Does the Use of Non-GAAP Earnings Influence Managers' Real Activities and Accounting Choices?

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ABSTRACT: It is now commonplace for managers to emphasize non-GAAP earnings metrics that exclude certain expenses, such as acquisition and restructuring expenses, intangible asset amortization, asset write-downs, and stock compensation expenses. This study hypothesizes that managers become focused on non-GAAP earnings, causing them to underweight excluded expenses when making investment and accounting decisions. Consistent with an underweighting of acquisition-related expenses, firms with a history of reporting non-GAAP earnings overinvest relative to their peers, and to engage in more acquisitions. With respect to accounting choices, excluded expenses such as write-downs and stock option expenses are recorded and measured more conservatively when excluded from non-GAAP earnings. The evidence is consistent with the use of non-GAAP earnings influencing real activities and accounting choices.

1. Introduction

Non-GAAP earnings are adjusted versions of the generally accepted accounting principles (GAAP) measure of net income. These metrics are being reported in an increasing percentage of public firms' earnings announcements.[1] Though firms may have a different formulations of non-GAAP earnings, these metrics commonly exclude expenses such as acquisition and restructuring expenses, intangible asset amortization, asset write-downs, and stock compensation expenses. This study hypothesizes that managers become focused on non-GAAP earnings, underweighting the excluded expenses. Consistent with this prediction, results suggest that managers are willing to incur and record larger expenses when those expenses are excluded from non-GAAP earnings. In terms of real activities, firms with a history of reporting non-GAAP earnings tend to overinvest, especially through acquisitions. In terms of accounting choices, firms with a history of reporting non-GAAP earnings seem more willing to record asset write-downs. Finally, firms that exclude stock option expenses from their non-GAAP earnings use more conservative Black-Scholes model inputs.

Accounting research often advances the notion that managers use real activities and accounting choices to manage reported earnings. For example, many studies hypothesize that the presence of earnings benchmarks (e.g., positive earnings growth, earnings guidance, and analyst estimates of earnings) influences managers' behaviors (Dechow, Ge, and Schrand 2010). This paper highlights and incorporates the fact that different definitions of earnings exist for different firms. Some firms report only GAAP-based net income while others report and display prominently their own customized non-GAAP performance measure. This paper proposes that

[1] According to text-based searches, non-GAAP earnings were reported in approximately 74 percent of earnings press releases in 2014, which is up from 41 percent in 2004. Figure 1 presents the percent of firms reporting non-GAAP earnings each year from 2004 to 2014.

managers who report non-GAAP earnings, become focused on non-GAAP earnings, reducing their motivation to minimize excluded expenses. There are various channels that could cause managers to focus on non-GAAP earnings. Managers may desire a high stock price and believe that investors place more weight on non-GAAP earnings (e.g., Bradshaw and Sloan 2002 and Brown and Sivakumar 2003), managers may be compensated directly on the basis of non-GAAP earnings (e.g., Curtis, Li, and Patrick 2015), and managers may honestly believe that the excluded expenses are unimportant.[2] This paper does not judge the appropriateness of managers' beliefs, but simply hypothesizes that managers focus on non-GAAP earnings, and tests predictions stemming from that hypothesis.

The conclusions of this paper should help investors evaluate companies. Specifically, investors should expect different real activities and accounting choices from firms that report non-GAAP earnings. Consistent with these practical implications, the tests in this paper are designed to determine whether non-GAAP reporting choices are an incremental predictor of managers' real activities and accounting choices. The hypothesized mechanism is that non-GAAP reporting choices influence real and accounting activities, but the alternative explanation is that some other variable causes the non-GAAP choice as well as the related activities. Four design choices address this challenge: (i) control variables, (ii) regression adjustment, (iii) entropy balancing, and (iv) difference-in-differences settings. The control variables are selected based on extensive prior literature on the various outcome variables, and are intended to represent potential confounding factors. The regression adjustment is a selection-on-observables design in which first-stage models are estimated that predict the non-GAAP reporting choices.

[2] For example, with respect to acquisition and restructuring costs, in its June 7, 2016 press release, Valeant Pharmaceutical's management states that "Such costs are generally not relevant to assessing or estimating the long-term performance of the acquired assets as part of the Company, and are not factored into management's evaluation of potential acquisitions or its performance after completion of acquisitions."

The fitted probabilities from these first-stage models are used as control variables in the second stage models, which test for the predicted effects. Entropy balance weights (Hainmueller 2012) are used to place higher weight on control firms that are similar to treatment firms on key determinants of the outcome variables. Finally, two accounting standard changes are used for difference-in-differences settings to provide an exogenous shock to GAAP-based net income.

The first accounting standard considered is SFAS 141(R), which required immediate expensing of acquisition and restructuring costs, which were previously capitalized with the purchase price. Results show that this rule change is associated with fewer acquisitions, consistent with the idea that managers dislike immediate expensing. However, firms with a history of reporting non-GAAP earnings (which commonly exclude acquisition and restructuring costs) did not reduce their acquisition activity by as much. This suggests that firms that report non-GAAP earnings place lower weight on acquisition and restructuring costs.

The second accounting standard considered is SFAS 123(R), which required expensing of stock option fair values, which were previously only disclosed in the footnotes. Results show that the expensing of stock option fair values is associated with more aggressive Black Sholes model inputs (specifically the expected volatility input). This is consistent with managers responding to the rule change by attempting to reduce the magnitude of stock option expenses (e.g., Choudhary 2011). However, firms that exclude stock option expenses from non-GAAP earnings continued to use conservative Black Sholes model inputs after SFAS 123(R) became effective.

Overall, this study provides evidence that non-GAAP earnings are more than simply a reporting choice. The key message of this study is that non-GAAP reporting choices may influence real activities and accounting choices.

This paper presents the literature review in section 2, hypothesis development in section 3, research design in section 3, results in section 4, and conclusion in section 5.

2. Literature Review

For more than 20 years, academics, regulators, and market participants have documented the rift between GAAP and non-GAAP earnings. Non-GAAP earnings is often credited as being more relevant than GAAP earnings, evidenced by its superior ability to predict future operating performance (e.g., Brown and Sivakumar 2003). On the other hand, since it is defined by managers, non-GAAP earnings has been criticized as being less reliable than GAAP earnings, and some argue that it has the potential to mislead investors (e.g., Doyle, Lundholm, and Soliman 2003).

Prior academic research on non-GAAP earnings generally fits into two broad research questions: how do managers define and present non-GAAP earnings? and how do investors use non-GAAP earnings? Particular attention has been paid to the manager-opportunism angle: do managers define and present non-GAAP earnings in an attempt to mislead investors? and are investors misled by non-GAAP earnings? Doyle, Jennings, and Soliman (2013) find evidence consistent with managers opportunistically defining non-GAAP earnings to beat analyst expectations. Christensen, Merkley, Tucker, and Venkataraman (2011) show that firms use non-GAAP earnings guidance to focus analysts' attention away from GAAP-based net income and onto non-GAAP earnings. Doyle, Lundholm, and Soliman (2003) show that expenses excluded from non-GAAP earnings predict future performance, suggesting that non-GAAP earnings exclude relevant information for investors. Bradshaw and Sloan (2002) examine the 1990s and

find evidence that the difference between GAAP and non-GAAP earnings widened and that investors' reliance on non-GAAP earnings for equity valuation increased during this period. Bradshaw and Sloan (2002) also show that firms emphasize non-GAAP earnings above GAAP-based net income in the earnings press release. Zhang and Zheng (2011) find no evidence of equity mispricing, on average, of non-GAAP earnings in the post-Regulation G regime (i.e., post-2003).[3]

There are also a number of studies closely related to this paper. In a concurrent working paper, Kyung, Ng, and Lee (2016) examine the recognition of goodwill write-downs for non-GAAP firms and argue that non-GAAP improves the quality of GAAP net income by increasing the likelihood, information content, and size of write-downs. The results of Kyung et al. (2016) are consistent with the accounting choice predictions of this paper; although this paper makes the point that asset write-downs may also be caused by a greater propensity to overinvest. Therefore, settings such as acquisition activities and stock option expense measurement are necessary to separate real activities from accounting choices. Bradshaw and Sloan (2002) observe an increase in the recognition of negative special items concurrent with the increase in popularity of non-GAAP earnings, although it is not clear from that study whether non-GAAP reporting practices are causing the increase in special items or vice versa. Kolev, Marquardt, and McVay (2008) find that, in efforts to inflate non-GAAP earnings, firms appear to classification-shift recurring expenses from operating expense captions into special item captions. Doyle, Jennings, and Soliman (2013) find that low discretionary accruals and low discretionary cash flows are associated with larger exclusions from non-GAAP earnings and that the magnitude of exclusions

[3] Regulation G was effective March 23, 2003 and required firms to provide a reconciliation of non-GAAP earnings to GAAP-based net income and to display non-GAAP earnings no more prominently than GAAP-based net income in the earnings press release.

increases with the costs of engaging in accruals earnings management. Their findings suggest that constraints on accruals-based earnings management cause firms to make opportunistic choices in defining non-GAAP earnings.

3. Hypothesis Development

3.1 Overview

The predictions tested in this study are generated from the hypothesis that managers focus on non-GAAP earnings. Practically speaking, the term "focus" implies that managers pay lower attention to those expenses excluded from non-GAAP earnings. This paper proposes (but does not test) three non-mutually exclusive channels that may bring about this non-GAAP earnings focus.

One channel is that managers may believe that investors are focused on non-GAAP earnings and assign higher multiples to non-GAAP earnings and lower multiples to excluded items. This would be an important motivation for managers whose compensation or reputation is tied to stock price. Bradshaw and Sloan (2002) conclude that non-GAAP earnings, "has displaced GAAP earnings as a primary determinant of stock prices." There is also empirical support for managers to hold this belief in Brown and Sivakumar (2003, Table 2), which presents evidence that street earnings (defined as EPS reported by I/B/E/S) has a higher valuation multiple than GAAP items excluded from street earnings. Further, according the I/B/E/S data, analysts are twice as likely to forecast non-GAAP earnings compared to GAAP-based net

income.[4] Taken together, these conditions may cause managers to believe that investors place higher weight on non-GAAP earnings.

Another possible channel is the use of non-GAAP earnings for incentive compensation. When this is the case, managers are predicted to underweight excluded expenses because their compensation structure does not incentivize them to avoid or minimize those expenses. For example, Dechow, Huson, and Sloan (1994) argue that shielding managers' compensation from restructuring charges encourages them to engage in restructuring activities. In support of this channel's existence, Curtis, Li, and Patrick (2015) find that the majority of firms in the S&P 500 use some earnings measure other than GAAP-based net income for performance compensation. Anecdotally, during Valeant Pharmaceuticals, Inc.'s acquisition spree that lasted from 2011 through 2015, its executives' cash bonuses were based on the company's non-GAAP earnings measure called "Cash EPS", a measure which excluded acquisition costs, restructuring costs, intangible asset amortization, write-downs, and other acquisition-related expenses.

Finally, managers may honestly believe that the excluded expenses are unimportant. Anecdotally, the argument that excluded expenses are unimportant usually differs depending on the type of excluded expense. Some expenses such as acquisition costs, restructuring costs and asset write-downs are commonly labeled as non-recurring expenses and are said to be poor predictors of future performance. Recurring excluded expenses such as stock compensation expenses and intangible asset amortization are commonly said to be non-cash and therefore not reflective of true operating performance.

[4] According to I/B/E/S data, when GAAP-based earnings and a different non-GAAP earnings are both forecasted, the mean (median) ratio of GAAP-based estimates to non-GAAP estimates is 2.0 (1.7).

Managers focus on non-GAAP earnings is also consistent with existing academic evidence that managers display non-GAAP earnings prominently in the earnings press release (e.g., Bradshaw and Sloan 2002; and Bowen et al. 2005) and use non-GAAP earnings guidance to focus analysts' attention away from GAAP-based net income and onto non-GAAP earnings (Christensen et al. 2011).

3.2 Real Activities

If managers focus on non-GAAP earnings, then the exclusion of acquisition costs, restructuring costs, intangible asset amortization, and asset write-downs should provide extra motivation for managers to grow non-GAAP earnings through high levels of investment, especially business acquisitions. In other words, if GAAP-based net income was the only performance measure for all firms, then managers' desire to grow earnings through increased investment and acquisitions would be moderated by the earnings-decreasing recognition of acquisition costs, restructuring costs, intangible asset amortization, and potential future asset write-downs.[5] Since acquisition costs, restructuring costs, intangible asset amortization, and asset write-downs are routinely excluded from non-GAAP earnings, the non-GAAP focus hypothesis predicts that managers who focus on non-GAAP earnings will overinvest relative to their peers, especially through acquisitions.

