, abnormal cost, $ABCOGS_{i,t}$, is the prediction error of (5).

Equations (4) and (5) are estimated annually for each REIT property type to determine the normal levels of revenue and cost. Large abnormal revenues and/or small abnormal costs are more likely a result of earning-increasing REM. In contrast, small abnormal revenues and/or large abnormal costs are more likely a result of earning-decreasing REM.

Finally, firms may manage their earnings via asset sales. Edelstein et al. (2007) indicate that managers may be tempted to report a loss on the sale of fixed assets when their dividend constraint is binding. Following Edelstein et al. (2007), we include the accounting gain or loss for the sale of real estate assets (scaled by lagged total assets), $GOSRE_{i,t}$, as a measure of REM. Large (small) gains or losses on the sale of real estate assets are more likely a result of earning-increasing (earning-decreasing) REM.

To reduce potential bias caused by outliers, we winsorize these four EM measures at the tails of 0.5% and 99.5%. Following Gunny (2005), we define positive (negative) EM firms as observations in the top (bottom) quintiles of $DA_{i,t}$, $ABREV_{i,t}$, and $GOSRE_{i,t}$ and the bottom (top) quintile of $ABCOGS_{i,t}$. Table 2 shows the descriptive statistics for the EM quintiles. We find no systematic difference in firm size, earnings volatility or stock returns.

5 Estimation of Embedded Information in Stock Prices

We use idiosyncratic stock return volatility as a measure of private information. This measure was first introduced by Roll (1988) to isolate idiosyncratic stock price volatility from stock price variation attributable to market-related and industry-related factors. Roll (1988) suggests that the low R^2 statistics resulting from estimation of common Capital Asset Pricing Models (CAPM), "seems to imply the existence of either private information or else occasional frenzy unrelated to concrete information."[20] Subsequent studies show that the capitalization of private information appears to be a more plausible answer to the question proposed by Roll (1988). Stock return synchronicity is consistently shown to enhance market efficiency. For example, Durnev et al. (2003) find that firms with greater firm-specific stock return volatility have firm fundamentals more closely tracked by their share prices. Other studies find that greater idiosyncratic stock return volatility lead to more efficient resource allocations (see Wurgler (2000), Durnev et al. (2004), Chen et al. (2006) and Ambrose and Lee (2008)) and management compensation (DeFond and Hung, 2004).

Idiosyncratic volatility is defined as the portion of a firm's stock return variation unrelated to market and industry returns, and is obtained by estimating the following OLS regression:

$$r_{j,w,t} = \alpha_{j,t} + \beta_{j,t} r_{m,w,t} + \gamma_{j,t} r_{i,w,t} + \varepsilon_{j,w,t} \tag{6}$$

where $r_{j,w,t}$ is the weekly stock return of firm j in year t; $r_{m,w,t}$ is the corresponding weekly market return; and $r_{i,w,t}$ is the weekly REIT index return. The weekly market return is the CRSP value-weighted weekly market return and the REIT index return is the value weighted average of the REIT weekly stock returns excluding the firm in question, that is,

$$r_{i,w,t} = \frac{\sum_{k \in i} \theta_{k,w,t} r_{k,w,t} - \theta_{j,w,t} r_{j,w,t}}{N_i - 1} \tag{7}$$

where $\theta_{k,w,t}$ is the value weight of firm k in week w of year t, and N is the number of REITs included in our sample. This exclusion prevents firms with relatively large market capitalizations from displaying spurious correlation with the index.

The variance of $\varepsilon_{j,w,t}$ is then scaled by the total variance of $r_{j,w,t}$ to form the measure of relative firm-specific return volatility:

$$\Psi_{j,t} = \frac{\sum_{w \in t} \varepsilon_{j,w,t}^2}{\sum_{w \in t}(r_{j,w,t} - \bar{r}_{j,w,t}^2)} \tag{8}$$

Note that $\Psi_{j,t}$ is simply $1 - R^2$ from the estimation of equation (6) and was first introduced by Roll (1988) to isolate idiosyncratic stock price volatility from stock price variation attributable to market-related and industry-related factors. This measure has been applied by subsequent theoretical and empirical studies to model idiosyncratic stock movement.[21]

6 Can stock investors detect earnings management?

We empirically examine if stock investors can detect earnings management. If earnings management is not discernible to stock investors, everything else being equal, share prices of earnings-managing firms should reflect a biased view of firm value and thus exhibit greater deviation from fundamental values. Empirically, we should see firms in the middle quintile exhibit superior predictive power on future earnings than the firms in the other quintile.

Following Collins, Kothari, Shanken, and Sloan (1994), we construct two measures of stock price informativeness based on the following regression:

$$r_t = a + b_0 \Delta E_t + \sum_{\tau} b_\tau \Delta E_{t+\tau} + \sum_{\tau} c_\tau r_{t+\tau} + \varepsilon_t \tag{9}$$

where ΔE_t and $\Delta E_{t+\tau}$ are the current and future changes in earnings per share, respectively, scaled by the stock price at the beginning of year t. Following the recommendation of Collins

et al. (1994), future stock returns $r_{t+\tau}$ are included as control variables. Equation (9) is estimated for each earnings management quintile and τ is set to 2 years.[22]

The first measure of stock price informativeness is the *future earnings response coefficient* (*FERC*), computed as the summation of regression coefficients of future earning changes, that is,

$$FERC \equiv \sum_{\tau} b_{\tau} \tag{10}$$

Collins et al. (1994) show that, after controlling for future returns, a positive b_{τ} signals that the co-movements of current returns and future earnings are in the same direction. We truncate b_{τ} at zero in the case of negative values.[23]

The second measure of stock price informativeness is the *future earnings incremental explanatory power* (*FINC*). *FINC* is the increase in the R^2 from the estimation of equation (9) associated with the inclusion of future earnings:

$$FINC \equiv R^2_{a+b_0\Delta E_t+\sum_{\tau} b_{\tau}\Delta E_{t+\tau}+\sum_{\tau} c_{\tau} r_{t+\tau}+\varepsilon_t} - R^2_{a+b_0\Delta E_t+\varepsilon_t} \tag{11}$$

Both *FERC* and *FINC* measure the extent that information about future earnings are captured by current stock prices. Larger values of *FERC* and *FINC* imply higher stock price informativeness.

Table 2 shows the average values of *FERC* and *FINC* across the EM quintiles. For example, Panel 1 shows the descriptive statistics for the EM quintiles based on the accruals management (DA) measure. The average *FERC* is 2.951, and the average *FINC* is 0.401, implying that the regression based on equation (9) is, on average, able to explain 40 percent of the current stock return variation when two years' future earnings are included. Both *FERC* and *FINC* possess considerable variability across observations. For example, the maximum *FINC* is 91.2 percent and the minimum *FINC* is 10.9 percent. The other EM based quintile

groups show qualitatively similar results.

We test the hypothesis that stock investors are able to detect earnings management and understand its consequences first via the panel regression of *FERC* and *FINC* on dummy variables of EM quintiles:

$$FERC = \alpha + \sum_i \beta_i \phi_i + \sum_k \gamma_k Z_k + \varepsilon_{i,t} \tag{12}$$

and

$$FINC = \alpha + \sum_i \beta_i \phi_i + \sum_k \gamma_k Z_k + \varepsilon_{i,t} \tag{13}$$

where ϕ_i are the dummy variables for EM quintiles with the middle quintile being omitted, Z_k is a set of control variables and $\varepsilon_{i,t}$ is the standard error. Because *FERC* is left truncated at zero, equation (12) is estimated as a Tobit regression, whereas (13) is estimated as OLS. We reject the hypothesis of no asymmetric information being produced by earnings management if one or more β_i are significantly negative.

We include an array of control variables in Z_k to rule out alternative explanations, and control for factors that could potentially affect stock price informativeness. Following Durnev et al. (2003), we control for problems in variable construction, factors that have an intrinsic effect on the relationship between returns and earnings, and the effects of earning timeliness.

As pointed out by Durnev et al. (2003), *FERC* and *FINC* are more accurately estimated using a large number of firms. Furthermore, a number of empirical studies show that earning news is more quickly impounded into the returns of large firms relative to the returns of small firms.[24] Thus, we include the *number of firms* and *average firm size* of each REIT EM quintile to control for potential problems in variable construction. *Number of firms* is defined as the number of REITs contained in a EM quintile; *average firm size* is defined as the logarithm of average inflation adjusted total asset of a EM quintile.

In addition, endogeneity may impact the correlation between current stock returns and future earnings. For instance, firms with more volatile past earnings may be more difficult to analyze, implying the need to control for *past earnings volatility*, which is defined as the standard deviation of changes in earnings over the past 3 years scaled by the previous year's stock price. In addition, because dividends ultimately depend upon earnings, earnings can be interpreted as a signal of future dividends. However, high current earnings do not necessarily translate into high future dividends if agency problems exist and manager interests are not aligned with shareholders. To account for heterogeneity among firms, we include *future dividend explanatory power*, which is defined as the R^2 from the regression of changes in current earnings on changes in current and future dividends:

$$\Delta E_t = a + b_0 \Delta D_t + \sum_{\tau} b_\tau \Delta D_{t+\tau} + \varepsilon_t \tag{14}$$

where ΔE_t and ΔD_t respectively are the changes of earning and dividend payout ratios in year t. To construct future dividend explanatory power, regression (14) is estimated for each EM quintile ($\tau = 1, 2$).

Finally, firms may also differ in terms of timeliness of earnings. Firms with less timely earnings may display a weaker correlation between returns and current earnings but strong correlation between return and future earnings. Hence, the estimated *FERC* and *FINC* tend to be higher for this type of firm (Durnev et al, 2003). Following previous studies, we utilize *annual stock return*, which is defined as the EM-quintile value weighted return per year, to control for earning timeliness.[25]

Table 3 presents the estimated coefficients for the fixed-effect panel regressions of equations (12) and (13) based on the four EM measures. Because the middle quintile contains observations with the least likelihood of engaging in earnings management, it is omitted.[26] Thus, the regression coefficients associated with the quintile dummy variables represent the

mean differences of stock-price informativeness between that quintile and the middle quintile. As shown in Table 3, we do not observe any systematic pattern in the estimated coefficients for the EM quintiles.[27] Hence, we have no evidence to reject the hypothesis that investors are able to detect earnings management.

7 How does stock price movement impact earnings management?

We now proceed to investigate our second research question: how does stock price movement impact earnings management? We test if stock market generated feedbacks can influence earnings management by regressing our EM variables on idiosyncratic stock return volatility. Specifically, we estimate the following logit panel regression:

$$EM_{i,t} = \alpha + \beta \Psi_{j,t} + \sum_{k} \gamma_k \, Z_k + \varepsilon_{i,t} \tag{15}$$

where $EM_{i,t}$ is an binary variable indicating suspected EM firms, Ψ is the idiosyncratic stock return volatility, and Z_k are control variables. $EM_{i,t}$ is constructed based on the four earnings management proxies (DA, $ABREV$, $GOSRE$, and $ABCOGS$). We classify REIT i as a positive EM firm if i's values of $DA_{i,t}$, $ABREV_{i,t}$, or $GOSRE_{i,t}$ are in the top quintile, or $ABCOGS_{i,t}$ is in the bottom quintile. Similarly, we classify REIT i as a negative EM firm if i's values of $DA_{i,t}$, $ABREV_{i,t}$, or $GOSRE_{i,t}$ are in the bottom quintile, or $ABCOGS_{i,t}$ is in the top quintile. With four earnings management proxies, equation (15) is estimated using eight alternative identifications of EM firms. Table 4 presents the summary statistics of variables used for estimating equation (15). Because DA, $ABREV$, and $ABCOGS$ are fitted residuals, their means are zero by construction. The small deviation from zero is due to winsorizing.

If stock market information does impact managers' choice on earnings management, then we should find that the estimated coefficient (β) is statistically significant. The sign of β should depend on the type of earnings management activity. Positive β associated with positive earnings management indicates that greater information leads to more overstated earnings. However, two alternatives may explain these findings. First, information asymmetry between managers and shareholders could lead to positive coefficients for β. Market information is likely to be insufficient to overcome asymmetric information. On the contrary, market scrutiny may even create excessive attention that pushes managers to overstate earnings. Second, information asymmetry between current and future shareholders could correspond to a positive estimated β. If current shareholders are more informed than perspective shareholders, then they may want to motivate managers to inflate earnings in order to expropriate wealth from future stock investors. On the other hand, a negative β associated with positive earnings management implies that market scrutiny enhances information transparency. As for negative earnings management, we expect β to be negative for REM because negative REM allows REITs to retain funds and overcome future financial constraints. We expect this relationship to be much less pronounced for accruals management because its impact on taxable income is quite minimal.