P1A: Managers who focus on non-GAAP earnings will overinvest relative to their peers, and engage in more acquisitions.

[5] This argument was captured in an article published in the Economist (2016). It states, "If regulators forced firms to focus on one 'correct' number, you can be sure that managers would find ways to massage it." To rephrase this passage from the Economist (2016), if regulators forced managers to focus on GAAP-based net income, then the acquisition business model would be less appealing because of the many costs of investment that are routinely excluded from non-GAAP earnings.

Prior to SFAS 141(R) (effective for fiscal years beginning after December 15, 2008), acquisition costs and expected restructuring costs were capitalized as part of the purchase price of the acquisition. Therefore, these costs would never be expensed, except through future asset write-downs, such as goodwill write-downs. SFAS 141(R) disallows the capitalization of acquisition costs and expected restructuring costs and requires firms to expense them on the income statement as they become incurred. These costs are material, on average. For example, in the year of an acquisition for which acquisition costs or restructuring costs are incurred, mean (median) acquisition costs are 8.3 percent (3.0 percent) of pretax income and mean (median) restructuring costs are 12.3 percent (5.9 percent) of pretax income. Approximately 11.8 percent of firms completing acquisitions report acquisition costs and 41.2 percent report restructuring costs during the relevant period. Partially offsetting the change in accounting for acquisition costs and restructuring costs is the opposite change in accounting for in-process R&D costs. Whereas in-process R&D costs were previously expensed upon the completion of an acquisition, SFAS 141(R) required firms to capitalize these costs as intangible assets. However, in-process R&D costs are slightly less common and less material. In the year of acquisition in which these costs are expensed, they have a mean (median) of 7.5 (3.5) percent of pretax income. Approximately 2.1 percent of acquiring firms report in-process R&D expenses during the relevant period. Overall, expensing of acquisition costs and restructuring costs, partially offset by capitalization of in-process R&D costs, should make acquisitions less attractive for managers who focus on GAAP-based net income, but this effect should be reduced if managers are focusing on a non-GAAP earnings measure, which frequently exclude these charges.

P1B: The relationship between non-GAAP earnings and acquisitions will become stronger after SFAS 141(R).

3.3 Accounting Choices – Asset Write-down Recognition

When they occur, asset write-downs are frequently excluded from non-GAAP earnings (e.g., Bradshaw and Sloan 2002 and Black, Christensen, Ciesielski, and Whipple 2016). Managers generally have the incentive to delay or avoid recording asset write-downs because they have a large negative impact on GAAP net income (e.g., Ramanna and Watts 2012). Because firms' non-GAAP earnings usually exclude asset write-downs, managers who focus on these alternative measures should be more willing to record asset write-downs on a timely basis. However, this prediction is potentially confounded with the related prediction that firms that overinvest (i.e., *P1A*) should be more likely to have assets whose book values exceed their fair values, leading them to record more asset write-downs in the future.

P2: Managers who focus on non-GAAP earnings will be more inclined to record asset write-downs.

3.4 Accounting Choices – Stock Option Expense Measurement

Based on a hand-collected sample, when non-GAAP earnings is reported by a firm that compensates its employees with stock options, the related expense is excluded from non-GAAP earnings roughly 41 percent of the time. Managers have significant discretion in the measurement of stock option expense, primarily through their expectation of future stock price volatility. Using this discretion, firms can opportunistically reduce the magnitude of stock option expense. A small downward adjustment to the expected volatility input can have a material downward effect on stock option expense. For example, in the sample used for this paper, a 10 percent decrease in the option volatility input across all firms would have an 8 percent decrease, on average, in stock option expense. Therefore, a higher expected volatility input represents

more conservative measurement of stock option expense. The volatility input is subject to managerial discretion because firms are free to choose the value based, in part, on private expectations about future volatility. Prior literature has presented evidence that this input is subject to opportunistic bias (e.g. Hodder, Mayew, McAnally, and Weaver 2006; Bartov, Mohanram, and Nissim 2007; and Choudhary 2011). The other inputs to the Black Sholes model: the risk free rate, the current share price, and the term of the option, are less influential in terms of their impact on the dollar value of stock compensation expense and are significantly less discretionary because they can be independently validated, *ex ante*, by auditors and market participants. The expected volatility input is supposed to represent management's best estimate of the firm's annualized stock price volatility over the life of the stock option. Therefore, the correct value is equal to the annualized stock price volatility over the life of the stock option, which becomes known to all *ex post*. Stock option expense is not a typical accrual because it never reverses, so it can be persistently understated, inflating net income in every period. As such, empirical testing of managerial opportunism does not need to be centered on any particular fiscal period. The desire to opportunistically reduce stock option expense is moderated by potential costs of engaging in earnings management, such as higher audit fees (through higher audit risk) and higher cost of capital (through greater market uncertainty about the reliability of accounting information). These costs are credible because persistent opportunistic bias in the expected volatility input can be observed *ex post* by comparing the chosen input to realized stock price volatility. In relation to the hypothesis of this paper, managers who focus on a non-GAAP earnings measure which excludes stock option expense should feel a lower incentive to opportunistically bias the expected volatility input downward.

P3A: Managers who focus on a non-GAAP earnings measure that excludes stock option expense will use a relatively larger expected volatility input.

Prior to SFAS 123(R) (effective for fiscal years beginning after June 15, 2005) firms had the option to only disclose the fair values of stock options in the financial statement footnotes, rather than recognizing them as expenses in the income statement. SFAS 123(R) required firms to recognize stock option expense in the GAAP income statement. Income statement recognition of stock option expense increased the incentive for managers to opportunistically bias the expected volatility input (e.g., Choudhary 2011). Managers who focus on a non-GAAP earnings measure that excludes stock option expense should feel a lower incentive to opportunistically bias the expected volatility input, especially in the post-SFAS 123(R) period.

P3B: The relationship between excluding stock option expense from non-GAAP earnings and the expected volatility input will become stronger after SFAS 123(R).

4. Research Design

4.1 Real Activities

P1A predicts that non-GAAP earnings focus is positively related to overinvestment. The following model is estimated by ordinary least squares (OLS):

$$\textit{Abnormal investment}_t = \alpha + \beta_1 \textit{Nongaap}_{t\text{-1 and } t\text{-2}} + \beta_2\, \textit{Fitted probability of Nongaap}_{t\text{-1 and } t\text{-2}} + \beta_3 \textit{Controls} + \varepsilon_t. \quad (1)$$

P1A predicts that $\beta_1 > 0$. Following McNichols and Stubben (2008), *Abnormal investment*$_t$ is the residual from an OLS regression of *Total investment*$_t$ on *Tobins* $Q_{t\text{-1}}$, $Q2_{t\text{-1}}$, $Q3_{t\text{-}}$

$_1$, *Q4*$_t$, *Operating cash flow*$_t$, *Asset growth*$_t$, and *Total investment*$_{t\text{-}1}$. The model of *Total investment*$_t$ is run separately within each industry-year. *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ is the proxy for non-GAAP earnings focus and is equal to one if the firm reported non-GAAP earnings in year *t*-1 and *t*-2 and zero if the firm only reported GAAP net income in years *t*-1 and *t*-2. It is important not to condition on whether the firm reports non-GAAP earnings in year *t* because it is possible that over-investment may simultaneously cause a firm to adopt a non-GAAP measure. This design choice is unavoidable and biases against finding the predicted positive coefficient on β_1. That is, consistent with *P1A*, the ability to adopt a non-GAAP earnings measure in year *t*, may give managers the extra motivation to engage in an acquisition or other significant investment; however, if no non-GAAP measure was reported in years *t*-1 and *t*-2, this observation will be included in the control group (i.e., *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ = 0).[6] *Fitted probability of Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ is the regression adjustment variable and is equal to fitted probability from a first-stage logistic regression of *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ on *Tobins Q*$_{t\text{-}1}$, *Operating cash flow*$_{t\text{-}1}$, *Asset growth*$_{t\text{-}1}$, *Abnormal investment*$_{t\text{-}1}$, I(*Acquisition cash flow*$_{t\text{-}1}$ < 0) and Log(*Market value*$_t$). The set of control variables contains the one-year-lagged value of the dependent variable, as well as other known determinants of abnormal investment. I(*Material weakness*$_t$) is based on Cheng, Dhaliwal, and Zhang's (2013) finding that over-investment is reduced after reporting a material weakness in internal controls. Sd(*Abnormal accruals*$_{t\text{-}5 \text{ thru } t\text{-}1}$) is based on Biddle, Hilary, and Verdi's (2009) finding that over-investment is reduced when earnings quality is high. Finally, Log(*Market value*$_t$) is a control for size, since firms reporting non-GAAP earnings tend to be larger. Industry and year fixed effects are included since these attributes tend to be associated with non-GAAP reporting as well as investment activities. Entropy weights based on *Tobins Q*$_{t\text{-}1}$, *Operating cash*

[6] Specifically, 17 percent of the control group (i.e., *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ = 0) begin reporting non-GAAP earnings in year *t*. These switching firms tend to have high levels of investment and acquisition activities in year *t*, but are included in the control group.

flow$_t$, and *Asset growth*$_{t\text{-}1}$ are applied and standard errors are clustered by firm and year. In an alternative specification of equation (1), a logistic regression is run using I(*Abnormal investment*$_t$ > 0) as the dependent variable.

P1A also predicts that non-GAAP earnings focus is positively related to acquisition activity. To test this prediction, the following models is estimated by logistic regression:

$$\begin{aligned} \text{I}(\textit{Acquisition cash flow}_t < 0) = {} & \alpha + \beta_1 \textit{Nongaap}_{t\text{-}1 \text{ and } t\text{-}2} \\ & + \beta_2 \textit{ Fitted probability of Nongaap}_{t\text{-}1 \text{ and } t\text{-}2} \\ & + \beta_3 \textit{Controls} + \varepsilon_t. \end{aligned} \tag{2}$$

P1A predicts that $\beta_1 > 0$. I(*Acquisition cash flow*$_t$ < 0) is equal to one if the firm has acquisition cash outflows in year *t*, and zero otherwise. Note that this measure only captures acquisitions that have cash outflows and will exclude stock-only acquisitions. As such, equation (2) is also run using I(*SDC Acquisition*$_t$) as an alternative dependent variable, which will capture all types of acquisition. *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ and *Fitted probability of Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ are as they are defined in equation (1). The control variables are also as they are listed in equation (1) except the following controls are added since the dependent variable is no longer a residual: *Operating cash flow*$_t$, *Asset growth*$_{t\text{-}1}$, and *Tobins Q*$_{t\text{-}1}$. Industry and year fixed effects are included and entropy weights are applied.

P1B predicts that The relationship between non-GAAP earnings and acquisitions will become stronger after SFAS 141(R). To test this prediction, the following model is estimated by logistic regression:

$$\begin{aligned} \text{I}(\textit{Acquisition cash flow}_t < 0) = {} & \alpha + \beta_1 \textit{Nongaap}_{t\text{-}1 \text{ and } t\text{-}2} + \beta_2 \textit{ Post SFAS 141R}_t \\ & + \beta_3 \textit{Nongaap}_{t\text{-}1 \text{ and } t\text{-}2} * \textit{Post SFAS 141R}_t \\ & + \beta_4 \textit{Fitted probability of Nongaap}_{t\text{-}1 \text{ and } t\text{-}2} \\ & + \beta_5 \textit{Controls} + \varepsilon_t. \end{aligned} \tag{3}$$

P1B predicts that $\beta_3 > 0$. *Post SFAS 141R*$_t$ is a dummy variable equal to one after the effective date of SFAS 141(R). The controls are the same as those included in equation (2). Industry fixed effects are included and entropy weights are applied. Equation (3) is also run using I(*SDC Acquisition*$_t$) as an alternative dependent variable.