We also include a set of control variables in estimating equation (15). First, we expect the presence of growth opportunities to influence earnings management. REITs with growth potential often require additional capital to fund future investment projects. If investors are unable to detect earnings management, then managers may have an incentive to manipulate earnings in order to facilitate successful capital offerings. We approximate investment opportunity using Tobin's q, which is defined as

$$q_{i,t} = \frac{E_{i,t} + D_{i,t} + PE_{i,t}}{BEA_{i,t}} \tag{16}$$

where $E_{i,t}$ is the market value of common equity, $D_{i,t}$ is the book value of debt, $PE_{i,t}$ is the book value of preferred equity, and $BEA_{i,t}$ is the book value of the firm's total asset. If earnings management leads to severe information asymmetry, then we expect high values of $q_{i,t}$ to encourage positive earnings management and discourage negative earnings management. Otherwise, larger values of Tobin's q should lead to greater negative earnings manipulation and lower positive earnings manipulation.

Second, we include two measures of financial constraint: *firm size* (lagged total market capitalization) and *leverage* (total debt scaled by previous year's total assets). If larger firms are able to generate economies of scale, then they are less likely to be financially constrained, and thus depend less on externally generated capital. Hence, we expect firm size to be inversely related to negative earnings management. Higher debt-to-equity ratios signify that firms have lower future debt capacity and may be subject to greater monitoring by debt holders. Thus, one would expect *leverage* to be inversely correlated with negative earnings management.

Third, the incentive to overstate earnings may be stronger following equity issuance. Thus, we include $\Delta share$, the percentage change in fully diluted shares outstanding, as a control variable to capture changes in firm equity positions. The utilization of fully diluted shares rather than common shares has the advantage of capturing the effect of issuing operating units by Umbrella Partnership Real Estate Investment Trusts (UPREITs). We also control for cash flow volatility. Bradley, Capozza, and Seguin (1998) show that cash flow volatility is negatively related to dividends. We measure cash flow volatility as the standard deviation of the previous 3 years' cash flow from operation (CFO). Following Yu (2007), we also control for the firm's profitability by including return to assets (ROA), which is calculated as net income as a percentage of average assets. Finally, to capture any structural differences between UPREITs and regular REITs, we include an indicator variable $UPREITs$ (1 for UPREITs, 0 otherwise). All control variables are winsorized at at the tails of 0.5% and

99.5% to limit extreme values.

7.1 Results

To focus on the correlation between earnings management and idiosyncratic stock return volatility, we first conduct a univariate comparison of means and medians of idiosyncratic stock return volatility across suspected EM and non-EM firms. Panel 1 of Table 5 shows the comparison for accruals management (DA). The p-values for the difference in means tests suggest that idiosyncratic stock return volatility is correlated with positive accruals management, however, the differences in medians are not significant. With respect to negative earnings management, we find no difference between suspected EM and non-EM firms.

Panels 2, 3, and 4 in table 5 show the results for the REM proxies ($ABREV$, $ABCOGS$, and $GOSRE$, respectively). Most noticeably, we see that, for the negative EM firms, the mean and median differences are highly significant for the three proxies of REM indicating that greater idiosyncratic stock return volatility is strongly correlated with negative real earnings management. In contrast, we find no consistent evidence across the three REM proxies that positive EM is linked to idiosyncratic stock return volatility.[28]

7.1.1 Accruals Management

We formally explore the interaction between stock return volatility and earnings management by estimating equation (15). Table 6 shows the estimated coefficients from the fixed-effects, panel regression where the dependent variable is accruals management (DA). After controlling for relevant factors, the estimated coefficient for idiosyncratic stock return volatility is negatively correlated (at the 5 percent statistical significance level) with negative accruals management. The finding of a inverse relation between idiosyncratic stock return volatility and negative accrual based earnings management is consistent with the *monitoring hypothesis* that firms are less likely to engage in earnings management activity when stock market

information is high.

The estimated coefficients for the control variables in Tables 6 display patterns that are consistent with our prior expectations. As a proxy of future investment opportunity, the estimated coefficients for Tobin's q are negatively related to positive EM (at the 5 percent level) and positively related to negative EM (at the 1 percent level). Thus, we do not find evidence that REIT managers attempt to obtain cheap outside financing by overstating firm profitability, which is consistent with the previous result that earnings management does not generate significant information asymmetry. In contrast, favorable investment opportunities appear to increase the probability of negative earnings management. This is consistent with REITs accumulating financial slack via negative earnings management in order to take advantage of future investment opportunities.

The two variables measuring financial constraint, *firm size* and *leverage*, are negatively associated with negative earnings manipulations. As shown in Table 6, the regression coefficient of lagged firm size is positive (significant at the 5 percent level) for positive earnings management and negative (significant at the 1 percent level) for negative earnings management. We also see that the coefficient for leverage is negative (significant a the 5 percent level) for negative earnings management. Collectively, these results confirm our expectation that financially constrained firms are more likely to engage in negative earnings management.

We also note that the estimated coefficients for UPREITs are significant at the 1 percent level and indicate that UPREITs are less likely to engage in positive earnings management and more likely to engage in negative earnings management. Finally, we note that the negative and significant (at the 5 percent level) coefficient for ROA suggests that firms with higher returns on assets are less likely to engage in negative earnings management.

7.1.2 Real Earnings Management (REM)

Table 7 shows the results for the REM proxies. Consistent with the univariate analysis, the statistically significant correlation between greater idiosyncratic stock return volatility and negative REM persists for all three REM measures.[29] However, the regression results indicate that positive REM is not significantly correlated with idiosyncratic stock return volatility.[30]

Similar to the results of the accruals based measure of earnings management, we see that the estimated coefficients for Tobin's q are positively related (at the 5 percent and 1 percent levels, respectively) to negative EM for the $ABREV$ and $GOSRE$ based measures. This implies that REITs are more likely to perform negative REM when expected future investment is good, and is consistent with the regulatory cost hypothesis. Relatively abundant market information makes raising capital via overstated earnings difficult. In contrast, negative REM reduces dividend payout and may potentially help relax future financial constraint. Consistent with our expectation, larger and highly levered firms appear to perform less negative earnings management. Correlations between firm size and all three REM measures are negative, though only $GOSRE$ is statistically significant (at the 1 percent level). Firms with high leverage are less likely to have low abnormal revenue (significant at the 10 percent level). Finally, we find UPREITs tend to perform less positive REM.

8 Robustness Checks

8.1 Measurement

Obviously, our interpretation builds upon the fact that idiosyncratic volatility serves as a valid proxy of private information capitalized into stock prices. Although an array of studies have offered empirical support to this measurement, we are also aware of the existence of some counter arguments. For example, West (1988) indicates that high idiosyncratic

volatility may be associated with poor information. In addition, Teoh, Yang, and Zhang (2008) find that firms with greater idiosyncratic volatility are more susceptible to accounting anomalies, which are likely outcomes of information asymmetry. Given that most of these studies are examining general industrial trends, we feel it is necessary to verify whether the positive correlation between idiosyncratic volatility and stock informativeness also prevails in the REIT industry. Specifically, we perform the test specified by Dumev et al. (2003). We construct information measures, $FERC$ and $FINC$ based on REIT property types via estimating equation (9) annually for each REIT property type, and $FERC$ and $FINC$ are similarly constructed in (10) and (11). If firm-specific stock price movements reflect the capitalization of private information, then greater idiosyncratic volatility will correspond to the increased availability of private information. Therefore, firms that possess higher firm-specific stock return volatility should have prices that are more closely aligned with fundamental values. As a result, stock prices should exhibit superior predictive power on future earnings. Thus, we estimate panel regressions of $FERC$ and $FINC$ on property-level average idiosyncratic volatility. We also include the set of control variables identified in (12) and (13).

Table 8 presents the estimated coefficients for the regression of $FERC$ and $FINC$ on property-level average idiosyncratic volatility. We see that idiosyncratic volatility is positively (significant at the 5 percent level) correlated with both information measures. This result is consistent with Durnev et al. (2003), who also report a strong correlation between idiosyncratic stock return volatility and stock price informativeness. It also appears that $FINC$ is more correlated with idiosyncratic volatility than $FERC$. Not only does idiosyncratic volatility show greater statistical significance in the $FINC$ model, a significantly larger portion of $FINC$ can be explained via our regression model. This result indicates that the general industrial trend identified by Durnev et al. (2003) also prevails in the REIT industry. Idiosyncratic volatility is attributable to private information on firm fundamentals. Hence,

our use of idiosyncratic volatility as a measure of private information is supported.

8.2 Other Specifications

As a final robustness check, we estimate equation (15) using continuous measures of earnings management, DA, $ABREV$, $ABCOGS$, and $GOSRE$, and examine an alternative earnings management measure. First, we regress the earnings management measure on idiosyncratic volatility together with the same set of control variables included equation (15). We estimate the model via fixed-effect regression. As shown in Table 9, the result are consistent with our previous results. Aside from the fact that $GOSRE$ lost its significance, greater idiosyncratic volatility appears to be negatively correlated with abnormal revenue and associated with high abnormal cost.

Next, we construct an additional REM measure based on the difference between REIT funds from operations (FFO) and the change in cash holdings.[31] The rationale for this measure is that REIT managers may divert cash from FFO. Thus, a larger difference between FFO and the change in cash holdings may suggest a greater of earnings management. We scale this difference by FFO and repeat the previous analysis using this measure. We find no evidence that this measure is correlated with our stock informativeness measures, $FERC$ and $FINC$, or idiosyncratic volatility.[32]

Since we are using idiosyncratic stock return volatility of current period, the validity our interpretation may be jeopardized by the endogeneity problem that earnings management may affect idiosyncratic volatility. In other words, earnings management may somehow lead to greater idiosyncratic volatility. However, as earnings management mitigates accounting transparency, it should reduce the amount of private information embedded in stock price rather than increasing it. Thus, the endogeneity problem is more likely to work against our interpretation by making our main findings less pronounced. In addition, if this endogeneity issue does exist, there is no reason to believe only negative REM can affect idiosyncratic

volatility. The fact that positive earnings management are not correlated with idiosyncratic volatility reduces our concern on the potential endogeneity problem. Finally, our main results do not change if we use lagged idiosyncratic stock return volatility as a measure of embedded information. In this case, discretionary accruals are still negatively related to idiosyncratic volatility. Although *GOSRE* lost its significance, the correlation between idiosyncratic volatility and negative REM persists for the other measures.

9 Conclusion

We examine the interaction between stock price movement and earnings management using REIT data. Specifically, we empirically address two questions. First, are investors able to "see through" earnings management? Second, how does stock price movement influence earnings management. We study the first question by comparing stock-price informativeness across suspected EM and non-EM firms. The "informativeness" of suspected EM firms' stock price does not appear to be systematically less than that of non-EM firms. Hence, we can not reject the hypothesis that stock investors are capable of detecting earnings management as well as understand its implication on firm value.

We address the second question by examining the correlation between earnings management and private information embedded in stock prices. We apply idiosyncratic stock return volatility as a measurement of embedded private information. Our main finding is that greater idiosyncratic stock return volatility is associated with negative REM. This result is robust to alternative proxies of earnings management as well as model specifications. To validate the use of idiosyncratic volatility as a measure of stock market information, we find the industrial pattern identified by Durnev et al. (2003) prevails in the REIT industry. That is, greater idiosyncratic stock return volatility is associated with greater stock informativeness. Hence, our result implies that greater stock market information leads to negative earnings management.

Our answers to both questions are consistent with the regulatory cost hypothesis that negative REM allows REITs to circumvent the mandatory dividend payout requirement and build up financial slack for future investment. The feasibility of this practice relies on the abundance of private information embedded in REIT stock prices. Modest earnings reports are promoted when shareholders understand and appreciate the intent of REM. We show that REIT managers are motivated to reduce regulatory costs when stronger feedback effects are generated by stock price volatility.

Our result is consistent with the literature showing that greater embedded information in stock prices promotes efficient capital allocation. In particular, our result suggests an explanation to the fact that firm investments are more responsive to investment opportunity when stock market information is relatively abundant (Chen et al. 2007). Information feedback from stock market trading may enable managers to more accurately forecast future opportunities.

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Notes

[1]See Fama and Jensen (1983) page 313.

[2]See Jensen (1986), Yermack (1996), and Lang, Poulsen, and Stulz (1995).