4.2 Accounting Choices – Asset Write-down Recognition

P2 predicts that non-GAAP earnings focus is positively related to the inclination to record an asset write-down. To test this prediction, the following model is estimated using a logistic regression:

$$\text{I}(\textit{Write-down}_t) = \alpha + \beta_1 \textit{Nongaap}_{t\text{-1 and } t\text{-2}} + \beta_2\, \textit{Fitted probability of Nongaap}_{t\text{-1 and } t\text{-2}} + \beta_3 \textit{Controls} + \varepsilon_t. \quad (4)$$

P2 predicts that $\beta_1 > 0$. I(*Write-down*$_t$), is equal to one if an asset write-down (goodwill or any other write-down) is recorded in year *t*, and zero otherwise. *Nongaap*$_{t\text{-1 and } t\text{-2}}$ is the proxy for non-GAAP earnings focus and is equal to one if the firm reported non-GAAP earnings in year *t*-1 and *t*-2 and zero if the firm only reported GAAP net income in years *t*-1 and *t*-2. Again, it is important not to condition on whether the firm reports non-GAAP earnings in year *t* because it is possible that recording a write-down may simultaneously cause a firm to adopt a non-GAAP measure. This design choice is unavoidable and biases against finding the predicted positive coefficient on β_1. That is, the ability to adopt a non-GAAP earnings measure in year *t*, may give managers the extra motivation to record an asset write-down; however, if no non-GAAP measure was reported in years *t*-1 and *t*-2, this observation will be included in the control group (i.e.,

$Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$).[7] *Fitted probability of* $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ is the regression adjustment variable and is equal to fitted probability from a first-stage logistic regression of $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ on I(*Acquisition cash flow*$_{t\text{-}1}$ < 0), *Book-to-market*$_{t\text{-}1}$, *Goodwill*$_{t\text{-}1}$, *Other intangibles*$_{t\text{-}1}$, *Weak*$_{t\text{-}1}$, and I(*Book-to-market*$_{t\text{-}1}$ > 1). I(*Book-to-market*$_{t\text{-}1}$ > 1) is interacted with *Book-to-market*$_{t\text{-}1}$, *Goodwill*$_{t\text{-}1}$, *Other intangibles*$_{t\text{-}1}$, and *Weak*$_{t\text{-}1}$. The control variables for equation (4) include I(*Write-down*$_{t\text{-}1}$) and I(*Acquisition cash flow*$_{t\text{-}1}$ < 0). Also included, consistent with Lawrence, Sloan, and Sun (2013) and Ramanna and Watts (2012), are *Adjusted BTM*$_t$, *Goodwill*$_{t\text{-}1}$, *Other intangibles*$_{t\text{-}1}$, *Weak*$_t$, I(*Adjusted BTM*$_t$ > 1), which is interacted with the preceding variables, I(*Return*$_t$ < 0) and *Return*$_t$ are included separately and in an interaction term, *Abnormal investment*$_t$, *New CEO*$_t$, *Count of segments*$_t$, and Log(*Market value*$_{t\text{-}1}$). Industry and year fixed effects are included since these attributes tend to be associated with non-GAAP reporting as well asset write-downs. Entropy weights based on *Goodwill*$_{t\text{-}1}$, *Other intangibles*$_{t\text{-}1}$, *Adjusted BTM*$_t$, *Book-to-market*$_{t\text{-}1}$, and Log(*Market value*$_{t\text{-}1}$) are applied.

4.3 Accounting Choices – Stock Option Expense Measurement

P3A predicts that managers who focus on non-GAAP earnings that exclude stock option expenses will use more conservative volatility inputs. Whether a firm excludes stock option expense from its non-GAAP earnings measure is not available in any public database. Therefore, a small hand-collected sample is used in this paper. To test *P3A*, the following model is estimated by OLS:

$$\begin{aligned} \textit{Volatility forecast error}_t = {} & \alpha + \beta_1 \textit{Stock comp. excluded}_t \\ & + \beta_2 \textit{ Fitted probability of exclusion}_t \\ & + \beta_3 \textit{Controls} + \varepsilon_t. \end{aligned} \tag{5}$$

[7] Specifically, 16 percent of the control group (i.e., $Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$) begin reporting non-GAAP earnings in year *t*. These switching firms have a high incidence of asset write-down recognition in year *t*, but are included in the control group.

P3B predicts that $\beta_1 > 0$. *Volatility forecast error*$_t$ is the percentage deviation of the volatility input from future realized volatility and is calculated as (*Volatility input*$_t$ - *Future volatility*$_t$)/ *Future volatility*$_t$. The *Volatility forecast error*$_t$ represents the deviation of firms' option volatility inputs from their *ex post* correct values. If managers are able to accurately predict future volatility for their own firms' stock, on average, then the average *Volatility forecast error*$_t$ represents the average amount of bias introduced to the expected volatility input. *Stock comp. excluded*$_t$ is a dummy variable equal to one if the firm's non-GAAP earnings measure excludes stock option expense for year *t*. *Fitted probability of exclusion*$_t$ is the regression adjustment variable and is equal to fitted probability from a first-stage logistic regression of *Stock comp. excluded*$_t$ on *Historical volatility*$_t$, *Size of grant*$_t$, Log(*Market value*$_t$), *Financing*$_t$, and *Big four auditor*$_t$. The control variables are partially based on Barth, Gow, and Taylor (2012) and include *Benchmark adjustment*$_t$, which will exactly equal the *Volatility forecast error*$_t$ if the firm mechanically uses *Historical volatility*$_t$ as the *Volatility input*$_t$, *Historical volatility*$_t$, *Size of grant*$_t$, Log(*Market value*$_t$), *Financing*$_t$, and *Big four auditor*$_t$. Industry and year fixed effects are included. Entropy weights based on *Historical volatility*$_t$, *Benchmark adjustment*$_t$, *Size of grant*$_t$, Log(*Market value*$_t$), *Financing*$_t$, and *Big four auditor*$_t$ are applied and standard errors are clustered by firm and year.

P3B predicts that the relationship between excluding stock option expense from non-GAAP earnings and the expected volatility input will become stronger after SFAS 123(R). The test of *P3A* uses a small hand-collected sample of firms for which it's known whether stock option expense is excluded from non-GAAP earnings. Because that sample is small, a matching

procedure is performed to construct the sample to test *P3B*. The following model is estimated by OLS:

$$\begin{aligned} \textit{Volatility forecast error}_t = {} & \alpha + \beta_1 \textit{ Stock comp. excluded}_t + \beta_2 \textit{ Post SFAS 123R}_t \\ & + \beta_2 \textit{ Stock comp. excluded}_t * \textit{Post SFAS 123R}_t \\ & + \beta_4 \textit{ Fitted probability of exclusion}_t \\ & + \beta_5 \textit{Controls} + \varepsilon_t. \end{aligned} \tag{6}$$

P3B predicts that $\beta_3 > 0$. *Post SFAS 123R*$_t$ is a dummy variable equal to one after the effective date of SFAS 123(R). The controls are the same as those included in equation (5). Industry fixed effects are included, entropy weights are applied, and standard errors are clustered by firm and year.

5. Results

5.1 Real Activities

The relationship between non-GAAP reporting and corporate investment activities are examined for all available Compustat observations with fiscal years from 2004 through 2014. The primary variable limiting sample sizes is the non-GAAP indicator variable, $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$, which is coded based on text searches of firms' earnings press releases. Earnings press releases on Form 8-K are matched to the fourth quarter earnings announcement date from Compustat. Therefore, firms that do not file Form 8-K (Item 2.02) when earnings are announced are excluded from the tests. For example, small firms may announce earnings in the 10-K rather than in a separate 8-K. Importantly, it is more difficult for management to emphasize non-GAAP earnings in a 10-K, so the effect predicted in this paper is not expected to be as strong if there is no earnings announcement separate from the 10-K. Further, firms are excluded if the previous

two years are missing data or not consistent (i.e., if the firm reports non-GAAP earnings in *t*-2, but not in *t*-1).

Table 1, Panel A presents means and medians for all corporate investment activities variables, partitioned on whether the firms report non-GAAP earnings measures in both of the previous two years (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 1$, or "non-GAAP firms") or neither of the previous two years (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$, or "GAAP-only firms"). The "Entropy Weighted Mean" column presents the weighted mean of each variable for GAAP-only firms using entropy weights. The goodness-of-fit of the first-stage regression is discernable from the *Fitted probability of* $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ variable. Non-GAAP firms average a 68 percent probability of being non-GAAP firms based on the first-stage variables, compared to 54 percent for GAAP-only firms. The resulting coefficient of discrimination is equal to 14 percent (68 percent – 54 percent). However, a high goodness-of-fit is not essential in the first stage, it is only essential that the first stage capture the variables that may confound the effect of non-GAAP reporting choice with selection into the non-GAAP reporting choice. Non-GAAP firms engage in higher $Abnormal\ investment_t$, on average, but are not significantly more likely to have positive abnormal investment, I($Abnormal\ investment_t < 0$). Non-GAAP firms also appear to engage in more acquisitions, on average; however, this difference is less pronounced after entropy weights are applied. Non-GAAP firms have higher $Operating\ cash\ flow_t$, lower $Tobins\ Q_{t\text{-}1}$ and larger Log($Market\ value_t$) than GAAP-only firms.

Table 1, Panel B presents pairwise correlations for all corporate investment activities variables. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ is positively and significantly correlated with all outcome variables, $Abnormal\ investment_t$, I($Abnormal\ investment_t < 0$), I($Acquisition\ cash\ flow_t < 0$), and I($SDC\ Acquisition_t$). Pairwise correlations among corporate investment variables are generally high,

which is attributable to the fact that these variables have been extensively developed through past academic research. I(*Acquisition cash flow*$_t$ < 0) and I(*SDC Acquisition*$_t$) are negatively correlated with *Post SFAS 141R*$_t$, which is consistent with the notion that acquisitions became less attractive after the new accounting standard that required timely income statement expensing of acquisition and restructuring costs.

Table 2 presents evidence on the relationship between non-GAAP earnings focus and corporate investment. Column (1) presents this relationship for the *Abnormal investment*$_t$ outcome variable. The positive and significant coefficient on *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ indicates that firms with a history of reporting non-GAAP earnings engage in high levels of investment relative to their peers. This result is consistent with *P1A*, which predicts that non-GAAP earnings focus will increase managers' desire to grow earnings through investment and acquisitions by reducing the concern about recognition of non-recurring investment costs and potential future asset write-downs and intangible asset amortization. The magnitude of the coefficient suggests that *Abnormal investment*$_t$ is higher by 0.6 percent of beginning-of-year assets. The positive coefficient on *Fitted probability of Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ implies that some of the factors that determine selection into reporting non-GAAP earnings are positively related to *Abnormal investment*$_t$. Consistent with prior research *Abnormal investment*$_t$ is negatively related to having a prior year material weakness and negatively related to the earnings quality proxy. Figure 2 presents the difference in *Abnormal investment*$_t$ between firms with a history of reporting non-GAAP earnings and those that have a history of only reporting GAAP-based net income for deciles of *Tobins* $Q_{t\text{-}1}$. In all but two deciles of *Tobins* $Q_{t\text{-}1}$, non-GAAP firms engage in higher levels of investment relative to their peers. Column (2) presents a logistic regression, which shows that managers with a history of reporting non-GAAP earnings are also more likely to

overinvest. The coefficient suggests that reporting non-GAAP earnings causes non-GAAP firms to be 2 percent more likely to have higher-than-normal levels of investment.[8] Column (3) presents results of a logistic regression examining the relationship between I(*Acquisition cash flow*$_t$ < 0) and firms' histories of reporting non-GAAP earnings. The positive and significant coefficient on *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ indicates that reporting non-GAAP earnings causes firms to be 10.3 percent more likely to engage in an acquisition. Figure 3, Panel A presents the difference in I(*Acquisition cash flow*$_t$ < 0) between firms with a history of reporting non-GAAP earnings and those that have a history of only reporting GAAP-based net income for deciles of *Tobins* $Q_{t\text{-}1}$. In all deciles of *Tobins* $Q_{t\text{-}1}$, non-GAAP firms are more likely to engage in acquisitions. Column (4) presents the difference-in-differences setting around SFAS 141(R). After SFAS 141(R), acquisition costs and restructuring costs were required to be expensed as incurred rather than capitalized with the acquisition purchase price. This change was partially offset with an opposite change in accounting for in-process R&D costs, which were previously expensed but now are capitalized under SFAS 141(R). The negative coefficient on *Post SFAS 141R*$_t$ indicates that firms are less likely to engage in acquisitions after SFAS 141(R) became effective. The positive and significant coefficient on the interaction term, *Post SFAS 141R*$_t$**Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$, is consistent with *P1B*, which predicts that managers with a non-GAAP earnings focus will engage in relatively more acquisitions after SFAS 141(R). The magnitude of the coefficient suggests that the difference-in-differences is a 3.5 percent smaller relative decrease in acquisitions. Figure 3, Panel B presents the mean I(*Acquisition cash flow*$_t$ < 0) before and after SFAS 141(R) became effective, conditional on past non-GAAP reporting choices. It is clear from the figure that non-GAAP firms acquisition activity was less affected by SFAS 141(R) than GAAP-only firms.