[3]Corporate decisions influenced by stock trading include capital budgeting (Chen, Goldstein and Jiang, 2007) and CEO turnovers (Lehn and Zhao, 2006).

[4]Our definition of market efficiency implies that stock prices incorporate public and private information; this definition assumes the presence of 'informed' investors. One proxy for the presence of informed investors is the level of institutional ownership (see Ali, Klasa, and Li, 2008, and Utama and Cready, 1997), and institutional investors represent a significant ownership clientele for REIT stocks.

[5]Although the minimum dividend payout requirement is not a binding constraint for most REITs, a number of incentives still exist for managers to perform negative earnings management even if their REIT's payout ratio is above the 90 percent mark. First, managers may value dividend consistency and the be unwilling to increase dividends to a level that is not sustainable (Lintner, 1956). Second, the mandatory dividend payout requirement may reduce the stability of dividend policy for firms that pay the minimum required dividend. For instance, unexpectedly high taxable income could lead to greater dividend payouts that may not be sustainable. Thus, negative earnings management would allow REIT managers to withhold cash and ensure a consistent dividend policy. In fact, firms often devote resources to smooth dividends. For example, Aharony and Swary (1980) show that firms may borrow during troughs in the business cycle in order to maintain normal dividend level.

[6]See Healy and Wahlen (1999) page 368.

[7]See Healy (1985), Holthausen, Larcher, and Sloan (1995) and Guidry, Leone and Rock (1998).

[8]See Healy and Palepu (1990), DeAngelo, DeAngelo and Skinner (1994) and Defond and Jiambalvo (1994).

[9]See Healy and Wahlen (1999) for a review of studies related to regulatory motivations of earnings management. Hand (1993) discusses the tax considerations associated with earnings management with respect to FIFO versus LIFO accounting treatment.

[10]See Beaver, Eger, Ryan and Wolfson (1989), Wahlen (1994), and Beaver and Engel (1996).

[11]See Teoh, Welch and Wong, (1998a) and Teoh, Welch and Wong, (1998b).

[12]See Jensen and Meckling (1976) for a discussion on the risk-shifting problem and Myers (1977) for the debt overhang problem.

[13]SNL coverage begins in 1990.

[14]The seven REITs property types are diversified, health care, hotel, multifamily, office, retail, and other.

[15]Data from 1996-1998 are needed for variable constructions.

[16]Dechow, Sloan, and Sweeney (1995) show that the modified Jones model outperforms other models in the accuracy of detecting accruals management. Discretionary accruals is a commonly used proxy for accruals management (see Teoh, Welch and Wong (1998a); Teoh, Welch and Wong (1998b); Gong, Louis and Sun (2007) and Yu (2007).)

[17]Our estimate of $DA_{i,t}$ is expressed as a percentage of lagged total assets.

[18]Our concentration on these three methods of earnings management is based on the fact that manipulations of other discretionary items, such as R&D, are less relevant for REITs.

[19]Edelstein et al. (2007) include a dummy variable indicating revenue losses in previous year and its interaction with $REV_{i,t}$ in their estimation of abnormal costs to account for the "stickiness" of costs. For robustness check, we adopt this specification when estimating (5). The results are similar.

[20] See Roll (1988), page 566.

[21]See Ambrose and Lee (2008), Durnev et al. (2003), and Chen et al. (2006).

[22]Durnev et al. (2003) reports their result based on $\tau = 3$. It is also reported in their paper that including one more year or one less year in (9) does not qualitatively change their result. We set τ equal to 2, because some REITs property-type groups contain small number of firms in early years, we do not have enough degree of freedom to estimate (9) with $\tau = 3$.

[23] If b_1 and b_2 are both greater than zero, then the explanatory power of future earnings on current returns extends to both years, and *FERC* equals $b_1 + b_2$. If b_1 is greater than 0 and b_2 is less than zero, then we assume that the explanatory power is limited only to next year's earnings, and FERC equals b_1. Finally, if b_1 and b_2 are both less than zero, then we assume that future earnings have virtually no explanatory power on current returns, and thus *FERC* equals zero.

[24] See Freeman (1987), Collins, Kothari, and Rayburn (1987), and Collins and Kothari (1989).

[25]See Basu (1997) and Durnev et al. (2003) for detailed discussion on the use of stock return to control for earning timeliness effect.

[26]We obtain similar results using other quintiles as the control group.

[27]Our results are similar if *FINC* is replaced with the logarithm of *FINC*.

[28]The exception is the REM measure, abnormal revenue ($ABREV$), where Panel 2 shows

that idiosyncratic stock return volatility is higher in suspected EM firms.

[29]Idiosyncratic volatility appears to have distinct impacts on accruals management and REM. Greater idiosyncratic volatility leads to less accruals management but more REM. This result is consistent with our hypothesis that the main incentive of REM is to reduce taxable income. This purpose is unlikely fulfilled via accruals management due to its minimal impact on taxable income.

[30]To avoid giving excess weight to firms with more observations, we also weight each firm-year observation by $1/T$, where T is the number of observations of the firm during our sample period. Our results are unaffected by this modification.

[31]We thank David Shulman for suggesting this alternative measure.

[32]The results of these regressions are available from the authors.

Table 1
Predictions of the Hypothesis

This table summarizes the empirical predictions of the three alternative hypotheses tested in this paper with regard to the stock informativeness across EM and non-EM firms and the relationship between stock market information and earnings management. The *agency cost hypothesis* argues that information asymmetry between shareholders and manager provides incentive for managers to overstate earnings. The *monitoring hypothesis* argues that as a monitoring mechanism, more stock market information reduces earnings management. The *regulatory cost hypothesis* argues that greater market information motivates managers to actively reduce regulatory cost via negative earnings management.