[8] This effect is computed as the effect of the treatment on the treated. That is, within the subsample of non-GAAP firms, the effect of the *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ coefficient on probability that I(*Abnormal investment*$_t$ < 0) is equal to 1.

Columns (5) and (6) present the same tests as columns (3) and (4), but with an alternative dependent variable, an indicator variable that equals one if the firm had acquisition according to the Securities Data Corporation dataset. Results are generally consistent for the alternative dependent variable, although less statistically significant.

5.2 Accounting Choices – Asset Write-down Recognition

The asset write-down recognition prediction is tested on all available Compustat observations with fiscal years from 2004 through 2014. Similar to tests of corporate investment activities, the primary sources of sample attrition are the presence on earnings announcement 8-K and a consistent of reporting or not reporting non-GAAP earnings. Table 3, Panel A presents means and medians for the asset write-down variables, partitioned on whether the firms report non-GAAP earnings measures in both of the previous two years (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ = 1, or "non-GAAP firms") or neither of the previous two years (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ = 0, or "GAAP-only firms"). The "Entropy Weighted Mean" column presents the weighted mean of each variable for GAAP-only firms. The coefficient of discrimination of the first stage is 10 percent (67 percent – 57 percent). Non-GAAP firms are much more likely to record asset write-downs; however, this difference is less pronounced after entropy weighting. The higher mean of I($Write\text{-}down_t$) is unusual considering the fact that non-GAAP firms are less likely to have their $Adjusted\ BTM_t$ greater than one. Non-GAAP firms have significantly more $Goodwill_{t\text{-}1}$ and $Other\ intangibles_{t\text{-}1}$, although these differences are reduced to zero when entropy weights are applied. Non-GAAP firms have higher Log($Market\ value_t$) than GAAP-only firms. Table 3, Panel B presents pairwise correlations for all asset write-down recognition variables. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$ is positively and significantly correlated with the likelihood of recording an asset write-down. Consistent with the notion that firms with significant investment activities are more likely to

have future asset write-downs, I(*Write-down*$_t$) is positively and significantly correlated with I(*Acquisition cash flow*$_t$ < 0). In untabulated analyses, I(*Write-down*$_t$) is positively correlated with all corporate investment dependent variables. Finally, *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ is positively correlated with the level of *Goodwill*$_{t\text{-}1}$ and *Other intangibles*$_{t\text{-}1}$, which validates the inclusion of these variables in the first-stage regression and the entropy weight computations.

Table 4 presents evidence on the relationship between non-GAAP earnings focus and the inclination to record an asset write-down. Consistent with *P2*, the positive and significant coefficient on *Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ indicates that reporting non-GAAP earnings causes firms to be 3.5 percent more likely to record a write-down in the current period, controlling for other known determinants of write-down recognition. The positive coefficient on *Fitted probability of Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$ implies that some of the factors that determine selection into reporting non-GAAP earnings are positively related to inclination to record a write-down. The positive and significant coefficient on I(*Write-down*$_{t\text{-}1}$) implies that firms with a history of recording write-downs are more likely to record write-downs in the future. Figure 4 presents the percent of firms that record asset write-downs for different intervals of pre-write-down book-to-market, *Adjusted BTM*$_t$, conditional on past non-GAAP reporting choices. Non-GAAP firms are more likely to record asset write-downs at all levels of *Adjusted BTM*$_t$.

5.3 Accounting Choices – Stock Option Expense Measurement

Sample sizes for the stock option expense tests are small because data on whether firms exclude stock option expense from their non-GAAP earnings measures is hand collected from a selection of earnings press releases. For the test of equation (5), the sample is limited to firms that report non-GAAP earnings for nine consecutive years from 2006 to 2014. Earnings

announcements are searched manually to determine whether stock option expense is excluded from non-GAAP earnings. The sample used to test equation (6) is a subset of the hand-collected firms that exclude stock option expense in the post-SFAS 123(R) period. Within the hand-collected sample, there are 62 firms that exclude stock option expense in 2006, 2007, and 2008 ("post excluders"). Post excluders are matched to firms that either report non-GAAP earnings that does not exclude stock option expense or those that do not report non-GAAP earnings at all in 2006, 2007, and 2008. Matching is performed by computing the Mahalanobis (1936) distance between the post excluders and all available control firms. Mahalanobis (1936) distance is a multi-variate distance measure that essentially standardizes variables before computing a Euclidian distance, also taking correlations between variables into account, which assists in matching on multiple dimensions. The Mahalanobis (1936) distance is computed using the pre-SFAS 123(R) volatility forecast error and the pre-SFAS 123(R) size of stock option grant. Each post excluder is matched to the closest non-excluder firm. There are 62 post excluders with 62 matching firms over five years, which results in a final sample size of 620 firm-years (62 firms * 2 * 5 years = 620).

Table 5, Panel A presents descriptive statistics for the full sample of stock option expense variables, partitioned on whether firms exclude stock option expense from non-GAAP earnings (i.e. *Stock comp. excluded*$_t$ = 1, or "excluders") or not (i.e. *Stock comp. excluded*$_t$ = 1, or "includers"). The "Entropy Weighted Mean" column presents the weighted mean of each variable for includers. Excluders and includers both have positive *Volatility forecast error*$_t$, on average, reflecting the fact that the distribution of *Volatility forecast error*$_t$ skews slightly positive, which implies that some firms are very conservative in selecting the volatility input. Excluders are slightly more conservative than includers and the difference is only strengthened

after entropy weighting. Excluders have a lower absolute mean and median *Volatility forecast error*$_t$, which is consistent with excluding firms choosing more accurate expected volatility inputs, although this difference is not statistically significant at conventional levels. Excluders have much higher *Historical volatility*$_t$ and *Size of grant*$_t$, but this difference is reduced to zero when entropy weights are applied. Excluders have smaller Log(*Market value*$_t$) than includers and are less likely to have a *Big four auditor*$_t$. Table 5, Panel B presents pairwise correlations for the full sample of stock option expense variables. Consistent with the notion that firms that exclude stock option expense will use a more conservative and more accurate volatility input, *Stock comp. excluded*$_t$ is positively correlated with *Volatility forecast error*$_t$ and negatively correlated with |*Volatility forecast error*$_t$|.

Table 5, Panel C presents means and medians of stock option expense variables for the difference-in-differences sample. Post excluders have higher average *Volatility forecast error*$_t$, which is entirely driven by the post period, since the firms were matched on the *Volatility forecast error*$_t$ and *Size of grant*$_t$ in the pre-period. Table 5, Panel D presents pairwise correlations for all stock option expense variables in the difference-in-differences sample. Notably, *Post SFAS 123R*$_t$ is negatively associated with the *Volatility forecast error*$_t$, consistent with firms becoming more aggressive in measuring stock option expense once income statement recognition became required in 2006.

Table 6 presents evidence on the relationship between the exclusion of stock option expense from non-GAAP earnings and stock option expense measurement. In columns (1) and (2), the dependent variable is the *Volatility forecast error*$_t$, which is the percentage difference between the volatility inputs used in the Black-Scholes option pricing model and the realized future volatility of the firms' stock. Column (1) presents results for the post-SFAS 123(R) period

only. Consistent with *P3A*, the positive coefficient on *Stock comp. excluded*$_t$ implies that firms that exclude stock option expense from non-GAAP earnings select a 7.7 percent more conservative expected volatility input, consistent with *P3A*. The magnitude of the coefficient translates to a 6.3 percent increase to the dollar value of stock option expense, on average. Figure 5, Panel A presents kernel density plots of the *Volatility forecast error*$_t$ conditional on whether stock option expense is excluded from firms' non-GAAP earnings. It is clear from the figure that there is a mass of firms that do not exclude stock option expense (*Stock comp. excluded*$_t$ = 0) and select an aggressive volatility input (negative *Volatility forecast error*$_t$). Column (2) presents the difference-in-differences setting, in which *Post excluder*$_t$ indicates whether the firm excludes stock option expense from non-GAAP earnings in the post-SFAS 123(R) period and *Post SFAS 123R*$_t$ indicates whether the volatility input was chosen after mandated income statement recognition of stock option expense. The negative coefficient on *Post excluder*$_t$ implies that firms that exclude stock option expense from non-GAAP earnings in the post period are more aggressive in the pre period. The negative coefficient on *Post SFAS 123R*$_t$ implies that firms become more aggressive after stock option expense recognition is mandated, on average. The positive coefficient on the interaction term, *Post SFAS 123R*$_t$* *Post excluder*$_t$, implies that firms that exclude stock option expense from non-GAAP earnings become relatively more conservative in the post-SFAS 123(R) period, consistent with *P3B*. Figure 5, Panel B presents the *Volatility forecast error*$_t$ by year, conditional on whether stock option expense is excluded from firms' non-GAAP earnings in the post-SFAS 123(R) period. The figure indicates that post excluders (*Post excluder* = 1) remain somewhat conservative whereas post includers (*Post excluder* = 0) become more aggressive in the post-SFAS 123(R) period. Columns (3) and (4)

show no statistically significant relationship between stock option expense input accuracy and exclusion from non-GAAP earnings.

5.4 Sensitivity Tests

Sensitivity tests are performed to ensure results are not due to particular specification choices. First, all tests use the Kenneth French's 10 industry portfolios as the industry definition, but the conclusions are not affected when 49 industry portfolios are used. The conclusions are also robust to including industry and year fixed effects in the first stage models that predict the non-GAAP reporting choice. For stock option tests, the conclusions are unchanged when the dependent variable is changed to the percentage deviation from historical volatility or simply the unscaled value of the volatility input itself. Two placebo settings are also investigated in untabulated analyses. Prior research has found that managers engage in real earnings management by reducing discretionary spending, such as spending on R&D activities (e.g., Roychowdhury 2006). The non-GAAP focus hypothesis would predict that firms that exclude R&D expense from non-GAAP earnings should be less likely to engage in real earnings management by cutting R&D spending. However, since Non-GAAP earnings rarely exclude R&D expenses (e.g., Black et al. 2016), R&D spending should have no relation to whether managers focus on non-GAAP earnings. As predicted, non-GAAP reporting practices are found to have no relationship to abnormal spending on R&D. This placebo setting is important because it provides evidence against the notion that non-GAAP firms are just growth firms that tend to overinvest across-the-board. Finally, prior research has found that revenue manipulation is an important tool used by some managers to manage earnings (e.g., Dechow and Schrand 2004). Since revenue is rarely, if ever, excluded from non-GAAP earnings, managers who focus on non-GAAP earnings should not engage in revenue earnings management differently from other

firms. As predicted, non-GAAP reporting practices are found to have no relationship to abnormal revenue recognition to meet analyst revenue benchmarks.

6. Conclusion

This paper proposes that managers focus on non-GAAP earnings, reducing their motivation to maximize GAAP-based net income. This proposition has implications for real activities and accounting choices. Specifically, managers with a non-GAAP earnings focus tend to engage in higher abnormal investment, especially through acquisitions, and are more inclined to record asset write-downs. Further, managers that exclude stock option expense from non-GAAP earnings measure stock option expense more conservatively, on average. These results are subjected to various selection-on-observables statistical techniques to strengthen the argument that non-GAAP earnings focus causes the real activities and accounting choices. Overall, this study provides evidence that non-GAAP reporting is more than simply an alternative measure of performance; the key message of this study is that non-GAAP reporting choices may influence real activities and accounting choices.

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Appendix

Variable Definitions

Corporate Investment Variables:

Abnormal investment$_t$	The residual from the investment prediction model used in McNichols and Stubben (2008), run separately by industry and year.
Asset growth$_{t\text{-}1}$	Total assets at the end of year *t*-1 divided by total assets at the end of year *t*-1 ($at_{t\text{-}1}/at_{t\text{-}2}$).
I(*Abnormal investment*$_t > 0$)	Equal to one if *Abnormal investment*$_t$ is positive, and zero otherwise.
I(*Acquisition cash flow*$_t < 0$)	Equal to one if the firm has acquisition related cash outflows (*aqc* < 0) in year *t*, and zero otherwise.
I(*Material weakness*$_{t\text{-}1}$)	Equal to one if the firm had a material weakness in year *t*-1 and zero otherwise.
I(*SDC Acquisition*$_t$)	Equal to one if the firm has was a bidder in an acquisition year *t*, obtained from the Securities Data Corporation dataset, and zero otherwise.
Log(*Market value*$_t$)	The natural logarithm of market value at the end of year *t*-1, obtained Compustat ln(*csho*prcc_f*).
Nongaap$_t$	Equal to one if any of the following terms appear in the firms' year *t* fourth quarter earnings press release: "non-gaap", "nongaap", "adjusted earn", "adjusted ebi", "ebitda", "adjusted net inc", or "adjusted net los", and zero otherwise.
Nongaap$_{t\text{-}1 \text{ and } t\text{-}2}$	Equal to one if *Nongaap*$_{t\text{-}1}$ and *Nongaap*$_{t\text{-}2}$ are both equal to one, and zero if *Nongaap*$_{t\text{-}1}$ and *Nongaap*$_{t\text{-}2}$ are both equal to zero.
Operating cash flow$_t$	Operating cash flows in year *t* scaled by total assets at the end of year *t*-1 ($oancf_t/at_{t\text{-}1}$).
Post SFAS 141R$_t$	Equal to one if the fiscal year begins after December 15, 2008, the effective date of SFAS 141(R), and zero otherwise.
Sd(*Abnormal accruals*$_{t\text{-}5 \text{ thru } t\text{-}1}$)	Standard deviation of abnormal accruals over five years ending in year t-1, using the combined Dechow and Dichev (2002) and Dechow, Sloan, and Sweeney (1995) accrual models run within industry and year.
Tobins Q$_{t\text{-}1}$	Market value of assets (*csho*prcc_f + at - ceq*) divided by total assets (*at*) all in year *t*.
Total investment$_t$	The sum of research and development expenditure (*xrd*), capital expenditure (*capx*), and acquisition expenditure (*aqc*), less cash receipts from sale of property, plant, and equipment (sppe) scaled by lagged total assets (*at*).

Write-down Variables:

Adjusted BTM$_t$	Compustat total assets (*at*), adding back any pre-tax write-down (*wdp*) or goodwill impairment (*gdwlip*), all divided by market value of assets (*csho*prcc_f + at - ceq*), all in year *t*.
Book to market$_t$	Compustat total assets (*at*) divided by market value of assets (*csho*prcc_f + at - ceq*), all in year *t*.
Count of segments$_t$	The number of business segments, operating segments, or geographic segments reported by the firm in year *t* according to the Compustat Historical Segments database.
Goodwill$_{t\text{-}1}$	Compustat total goodwill (*gdwl*) divided by total assets (*at*), all in year *t*-1.
I(*Acquisition cash flow*$_t < 0$)	Equal to one if the firm has acquisition related cash outflows (*aqc* < 0) in year *t*, and zero otherwise.
I(*Return*$_t$)	Equal to one if *Return*$_t$ is negative, and zero otherwise.

I(*Write-down*$_t$)	Equal to one if Compustat pre-tax write-down (*wdp*), pre-tax goodwill impairment (*gdwlip*), or both are less than zero in year *t*, and zero otherwise.
Log(*Market value*$_{t-1}$)	The natural logarithm of market value at the end of year *t*-1, obtained Compustat (*csho*prcc_f*).
New CEO$_t$	Equal to one if a new CEO was appointed in year *t* according to the Audit Analytics Director and Officer Changes database, and zero otherwise.
Nongaap$_t$	Is equal to one if any of the following terms appear in the firms' year *t* fourth quarter earnings press release: "non-gaap", "nongaap", "adjusted earn", "adjusted ebi", "ebitda", "adjusted net inc", or "adjusted net los", and zero otherwise.
Nongaap$_{t-1 \text{ and } t-2}$	Equal to one if *Nongaap*$_{t-1}$ and *Nongaap*$_{t-2}$ are both equal to one, and zero if *Nongaap*$_{t-1}$ and *Nongaap*$_{t-2}$ are both equal to zero.
Other intangibles$_{t-1}$	Compustat total intangible assets (*intan*) minus total goodwill (*gdwl*), all divided by total assets (*at*), all in year *t*-1.
Return$_t$	The value-weighted stock return for the 12 months of fiscal year *t*, obtained from CRSP.
Weak$_t$	Equal to one if the average of the past two years (years *t* and *t*-1) of value-weighted returns, calculated with CRSP data from month -9 to month +3, is less than 5 percent, or if the average of the past two years of return on assets, calculated as Compustat pre-tax income (*pi*) adding back special items (*spi*) divided by total assets (*at*), is less than 5 percent, and zero otherwise.

Stock Option Expense Variables:

Benchmark adjustment$_t$	(*Historical volatility*$_t$ - *Future volatility*$_t$) / *Future volatility*$_t$
Big four auditor$_t$	Equal to one if the firm's auditor was PricewaterhouseCoopers, Deloitte & Touche, Ernst & Young, or KPMG and zero otherwise, obtained from Compustat (*au*).
Financing$_t$	Cash flow from financing activities (*fincf*) divided by total assets (*at*), both obtained from Compustat.
Future volatility$_t$	The squared root of twelve multiplied by 100 multiplied by the standard deviation of the natural logarithm of monthly price relatives beginning on the balance sheet date of year *t* and ending *n* months after the balance sheet date, where the price relative for month *m* is the CRSP stock price at the end of month *m* divided by the CRSP stock price at the end of month *m*-1, and *n* is the number of months of the option life as reported by the company and obtained from Compustat (*optlife*).
Historical volatility$_t$	The squared root of twelve multiplied by 100 multiplied by the standard deviation of the natural logarithm of monthly price relatives beginning *n* months before the balance sheet date of year *t* and ending on the balance sheet date, where the price relative for month *m* is the CRSP stock price at the end of month *m* divided by the CRSP stock price at the end of month *m*-1, and *n* is the number of months of the option life as reported by the company and obtained from Compustat (*optlife*).
Log(*Market value*$_t$)	The natural logarithm of market value at the end of year *t*, obtained Compustat ln(*csho*prcc_f*).
Post Excluder$_t$	Equal to one if the firm excludes stock compensation expense from its non-GAAP measure during fiscal years 2006, 2007, and 2008, and zero otherwise.
Post SFAS 123R$_t$	Equal to one if the fiscal year begins after June 15, 2005, the effective date of SFAS 123(R), and zero otherwise.
Size of grant$_t$	The number of options granted during year *t* (*optgr*) divided by the number of common shares outstanding at the end of year *t* (*csho*), both obtained from

	Compustat.
Stock comp. excluded$_t$	Equal to one if stock-based compensation expense is excluded from a non-GAAP earnings measure in the fourth quarter of year *t*, and zero otherwise. This was hand collected from earnings press releases.
Volatility forecast error$_t$	(*volatility input*$_t$ - *future volatility*$_t$) / *future volatility*$_t$
Volatility input$_t$	The expected volatility input chosen by the company in year *t* as the expected future annual volatility over the term of the option life, in percent, obtained from Compustat (*optvol*).

Table 1

Descriptive Statistics - Corporate Investment Activities

Panel A: Means and Medians

	$Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 1$ (N = 11,504)		$Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$ (N = 6,775)		
	Mean	Median	Mean	Median	Entropy Weighted Mean
(1) $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$	1.00	1.00	0.00	0.00	0.00
(2) *Fitted probability of* $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$	0.68	0.71	0.54	0.55	0.66
(3) *Abnormal investment*$_t$	0.15	-1.54	-0.25	-1.25	-0.37
(4) I(*Abnormal investment*$_t > 0$)	0.34	0.00	0.34	0.00	0.33
(5) I(*Acquisition cash flow*$_t < 0$)	0.47	0.00	0.26	0.00	0.34
(6) I(*SDC Acquisition*$_t$)	0.43	0.00	0.27	0.00	0.36
(7) *Post SFAS 141R*$_t$	0.76	1.00	0.64	1.00	0.63
(8) *Operating cash flow*$_t$	0.09	0.09	0.02	0.06	0.09
(9) *Asset growth*$_{t\text{-}1}$	0.06	0.04	0.05	0.05	0.06
(10) *Tobins Q*$_{t\text{-}1}$	1.70	1.39	1.97	1.42	1.70
(11) I(*Material weakness*$_{t\text{-}1}$)	0.05	0.00	0.05	0.00	0.04
(12) Sd(*Abnormal accruals*$_{t\text{-}5 \text{ thru } t\text{-}1}$)	0.04	0.03	0.05	0.03	0.04
(13) Log(*Market value*$_t$)	7.17	7.20	5.89	5.82	7.17

Panel B: Pairwise Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)		**0.38**	**0.02**	0.01	**0.21**	**0.16**	**0.12**	**0.19**	0.02	**-0.10**	0.00	**-0.14**	**0.30**
(2)	**0.36**		**-0.02**	**-0.03**	**0.43**	**0.32**	0.01	**0.47**	**0.04**	**-0.27**	**-0.07**	**-0.39**	**0.79**
(3)	0.01	**-0.05**		**0.56**	**0.20**	**0.11**	0.00	0.00	0.00	0.00	**-0.02**	**0.02**	**-0.02**
(4)	0.01	**-0.04**	**0.82**		**0.19**	**0.10**	-0.01	**-0.03**	**0.06**	**0.02**	-0.01	**0.08**	**-0.04**
(5)	**0.21**	**0.45**	**0.16**	**0.19**		**0.40**	**-0.08**	**0.18**	**0.11**	0.01	**-0.02**	**-0.13**	**0.28**
(6)	**0.16**	**0.32**	**0.09**	**0.10**	**0.40**		**-0.05**	**0.17**	**0.09**	**0.02**	**-0.04**	**-0.12**	**0.29**
(7)	**0.12**	0.01	**0.05**	-0.01	**-0.08**	**-0.05**		**-0.04**	**-0.09**	**-0.10**	**-0.09**	-0.01	0.00
(8)	**0.13**	**0.37**	**-0.05**	**0.04**	**0.22**	**0.20**	**-0.07**		**0.16**	**-0.16**	**-0.03**	**-0.32**	**0.32**
(9)	0.00	**0.11**	**0.03**	**0.10**	**0.14**	**0.12**	**-0.12**	**0.22**		**0.12**	0.00	-0.01	**0.18**
(10)	**-0.02**	**0.04**	**-0.14**	**0.03**	**0.14**	**0.13**	**-0.20**	**0.38**	**0.26**		-0.01	**0.26**	**0.13**
(11)	0.00	**-0.08**	**-0.02**	-0.01	**-0.02**	**-0.04**	**-0.09**	**-0.05**	**-0.02**	*-0.01*		**0.07**	**-0.10**
(12)	**-0.11**	**-0.32**	-0.02	**0.09**	**-0.09**	**-0.09**	**-0.06**	**-0.03**	-0.01	**0.21**	**0.08**		**-0.27**
(13)	**0.30**	**0.82**	**-0.07**	**-0.04**	**0.28**	**0.28**	0.00	**0.40**	**0.21**	**0.30**	**-0.10**	**-0.28**	

Panel A presents means and medians of all corporate investment activities variables conditional on whether the firm reported non-GAAP earnings in years *t*-1 and *t*-2 (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$). The 'Entropy Weighted Mean' column presents the weighted means for the control group (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$) using the weights developed in the entropy balancing procedure. Panel B presents Pearson/Spearman pairwise correlations above/below the diagonal. *Italics*, underline, and **bold** represent significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 2