	Systematic difference in stock-price informativeness quintiles	Correlation between embedded information and earnings management	
		Positive EM	Negative EM
Agency Cost Hypothesis	Yes	+	-
Monitoring Hypothesis	No	-	-
Regulatory Cost Hypothesis	No		+

Table 2
Descriptive Statistics

This table presents the descriptive statistics of our stock-price informativeness measure, *FERC* and *FINC*, and control variables included for estimated equation (12) and (13). Panel 1 presents descriptive statistics of EM quintiles constructed using discretionary accruals (*DA*). Panel 2 presents descriptive statistics of EM quintiles constructed using abnormal revenues (*ABREV*). Panel 3 presents descriptive statistics of based on EM quintiles constructed using abnormal cost (*ABCOGS*). Panel 4 presents descriptive statistics of EM quintiles using gain of loss from the sale of real estate assets. (*GOSRE*). **FERC** is sum of the coefficients on future changes in earnings in regression (9). **FINC** is the increase of the coefficient of determination of regression (9). **Number of firms** is defined as the number of REITs contained in an EM quintile. **Average firm size** is defined as the logarithm of average inflation adjusted total asset of an EM quintile. **Past earnings volatility** (σ_E) is defined as the average standard deviation of changes in earnings over the past 3 years scaled by the previous year's stock price of each EM quintile. **Future dividend explanatory power** (EP_{DIV}) is defined as the R^2 from the regression (14) of changes in current earnings on changes in current and future dividends. **Annual stock return** is defined as the weighted annual return of each EM quintile.

Variable	Obs	Mean	Std.Dev.	Min	Max
Panel 1 - EM quintiles based on *DA*					
FERC	30	2.951	2.975	0.000	10.422
FINC	30	0.401	0.204	0.109	0.912
Number of Firms	30	17.567	2.473	13.000	22.000
Average Firm Size	30	12.102	0.332	11.407	12.587
σ_E	30	0.035	0.020	0.017	0.098
EP_{DIV}	30	0.349	0.256	0.024	0.911
Annual Stock Return	30	0.077	0.194	-0.221	0.515
Panel 2 - EM quintiles based on *ABREV*					
FERC	30	3.044	2.607	0.000	8.219
FINC	30	0.430	0.215	0.081	0.795
Number of Firms	30	18.233	3.245	11.000	23.000
Average Firm Size	30	12.073	0.561	10.528	13.080
σ_E	30	0.037	0.019	0.005	0.087
EP_{DIV}	30	0.334	0.255	0.023	0.969
Annual Stock Return	30	0.069	0.188	-0.228	0.379
Panel 3 - EM quintiles based on *ABCOGS*					
FERC	30	3.199	2.867	0.000	10.220
FINC	30	0.357	0.199	0.046	0.764
Number of Firms	30	18.233	3.401	10.000	24.000
average Firm Size	30	12.054	0.401	11.157	12.701
σ_E	30	0.037	0.022	0.012	0.097
EP_{DIV}	30	0.316	0.227	0.024	0.815
Annual Stock Return	30	0.071	0.193	-0.274	0.417
Panel 4 - EM quintiles based on *GOSRE*					
FERC	30	3.193	3.229	0.000	13.157
FINC	30	0.369	0.196	0.037	0.780
Number of Firms	30	16.033	1.299	13.000	18.000
Firm Size	30	12.105	0.372	11.492	12.946
σ_E	30	0.037	0.023	0.008	0.098
EP_{DIV}	30	0.301	0.240	0.014	0.930
Annual Stock Return	30	0.073	0.195	-0.248	0.418

Table 3

This table presents the regression of stock-price informativeness measure, *FERC* and *FINC*, on dummy variables of EM quintiles. Column 1 and 2 show results with EM quintiles being constructed with discretionary accruals (*DA*). Column 3 and 4 show results with EM quintiles being constructed with abnormal revenues (*ABREV*). Column 5 and 6 show results with EM quintiles being constructed with abnormal cost (*ABCOGS*). Column 7 and 8 show results with EM quintiles being constructed with gain of loss from the sale of real estate assets (*GOSRE*). *FERC* is sum of the coefficients on future changes in earnings in regression (9). **FERC** is sum of the coefficients on future changes in earnings in regression (9). **FINC** is the increase of the coefficient of determination of regression (9). **Number of firms** is defined as the number of REITs contained in an EM quintile. **Average firm size** is defined as the logarithm of average inflation adjusted total asset of an EM quintile. **Past earnings volatility** (σ_E) is defined as the average standard deviation of changes in earnings over the past 3 years scaled by the previous year's stock price of each EM quintile. **Future dividend explanatory power** (EP_{DIV}) is defined as the R^2 from the regression (14) of changes in current earnings on changes in current and future dividends. **Annual stock return** is defined as the weighted annual return of each EM quintile. *p*-values are shown in parentheses bellow each regression coefficient. One, two, and three asterisks respectively denote significance at 10%, 5%, and 1% level.

EM Quintiles Based on	*DA*		*ABREV*		*ABCOGS*		*GOSRE*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	*FERC*	*FINC*	*FERC*	*FINC*	*FERC*	*FINC*	*FERC*	*FINC*
Quintile 1	3.857	0.373	-2.218	-0.197	1.056	0.037	2.822	-0.020
	(0.190)	(0.110)	(0.260)	(0.140)	(0.660)	(0.830)	(0.270)	(0.900)
Quintile 2	0.830	0.231	2.699	-0.069	0.695	-0.063	3.504	-0.201
	(0.670)	(0.150)	(0.070)*	(0.470)	(0.660)	(0.590)	(0.210)	(0.230)
Quintile 4	0.739	0.243	1.756	0.044	0.693	0.046	1.041	-0.045
	(0.690)	(0.120)	(0.270)	(0.680)	(0.710)	(0.730)	(0.540)	(0.680)
Quintile 5	1.478	0.384	0.322	-0.207	3.494	0.265	-1.647	-0.052
	(0.680)	(0.170)	(0.870)	(0.130)	(0.380)	(0.360)	(0.590)	(0.780)
Number of Firms	0.202	0.026	-0.431	-0.039	0.486	0.018	0.532	0.018
	(0.680)	(0.490)	(0.080)*	(0.020)**	(0.290)	(0.590)	(0.530)	(0.730)
Average Firm Size	1.393	-0.147	-0.974	-0.171	0.904	0.154	0.745	-0.170
	(0.460)	(0.330)	(0.410)	(0.050)*	(0.640)	(0.280)	(0.750)	(0.260)
σ_E	-27.658	-4.874	35.665	-1.850	23.353	1.283	-21.062	0.546
	(0.370)	(0.060)*	(0.230)	(0.350)	(0.460)	(0.580)	(0.720)	(0.870)
EP_{DIV}	8.157	0.071	-3.392	0.131	-3.183	-0.164	0.750	0.476
	(0.000)***	(0.670)	(0.160)	(0.410)	(0.330)	(0.490)	(0.850)	(0.070)*
Annual Stock Return	-3.322	-0.291	-3.481	1.118	-9.015	-0.218	-8.874	-0.468
	(0.430)	(0.400)	(0.450)	(0.000)	(0.070)*	(0.530)	(0.090)*	(0.160)
Intercept	-19.501	1.597	23.336	3.083	-16.367	-1.971	-12.432	2.202
	(0.470)	(0.450)	(0.160)	(0.010)	(0.530)	(0.300)	(0.640)	(0.190)
Year-Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	30	30	30	30	30	30	30	30
R^2 / Pseudo R^2	0.168	0.534	0.103	0.745	0.074	0.499	0.128	0.563