Non-GAAP Earnings Focus and Corporate Investment Activities

	(1) OLS	(2) Logistic	(3) Logistic	(4) Logistic	(5) Logistic	(6) Logistic
	Abnormal investment$_t$	I(*Abnormal investment$_t$ > 0*)	I(*Acquisition cash flow$_t$ < 0*)	I(*Acquisition cash flow$_t$ < 0*)	I(*SDC Acquisition$_t$*)	I(*SDC Acquisition$_t$*)
Nongaap$_{t\text{-}1 \text{ and } t\text{-}2}$	**0.609****	**0.093*****	**0.423*****	**0.325*****	**0.170*****	**0.074**
	(2.27)	**(3.11)**	**(12.29)**	**(5.43)**	**(5.36)**	**(1.33)**
Fitted probability of Nongaap$_{t\text{-}1 \text{ and } t\text{-}2}$	0.778	-0.109	2.078***	2.098***	1.809***	1.808***
	(0.39)	(-0.658)	(3.95)	(3.98)	(8.21)	(8.02)
[Dependent Variable]$_{t\text{-}1}$	-0.574	0.568***	1.943***	1.940***	1.294***	1.294***
	(-1.57)	(19.03)	(24.53)	(24.47)	(39.98)	(39.96)
Post SFAS 141R$_t$				-0.615***		-0.107
				(-4.47)		(-0.83)
Post SFAS 141R$_t$ * Nongaap$_{t\text{-}1 \text{ and } t\text{-}2}$				**0.144****		**0.141****
				(2.00)		**(2.12)**
Operating cash flow$_t$			1.467***	1.478***	1.332***	1.331***
			(6.59)	(6.63)	(7.06)	(7.05)
Asset growth$_{t\text{-}1}$			0.260***	0.247**	0.107	0.109
			(2.69)	(2.55)	(1.33)	(1.35)
Tobins Q$_{t\text{-}1}$			0.061*	0.060*	0.029	0.029
			(1.88)	(1.83)	(1.31)	(1.32)
I(*Material weakness$_{t\text{-}1}$*)	-1.297***	-0.202***	-0.198**	-0.197**	-0.337***	-0.332***
	(-3.50)	(-2.73)	(-2.32)	(-2.30)	(-4.13)	(-4.07)
Sd(*Abnormal accruals$_{t\text{-}5 \text{ thru } t\text{-}1}$*)	12.752***	3.189***	-2.365***	-2.330***	-0.922*	-0.925*
	(2.91)	(7.56)	(-4.12)	(-4.07)	(-1.82)	(-1.82)
Log(*Market value$_t$*)	-0.289**	-0.062***	0.015	0.015	0.114***	0.114***
	(-2.07)	(-4.86)	(0.46)	(0.46)	(7.05)	(7.04)
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors (firm and year)	Yes	No	No	No	No	No
Entropy weights applied	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	18,279	18,279	18,279	18,279	18,279	18,279
Adjusted R^2 / McFadden Pseudo R^2	0.004	0.027	0.263	0.264	0.162	0.162

This table presents evidence on the relationship between investment activities and non-GAAP reporting choices. Variable definitions are presented in the Appendix. The type of regression model fitted and dependent variable names are noted below the column numbers. Coefficient estimates and t-statistics (OLS) or z-statistics (Logistic) are presented within the columns. Adjusted R^2 is presented for OLS models and McFadden Psuedo R^2 is presented for Logistic models. *, **, and *** represent statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, using two-tailed tests.

Table 3

Descriptive Statistics – Write-down Recognition

Panel A: Means and Medians

	$Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 1$ (N = 13,046)		$Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$ (N = 8,410)		
	Mean	Median	Mean	Median	Entropy Weighted Mean
(1) $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$	1.00	1.00	0.00	0.00	0.00
(2) *Fitted probability of* $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$	0.67	0.67	0.57	0.55	0.66
(3) I(*Write-down*$_t$)	0.23	0.00	0.14	0.00	0.20
(4) I(*Acquisition cash flow*$_{t\text{-}1} < 0$)	0.45	0.00	0.24	0.00	0.40
(5) I(A*djusted BTM*$_t > 1$)	0.17	0.00	0.22	0.00	0.18
(6) *Adjusted BTM*$_t$	0.74	0.75	0.74	0.77	0.74
(7) *Goodwill*$_{t\text{-}1}$	0.13	0.06	0.06	0.00	0.13
(8) *Other intangibles*$_{t\text{-}1}$	0.06	0.02	0.02	0.00	0.06
(9) *Weak*$_t$	0.75	1.00	0.77	1.00	0.72
(10) I(*Return*$_t < 0$)	0.44	0.00	0.49	0.00	0.47
(11) *Return*$_t$	0.06	0.04	0.04	0.01	0.04
(12) *New CEO*$_t$	0.12	0.00	0.11	0.00	0.12
(13) *Count of segments*$_t$	2.74	2.00	2.12	1.00	2.85
(14) Log(*Market value*$_{t\text{-}1}$)	7.07	7.04	5.83	5.69	7.07

Panel B: Pairwise Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)		**0.35**	**0.12**	**0.21**	**-0.06**	0.00	**0.25**	**0.22**	**-0.03**	**-0.05**	**0.02**	**0.02**	**0.16**	**0.31**
(2)	**0.35**		**0.22**	**0.58**	**-0.21**	**-0.27**	**0.72**	**0.66**	**-0.25**	**-0.04**	-0.01	**0.02**	**0.28**	**0.48**
(3)	**0.12**	**0.22**		**0.15**	**0.13**	**0.16**	**0.14**	**0.15**	**0.03**	**0.07**	**-0.09**	**0.07**	**0.15**	**0.08**
(4)	**0.21**	**0.58**	**0.15**		**-0.08**	**-0.04**	**0.44**	**0.25**	**-0.12**	-0.01	-0.01	0.00	**0.21**	**0.25**
(5)	**-0.06**	**-0.22**	**0.13**	**-0.08**		**0.64**	**-0.10**	**-0.07**	**0.22**	**0.19**	**-0.21**	**0.02**	**-0.06**	**-0.26**
(6)	-0.01	**-0.33**	**0.14**	**-0.07**	**0.68**		**-0.08**	**-0.06**	**0.32**	**0.24**	**-0.28**	**0.04**	**0.02**	**-0.24**
(7)	**0.28**	**0.74**	**0.19**	**0.51**	**-0.12**	**-0.14**		**0.35**	**-0.16**	**-0.02**	-0.01	0.01	**0.16**	**0.21**
(8)	**0.31**	**0.74**	**0.21**	**0.43**	**-0.11**	**-0.14**	**0.60**		**-0.06**	**-0.03**	**0.03**	0.02	**0.09**	**0.10**
(9)	**-0.03**	**-0.27**	**0.03**	**-0.12**	**0.22**	**0.35**	**-0.19**	**-0.12**		**0.28**	**-0.21**	**0.05**	**-0.11**	**-0.17**
(10)	**-0.05**	**-0.04**	**0.07**	-0.01	**0.19**	**0.24**	**-0.02**	**-0.04**	**0.28**		**-0.65**	**0.05**	**-0.03**	0.01
(11)	**0.04**	**0.02**	**-0.09**	0.00	**-0.23**	**-0.29**	0.01	**0.03**	**-0.29**	**-0.86**		**-0.05**	*0.01*	**-0.10**
(12)	**0.02**	**0.02**	**0.07**	0.00	**0.02**	**0.03**	0.01	**0.02**	**0.05**	**0.05**	**-0.06**		**0.02**	0.00
(13)	**0.17**	**0.32**	**0.15**	**0.23**	**-0.06**	0.00	**0.25**	**0.23**	**-0.13**	**-0.04**	**0.03**	**0.02**		**0.37**
(14)	**0.32**	**0.49**	**0.08**	**0.26**	**-0.25**	**-0.25**	**0.28**	**0.20**	**-0.18**	0.00	**-0.05**	0.00	**0.36**	

Panel A presents means and medians of all write-down recognition variables conditional on whether the firm reported non-GAAP earnings in years *t*-1 and *t*-2 (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2}$). The 'Entropy Weighted Mean' columns presents the weighted means for the control group (i.e. $Nongaap_{t\text{-}1 \text{ and } t\text{-}2} = 0$) using the weights developed in the entropy balancing procedure. Panel B presents Pearson/Spearman pairwise correlations above/below the diagonal. *Italics*, underline, and **bold** represent significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 4

Non-GAAP Earnings Focus and Write-down Recognition

	Logistic Regression I(*Write-down*$_t$)	
	Coefficient	z-statistic
***Nongaap*$_{t\text{-}1 \text{ and } t\text{-}2}$**	0.206***	(5.95)
Fitted probability of Nongaap$_{t\text{-}1 \text{ and } t\text{-}2}$	2.619***	(6.39)
I(*Write-down*$_{t\text{-}1}$)	0.776***	(14.75)
I(*Acquisition cash flow*$_{t\text{-}1}$ < *0*)	0.068	(1.57)
I(*Adjusted BTM*$_t$ > 1)	-1.157***	(-4.45)
Adjusted BTM$_t$	0.977***	(9.13)
Goodwill$_{t\text{-}1}$	-0.308	(-1.57)
Other intangibles$_{t\text{-}1}$	-0.009	(-0.03)
Weak$_t$	0.171***	(3.80)
I(*Adjusted BTM*$_t$ > 1) * *Adjusted BTM*$_t$	0.943***	(5.15)
I(*Adjusted BTM*$_t$ > 1) * *Goodwill*$_{t\text{-}1}$	1.352***	(4.92)
I(*Adjusted BTM*$_t$ > 1) * *Other intangibles*$_{t\text{-}1}$	0.350	(0.86)
I(*Adjusted BTM*$_t$ > 1) * *Weak*$_t$	0.498***	(2.77)
I(*Return*$_t$ < 0)	-0.042	(-0.93)
Return$_t$	0.214***	(3.80)
I(*Return*$_t$ < 0) * *Return*$_t$	-1.005***	(-9.15)
New CEO$_t$	0.376***	(8.00)
Count of segments$_t$	0.115***	(12.98)
Log(*Market value*$_{t\text{-}1}$)	0.040***	(3.30)
Industry and year fixed effects	Yes	
Entropy weights applied	Yes	
Number of observations	21,456	
McFadden Psuedo R^2	0.150	

This table presents evidence on the relationship between managers' choice to record asset write-downs and past non-GAAP reporting choices, using a logistic regression. Variable definitions are presented in the Appendix. Coefficient estimates and z-statistics are presented within the columns. *, **, and *** represent statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, using two-tailed tests.

Table 5

Descriptive Statistics – Stock Option Expense Measurement

Panel A: Means and Medians – Full Sample

	Stock comp. excluded$_t$ = 1 (N =598)		*Stock comp. excluded*$_t$ = 0 (N = 859)		
Main test:	Mean	Median	Mean	Median	Entropy Weighted Mean
(1) *Stock comp. excluded*$_t$	1.00	1.00	0.00	0.00	0.00
(2) *Fitted probability of exclusion*$_t$	0.54	0.50	0.32	0.29	0.53
(3) *Volatility forecast error*$_t$	0.28	0.19	0.22	0.15	0.19
(4) | *Volatility forecast error*$_t$ |	0.42	0.30	0.45	0.36	0.46
(5) *Benchmark adjustment*$_t$	0.28	0.19	0.30	0.24	0.28
(6) *Historical volatility*$_t$	50.25	46.06	39.48	37.10	50.25
(7) *Size of grant*$_t$	0.02	0.02	0.01	0.01	0.02
(8) Log(*market value*$_t$)	6.96	6.88	8.20	8.10	6.96
(9) *Financing*$_t$	-0.01	-0.01	-0.02	-0.02	-0.01
(10) *Big four auditor*$_t$	0.88	1.00	0.96	1.00	0.87

Panel B: Pairwise Correlations – Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)		**0.43**	0.06	-0.03	-0.01	**0.27**	**0.36**	**-0.35**	0.03	**-0.15**
(2)	**0.43**		**0.09**	0.00	**0.10**	**0.60**	**0.79**	**-0.76**	**0.07**	**-0.32**
(3)	0.06	**0.09**		**0.78**	**0.80**	**0.27**	0.00	**-0.10**	*-0.05*	**-0.11**
(4)	**-0.07**	-0.05	**0.57**		**0.58**	**0.15**	-0.06	-0.03	-0.03	**-0.09**
(5)	-0.02	**0.07**	**0.81**	**0.42**		**0.50**	-0.03	-0.01	-0.06	**-0.08**
(6)	**0.27**	**0.60**	**0.25**	0.03	**0.44**		**0.25**	**-0.46**	**0.09**	**-0.24**
(7)	**0.36**	**0.77**	-0.04	**-0.11**	-0.07	**0.23**		**-0.38**	0.01	**-0.18**
(8)	**-0.33**	**-0.80**	**-0.09**	0.02	0.02	**-0.43**	**-0.39**		-0.02	**0.39**
(9)	0.06	**0.16**	-0.07	*-0.04*	**-0.07**	**0.19**	0.01	**-0.12**		-0.01
(10)	**-0.15**	**-0.29**	**-0.11**	**-0.08**	**-0.08**	**-0.19**	**-0.12**	**0.36**	-0.02	

(continued on next page)