Table 4

This table presents descriptive statistics of the sample. DA is **discretional accruals**. $ABREV$ is **abnormal revenue**. $ABCOGS$ is the **abnormal cost of goods sold**. $GOSRE$ is **gain/loss from sale of real estate assets**. **Idiosyncratic volatility** is the 1-R^2 from the regression of REITs stock return on market index and REITs index. **Tobin's Q** is computed as a firm's market value of assets over book value of total assets. Firm size is the lagged total market capitalization. **UPREITs** is a dummy variable indicating UPREIT status (1 if UPREIT). **CFO volatility** is the standard deviation of previous 3 years CFO. **ROA** is return to assets, which is calculated as net income as a percentage of average assets. **Leverage** is total debt scaled by previous years total assets, **Δ Share** is the percentage change of fully diluted shares outstanding.

Variable	Obs	Mean	Std. Dev.	Min	Max
Discretional Accruals (DA)	616	-0.0001	0.0292	-0.1717	0.1554
Abnormal Revenue ($ABREV$)	637	0.0014	0.0588	-0.5604	0.5623
Abnormal Cost of Goods Sold ($ABCOGS$)	637	-0.0038	0.0272	-0.1819	0.1388
Gain/Loss on Sale of Real Estate Assets ($GOSRE$)	630	0.0047	0.0122	-0.0052	0.1167
Idiosyncratic Volatility	637	0.6162	0.2385	0.1563	0.9989
Tobin's Q	637	1.2808	0.3719	0.5400	3.7713
Firm Size	637	1.4528	1.8178	0.0027	12.1899
UPREITs	637	0.6641	0.4727	0.0000	1.0000
CFO Volatility	637	19.1017	24.0679	0.0014	169.0523
ROA	637	4.0351	3.3211	-8.1400	24.1000
Leverage	637	0.5640	0.2348	0.0000	1.6100
Δ Share	637	0.0840	0.2110	-0.6547	2.0357

Table 5

This table compares mean and median between suspected EM and non-EM samples identified via our four measures of earnings management (DA, $ABREV$, $GOSRE$, and $ABCOGS$). We classify REIT i as a positive EM firm if $DA_{i,t}$, $ABREV_{i,t}$, and $GOSRE_{i,t}$ are in the top quintile and $ABCOGS_{i,t}$ is in the bottom quintile. Similarly, we classify REIT i as a negative EM firm if $DA_{i,t}$, $ABREV_{i,t}$, and $GOSRE_{i,t}$ are in the bottom quintile and $ABCOGS_{i,t}$ is in the top quintile. Panels 1 through 4 are respectively compare mean and median between suspected EM and non-EM samples based on DA, $ABREV$, $ABCOGS$, and $GOSRE$. p-values of Wilcoxon Rank-Sum test and Median test are computed for mean and median differences.

Panel 1 - Suspected EM & non-EM firms identified by DA					
		EM Firm	non-EM firm	Diff	p-value
Positive EM	Mean	0.6550	0.6103	0.0447	0.0644
	Median	0.6534	0.6003	0.0531	0.3030
Negative EM	Mean	0.6080	0.6210	-0.0131	0.5668
	Median	0.6132	0.6025	0.0106	0.6000

Panel 2 - Suspected EM & non-EM firms identified by $ABREV$					
		EM Firm	non-EM firm	Diff	p-value
Positive EM	Mean	0.6717	0.6073	0.0644	0.0165
	Median	0.6645	0.5737	0.1388	0.0110
Negative EM	Mean	0.7477	0.5863	0.1614	0.0000
	Median	0.8277	0.6074	0.2203	0.0000

Panel 3 - Suspected EM & non-EM firms identified by $ABCOGS$					
		EM Firm	non-EM firm	Diff	p-value
Positive EM	Mean	0.6372	0.6105	0.0266	0.2439
	Median	0.6258	0.5927	0.0330	0.4270
Negative EM	Mean	0.6983	0.6018	0.0965	0.0002
	Median	0.6904	0.5731	0.1173	0.0050

Panel 4 - Suspected EM & non-EM firms identified by $GOSRE$					
		EM Firm	non-EM firm	Diff	p-value
Positive EM	Mean	0.5957	0.6211	-0.0255	0.2973
	Median	0.5636	0.6128	-0.0492	0.3770
Negative EM	Mean	0.6518	0.5885	0.0633	0.0011
	Median	0.6509	0.5640	0.0868	0.0280

Table 6

This table presents regression of accruals management (identified using DA) on idiosyncratic volatility. We classify REIT i as a positive EM firm if $DA_{i,t}$ is in the top quintile. Similarly, we classify REIT i as a negative EM firm if $DA_{i,t}$ is in the bottom quintile. p-values, computed using White standard error (White, 1980), are shown in parentheses bellow each regression coefficient. One, two, and three asterisks respectively denote significance at 10%, 5%, and 1% level.

EM & non-EM firms identified by	DA	
Dependent Variable	Positive EM	Negative EM
Idiosyncratic Volatility	0.2165	-1.3640**
	(0.7447)	(0.0446)
Tobin's Q	-0.9914**	1.7050***
	(0.0102)	(0.0000)
Firm Size	0.1939**	-0.3732***
	(0.0354)	(0.0074)
UPREITs	-1.4128***	1.0098***
	(0.0000)	(0.0005)
CFO Volatility	-0.0014	0.0047
	(0.8141)	(0.4662)
ROA	0.0292	-0.1353**
	(0.4378)	(0.0213)
Leverage	0.5155	-1.3267**
	(0.2904)	(0.0338)
Δ Share	-0.1455	0.0168
	(0.7561)	(0.9805)
Intercept	0.3137	-1.0814
	(0.6930)	(0.1645)
Firm fixed-effect	Yes	Yes
Year fixed-effect	Yes	Yes
Pseudo R^2	0.0959	0.1287
N	616	616

Table 7

This table presents regression of REM (identified using $ABREV$, $ABCOGS$, and $GOSRE$) on idiosyncratic volatility. We classify REIT i as a positive EM firm if $ABREV_{i,t}$, and $GOSRE_{i,t}$ are in the top quintile and $ABCOGS_{i,t}$ is in the bottom quintile. We classify REIT i as a negative EM firm if $ABREV_{i,t}$, and $GOSRE_{i,t}$ are in the bottom quintile and $ABCOGS_{i,t}$ is in the top quintile. p-values, computed using White standard error (White, 1980), are shown in parentheses bellow each regression coefficient. One, two, and three asterisks respectively denote significance at 10%, 5%, and 1% level.

EM & non-EM firms identified by	*ABREV*		*ABCOGS*		*GOSRE*	
Dependent Variable	Positive EM	Negative EM	Positive EM	Negative EM	Positive EM	Negative EM
Idiosyncratic Volatility	-0.0135	3.7655***	-0.5764	1.1570*	-0.6074	1.0731**
	(0.9839)	(0.0000)	(0.3823)	(0.0883)	(0.2971)	(0.0378)
Tobin's Q	-0.2212	0.7061**	0.1471	0.0299	-0.5138	1.0540***
	(0.5865)	(0.0423)	(0.6733)	(0.9428)	(0.1547)	(0.0009)
Firm Size	0.0427	-0.1702	0.0912	-0.1197	0.0616	-0.2330***
	(0.6725)	(0.2988)	(0.2962)	(0.3781)	(0.4562)	(0.0023)
UPREITs	0.1277	0.0329	-0.9156***	0.1164	-0.6151***	0.3164
	(0.6651)	(0.8981)	(0.0021)	(0.6676)	(0.0092)	(0.1675)
CFO Volatility	0.0040	0.0074	-0.0075	0.0050	0.0007	-0.0022
	(0.5543)	(0.2762)	(0.2364)	(0.4784)	(0.8928)	(0.6924)
ROA	-0.0151	-0.0300	0.0654	-0.0695	0.0025	0.0025
	(0.7475)	(0.4556)	(0.1095)	(0.1773)	(0.9509)	(0.9394)
Leverage	0.8196	-1.1127*	0.1204	0.7462	0.2475	-0.0642
	(0.1035)	(0.0683)	(0.8032)	(0.1083)	(0.5806)	(0.8755)
Δ Share	1.3937**	-2.1187***	0.6927	-3.4500***	-0.6983	1.4209***
	(0.0239)	(0.0092)	(0.1300)	(0.0023)	(0.2984)	(0.0013)
Intercept	-1.5878**	-3.7705***	-0.9666	-1.8512**	0.2135	-1.7247**
	(0.0409)	(0.0000)	(0.2107)	(0.0204)	(0.7902)	(0.0118)
Firm fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.1424	0.1664	0.1202	0.1216	0.0441	0.1269
N	637	637	637	637	630	630

Table 8

This table reports regression results of stock-price informativeness on average idiosyncratic volatility of REIT property types. The seven REITs property types are diversified, health care, hotel, multifamily, office, retail, and other. Model 8.1 is estimated using *FERC* as the dependent variable. Model 8.2 is estimated using *FINC* as the dependent variable. For all specifications, firm and time random effects are included. p-values are shown in parentheses bellow each regression coefficient. One, two, and three asterisks respectively denote significance at 10%, 5%, and 1% level. are shown at the bottom for each specification. Pseudo R^2 for models using FERC are computed to establish comparability between models with *FERC* and *FINC*.

	FERC	*FINC*
Model	8.1	8.2
Idiosyncratic Volatility	13.902**	1.052***
	(0.038)	(0.001)
Number of Firms	-0.117	-0.024***
	(0.347)	(0.000)
Average Firm Size	1.964*	0.109**
	(0.064)	(0.033)
Past Earning Volatility	-0.303	-2.584**
	(0.99)	(0.021)
Future Dividend Explanatory Power	-1.059	-0.029
	(0.699)	(0.827)
Annual Stock Return	6.251*	0.007
	(0.052)	(0.963)
Intercept	-28.216*	-1.093
	(0.097)	(0.184)
R^2 / Pseudo R^2	0.165	0.565
N	49	49

Table 9

This table presents regression of continuous measures of earnings management, *DA*, *ABREV*, *ABCOGS*, and *GOSRE*, on idiosyncratic volatility. *p*-values, computed using White standard error (White, 1980), are shown in parentheses bellow each regression coefficient. One, two, and three asterisks respectively denote significance at 10%, 5%, and 1% level.

	DA	*ABREV*	*ABCOGS*	*GOSRE*
Idiosyncratic Volatility	0.0038	-0.0611***	0.0129**	0.0006
	(0.6004)	(0.0001)	(0.0350)	(0.8277)
Tobin's Q	-0.0234***	-0.0124	-0.0042	-0.0020
	(0.0001)	(0.3393)	(0.4572)	(0.3323)
Firm Size	0.0034***	0.0012	-0.0008	0.0003
	(0.0004)	0.4973	0.3482	0.6334
UPREITs	-0.0168***	0.0075	0.0099***	-0.0048***
	(0.0000)	(0.2017)	(0.0015)	(0.0005)
CFO Volatility	-0.0001*	-0.0001	0.0001	0.0000
	(0.0616)	(0.5887)	(0.1449)	(0.7310)
ROA	0.0009	0.0003	-0.0015***	-0.0003
	(0.1751)	(0.8305)	(0.0093)	(0.2089)
Leverage	0.0123**	0.0188	-0.0007	0.0015
	(0.0373)	(0.1280)	(0.9058)	(0.4148)
Δ Share	-0.0038	0.0284**	-0.0132***	-0.0035**
	(0.4924)	(0.0210)	(0.0009)	(0.0144)
Intercept	0.0274**	0.0446	0.0002	0.0146***
	(0.0194)	(0.0609)	(0.9860)	(0.0006)
Firm fixed-effect	Yes	Yes	Yes	Yes
Year fixed-effect	Yes	Yes	Yes	Yes
R^2	0.1369	0.1026	0.1210	0.0921
N	616	637	637	630