Panel C: Means and Medians – Difference-in-Differences Sample

	Post excluder$_t$ = 1 (N = 310)		*Post excluder*$_t$ = 0 (N = 310)	
Difference-in-differences test:	Mean	Median	Mean	Median
(1) *Post Excluder*$_t$	1.00	1.00	0.00	0.00
(2) *Post SFAS 123R*$_t$	0.60	1.00	0.60	1.00
(3) *Fitted probability of exclusion*$_t$	0.53	0.53	0.47	0.49
(4) *Volatility forecast error*$_t$	0.15	0.08	0.07	0.02
(5) | *Volatility forecast error*$_t$ |	0.36	0.25	0.31	0.24
(6) *Benchmark adjustment*$_t$	0.24	0.11	0.11	0.03
(7) *Historical volatility*$_t$	58.87	51.87	56.88	48.56
(8) *Size of grant*$_t$	0.03	0.02	0.03	0.02
(9) Log(*market value*$_t$)	6.77	6.89	6.43	6.13
(10) *Financing*$_t$	0.01	0.01	0.06	0.00
(11) *Big four auditor*$_t$	0.89	1.00	0.78	1.00

Panel D: Pairwise Correlations – Difference-in-Differences Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)		0.00	**0.24**	0.09	*0.08*	**0.13**	0.03	0.09	0.08	**-0.12**	**0.15**
(2)	0.00		**-0.23**	**-0.21**	**-0.15**	**-0.23**	**-0.24**	**-0.22**	-0.01	*-0.07*	**-0.10**
(3)	**0.22**	**-0.22**		**0.13**	0.03	**0.28**	**0.14**	**0.36**	**0.33**	**-0.48**	**0.61**
(4)	0.08	**-0.22**	**0.15**		**0.64**	**0.76**	**0.34**	**0.11**	**-0.14**	-0.06	-0.09
(5)	0.06	**-0.14**	-0.01	**0.29**		**0.47**	**0.23**	0.03	**-0.13**	-0.01	-0.05
(6)	0.10	**-0.23**	**0.28**	**0.77**	**0.22**		**0.53**	**0.12**	-0.02	-0.09	-0.07
(7)	0.06	**-0.22**	**0.12**	**0.32**	0.10	**0.46**		**0.39**	**-0.51**	**0.29**	**-0.18**
(8)	**0.14**	**-0.24**	**0.31**	**0.18**	-0.01	**0.17**	**0.44**		**-0.36**	0.09	**-0.21**
(9)	**0.11**	-0.01	**0.37**	**-0.14**	*-0.07*	0.00	**-0.55**	**-0.34**		**-0.16**	**0.46**
(10)	-0.01	**-0.11**	**-0.40**	*-0.07*	0.00	*-0.07*	**0.33**	**0.11**	**-0.20**		-0.03
(11)	**0.15**	**-0.10**	**0.55**	-0.08	-0.02	*-0.07*	**-0.21**	**-0.22**	**0.48**	-0.06	

Panel A presents means and medians of all stock option expense measurement variables conditional on whether the firm excluded stock option expense from its non-GAAP earnings (i.e. *Stock comp. excluded*$_t$). The 'Entropy Weighted Mean' column presents the weighted means for the control group (i.e. *Stock comp. excluded*$_t$ = 0) using the weights developed in the entropy balancing procedure. Panel B presents Pearson/Spearman pairwise correlations above/below the diagonal. *Italics*, underline, and **bold** represent significance at the 0.10, 0.05, and 0.01 levels, respectively. Panel C presents means and medians of all stock option expense measurement variables for the difference-in-differences tests, conditional on whether the firm excluded stock option expense from its non-GAAP earnings in the post-SFAS123(R) period (i.e. *Post Excluder*$_t$). Panel D presents Pearson/Spearman pairwise correlations above/below the diagonal. *Italics*, underline, and **bold** represent significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6

Exclusion of Stock Option Expense from non-GAAP Earnings and Stock Option Expense Measurement

	(1)	(2)	(3)	(4)
	Volatility forecast error$_t$		*| Volatility forecast error$_t$ |*	
Stock comp. excluded$_t$	**0.077*** **		**0.004**	
	(2.88)		**(0.11)**	
Post excluder$_t$		-0.103***		0.004
		(-2.64)		(0.09)
Post SFAS 123R$_t$		-0.132***		-0.052
		(-6.23)		(-1.61)
Post SFAS 123R$_t$ * Post excluder$_t$		**0.117*** **		**0.019**
		(12.00)		**(0.44)**
Fitted probability of exclusion$_t$	-0.230	-0.081	-0.026	-2.312***
	(-1.68)	(-0.10)	(-0.22)	(-3.29)
Benchmark adjustment$_t$	0.885***	0.762***	0.523***	0.342***
	(28.11)	(19.26)	(4.13)	(3.09)
Historical volatility$_t$	-0.008***	-0.004**	-0.006***	0.002
	(-5.72)	(-2.55)	(-3.24)	(1.01)
Size of grant$_t$	2.725**	-0.097	1.867	4.630***
	(2.17)	(-0.05)	(1.39)	(2.92)
Financing$_t$	0.110**	0.040	-0.011	-0.658***
	(1.99)	(0.15)	(-0.18)	(-3.45)
Big four auditor$_t$	0.010	0.066	-0.058	0.507***
	(0.168)	(0.37)	(-1.12)	(2.91)
Log(*Market value$_t$*)	-0.071***	-0.057***	-0.025**	0.007
	(-5.08)	(-2.82)	(-2.45)	(0.47)
Fixed effects	Industry and Year	Industry	Industry and Year	Industry
Clustered standard errors (firm and year)	Yes	Yes	Yes	Yes
Entropy weights applied	Yes	Yes	Yes	Yes
Number of observations	1,457	620	1,457	620
Adjusted R^2	0.794	0.662	0.506	0.093

This table presents evidence on the relationship between the exclusion of stock option expense from non-GAAP earnings and the measurement of the expected volatility input. Variable definitions are presented in the Appendix. Coefficient estimates and t-statistics are presented within the columns. *, **, and *** represent statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, using two-tailed tests.

Figure 1
Non-GAAP Earnings Reporting Trend

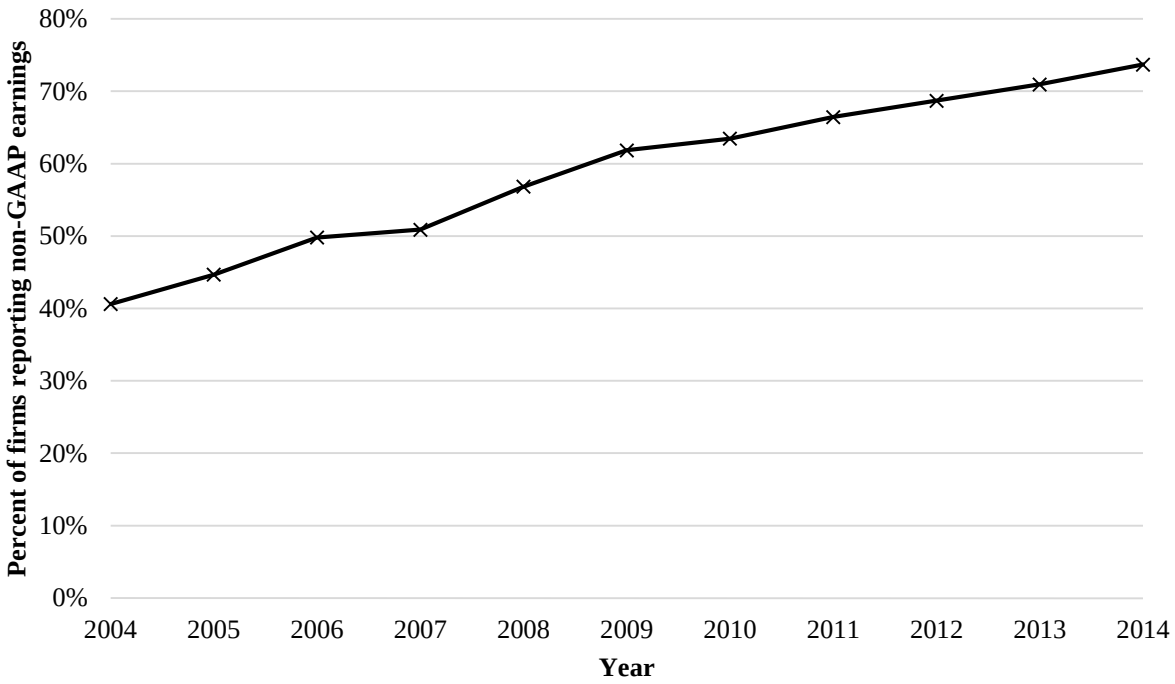


Figure 1 presents the percent of firms reporting non-GAAP earnings in the population of firms that issue fourth quarter earnings press releases. The sample period starts in 2004 and ends in 2014.

Figure 2
Abnormal Investment and Past Non-GAAP Reporting Choices

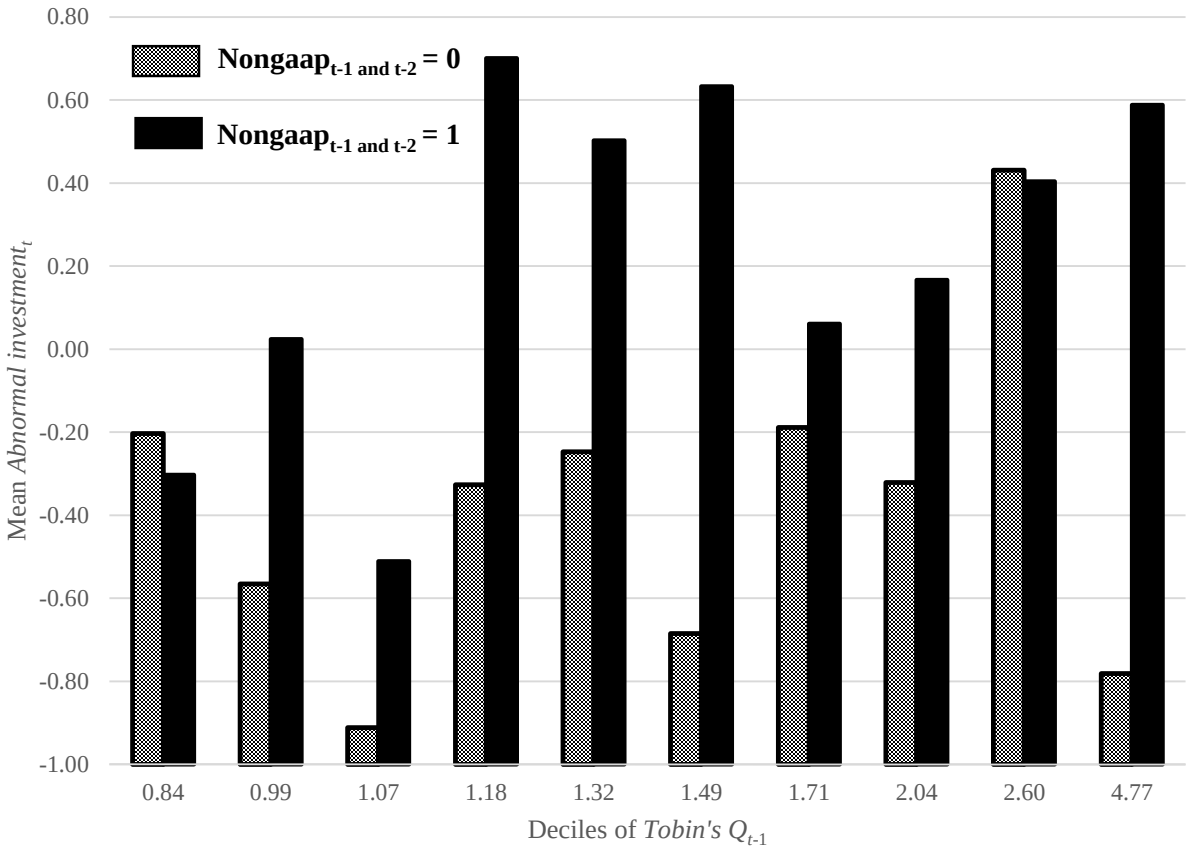
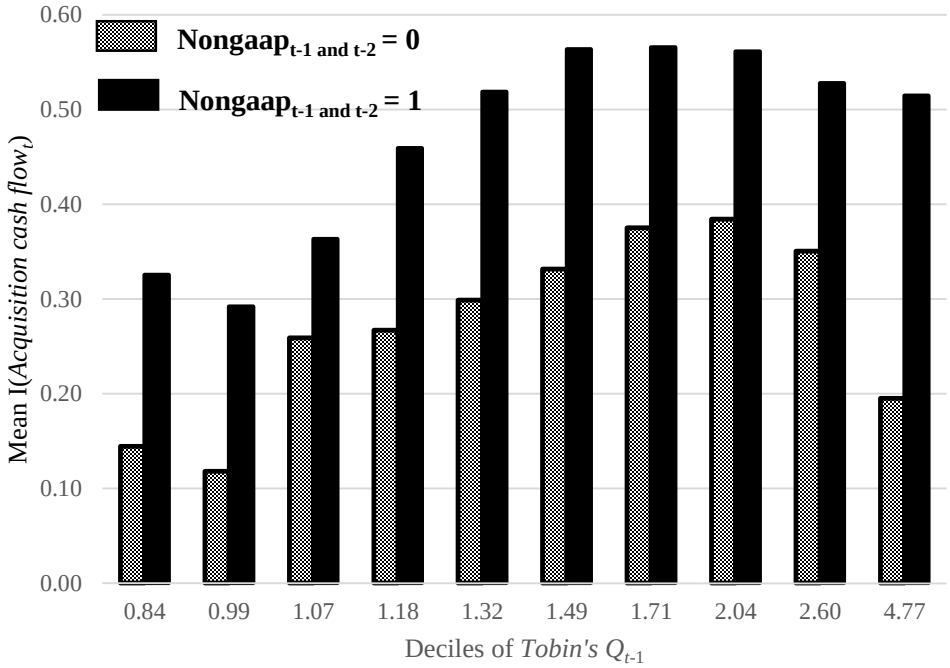


Figure 2 presents the mean *Abnormal investment*$_t$ for firms in different deciles of *Tobins* $Q_{t\text{-}1}$, conditional on past non-GAAP reporting choices.

Figure 3

Acquisitions and Past Non-GAAP Reporting Choices

Panel A: Acquisitions by *Tobins* Q_{t-1} decile



Panel B: Effect of SFAS 141(R) on acquisitions

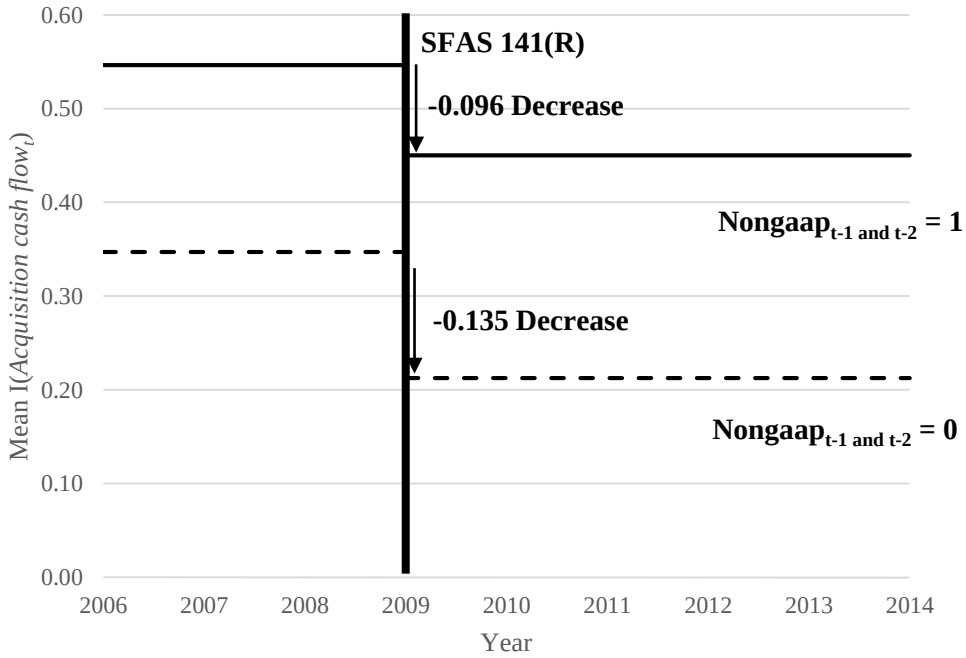


Figure 3; Panel A presents the mean of I(*Acquisition cash flow$_t$* < 0) for firms in different deciles of *Tobins* Q_{t-1}, conditional on past non-GAAP reporting choices. Panel B presents the mean of I(*Acquisition cash flow$_t$* < 0) before and after SFAS 141(R) became effective, conditional on past non-GAAP reporting choices. The solid vertical line at the year 2009 represents the first year that SFAS 141(R) was effective.

Figure 4

Asset Write-downs and Past Non-GAAP Reporting Choices

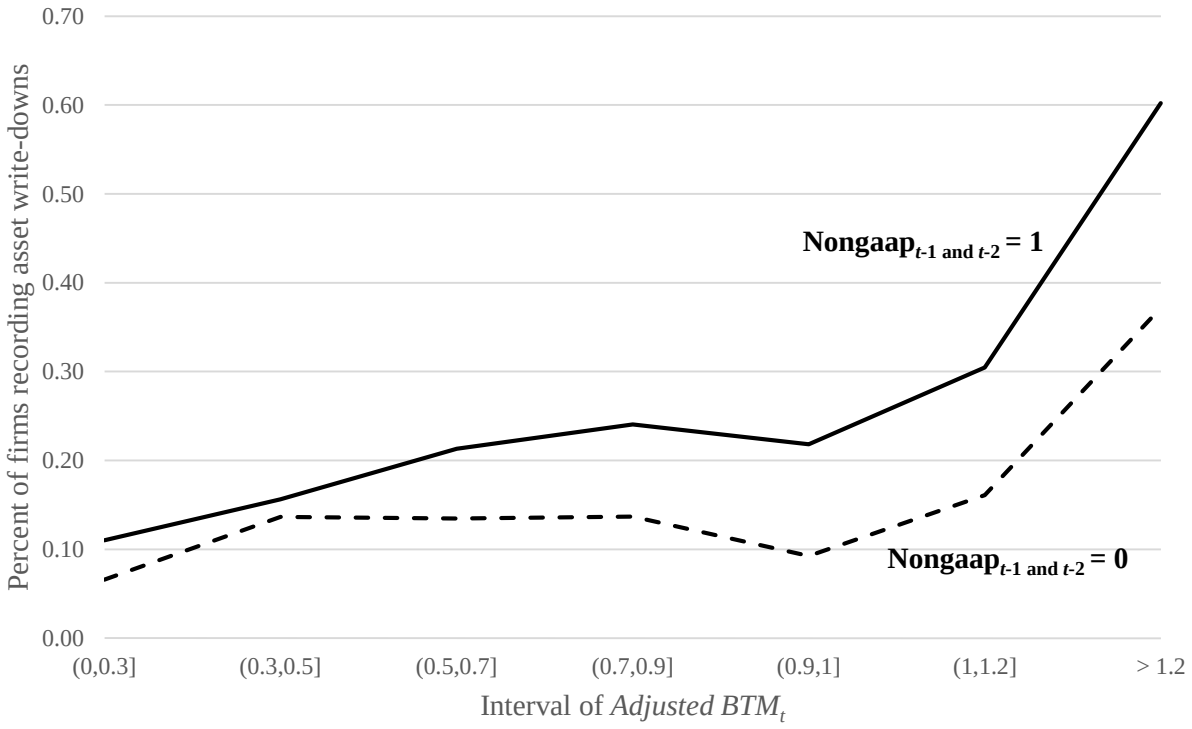
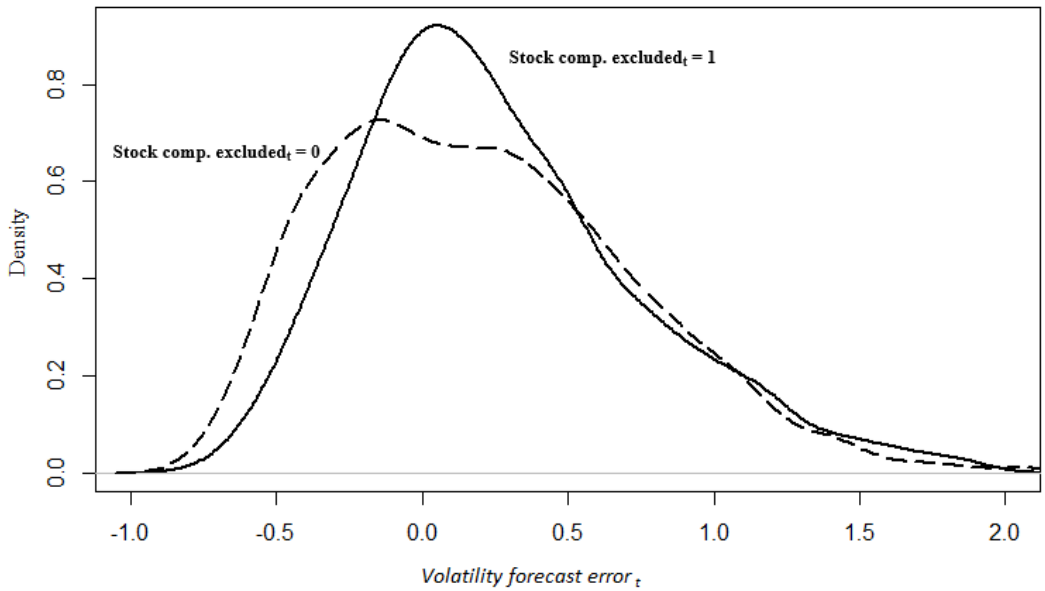


Figure 4 presents the percent of firms that record asset write-downs, I(*Write-down*$_t$), for different intervals of pre-write-down book-to-market, *Adjusted BTM*$_t$, conditional on past non-GAAP reporting choices. Intervals are 0-0.3, 0.3-0.5, 0.5-0.7, 0.7-0.9, 0.9-1.0, 1.0-1.2, and greater than 1.2.

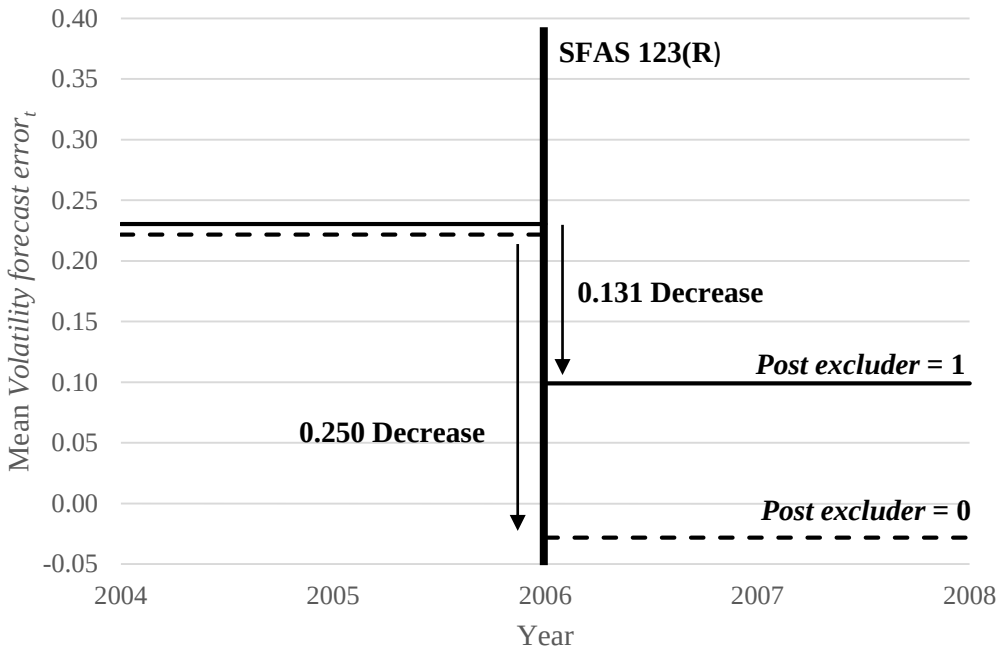
Figure 5

Black Scholes Expected Volatility Input and Exclusion of Stock Option Expense from Non-GAAP Earnings

Panel A: Forecast Errors



Panel B: Forecast Errors Over Time – Matched Sample



Panel A presents kernel density plots of the percent deviation of the volatility input from future realized volatility, *Volatility forecast error*$_t$, conditional on whether stock option expense is excluded from firms' non-GAAP earnings. Panel B presents the percent deviation of the volatility input from future realized volatility, *Volatility forecast error*$_t$, by year, conditional on whether stock option expense is excluded from firms' non-GAAP earnings in the post-SFAS 123(R) period.