Winter 2011

Analyst Following, Capital Market Pressure, and Real Activity Manipulation

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A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

BUSINESS ADMINISTRATION - FINANCE

OLD DOMINION UNIVERSITY
December 2011

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ABSTRACT

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Old Dominion University, 2011
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I investigate the impact of analyst following on real activity manipulation. Because analysts follow firms and serve as information intermediaries, analyst following should reduce earnings management through real activity manipulation. However, given the negative ramifications of missing analysts' earnings forecasts, the fact that analysts are watching and issuing forecasts might actually create capital market pressures as managers try to ensure that they do not miss earnings targets. Because managers can engage in earnings management through real activities manipulation and accrual manipulation, I control for accrual manipulation in examining the relationship between analyst following and real activity manipulation. I find that analyst following is associated with more real activities earnings management. I also find evidence that discretionary accrual manipulation and real activity manipulation are used as substitutes to manage earnings. These findings provide valuable information for model specification for future research that investigates earnings management.

AKNOWLEGDEMENTS

I would like to thank the members of my dissertation committee, Dr. Mohammad Najand, Dr. Kenneth Yung and Dr. Vinod Agarwal, for their advice, guidance and support during this process.

I would also like to thank my family and friends for their continual encouragement and support through the process and for always asking about the status of my dissertation. They will now need a new greeting for me because "how's the dissertation going" is no longer applicable. I also want to give special thanks to my husband, Alva, for carving out time when I could work for hours without being interrupted by my loving and energetic children and to my children, Alva Jr., Zion and Nicole for their periodic concern about why I was locked away in my office during these times.

I would also like to thank the Economic Education team members at work, whose extra efforts this year allowed me to devote this summer to finishing my dissertation.

Most importantly, I'd like to thank God for helping guide me to find my way to this point.

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CHAPTER 1

Introduction

The negative market response to missing earnings targets provides a powerful incentive for management to meet earnings forecasts. Ideally, meeting these targets is accomplished through normal operational activities. However, these targets can also be met by manipulating accruals and/or real activities which can negatively impact long-term firm value. Therefore, the existence of governance and monitoring mechanisms that can effectively curb accrual and real activity manipulation are important.

Security analysts follow firms and provide market information and therefore may serve an important monitoring role in reducing accrual and real activity manipulation. However, because of attention to analyst forecasts and the negative market reaction for firms that miss earnings targets, analyst following might actually exacerbate accrual and real activity manipulation by management. This paper investigates whether security analysts effectively function as external monitors reducing earnings management through real activity manipulation or whether they create capital market pressure which induces more manipulation.

Theoretically, the alignment of the interests of managers and shareholders through contracts and monitoring should make this type of manipulation unlikely. However, some managerial incentive structures, such as compensation tied to share price or other accounting variables, can create pressure to manipulate earnings. The costs associated with this type of manipulation, whether in the form of reduced transparency about the actual state of the firm or through the expenditure of non-value producing managerial effort, can be detrimental to the long-term performance of the company [Gunny (2005),

Graham et al (2005), Zang (2007), Cohen and Zarowin (2010)]. Although several prior studies have found that analyst following is associated with higher performance measures [Merton (1987), Moyer et al (1989), Chung and Jo (1996), Doukas et al (2000), Das et al (2006)], there is limited research that investigates the contribution of analyst following in reducing real activities earnings management.

Earnings management stems from management's ability to use discretion in financial reporting. Managers routinely estimate future economic events, choose among accounting methods for reporting transactions, use judgment in the management of working capital, and decide when to realize or defer expenses. In this paper, I define earnings management using a frequently referenced definition by 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 stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."[1] Therefore earnings management can be viewed as an agency dilemma, especially if some stakeholders are not able to recognize and appropriately discount earnings numbers obtained through manipulation.

Much of the earnings management literature focuses on accrual management. Accrual management is identified by abnormal levels of discretionary accruals. However, managers can manipulate earnings through either accruals or real activities. Rowychowdhury (2006) defines real activity manipulation as departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal

[1] In this paper, I use earnings management and earnings manipulation interchangeably.

course of operations. Because accrual manipulation and real activity manipulation are likely used together to obtain a desired outcome, both should be examined together. This paper contributes to the literature by examining the monitoring role that analysts may play in reducing real activity manipulation. The paper also provides additional insight on the monitoring role of analysts in reducing accrual management which has been studied previously in the literature, but not in the context of substitutability between accrual management and real activity management. The results indicate analyst following is associated with higher real activities manipulation as measured by the proxies in this paper. In addition, the results confirm a substitution relationship between discretionary accrual manipulation and the real activity manipulation proxies. This finding provides valuable information for model specification in future research that investigates earnings management.

The rest of this study is organized as follows. Section 2 presents a brief literature review and a discussion of the hypotheses. Section 3 describes the sample and variables used. Section 4 provides detailed results of the relationship between analyst following and real activity manipulation. Section 5 discloses various robustness checks. Section 6 summarizes the conclusions.

CHAPTER 2

Literature Review and Hypothesis

Because managers have some discretion in accounting, including deciding when to realize or defer income and expenses, they are able to affect reported earnings numbers through accruals. Ideally, this discretion should allow the manager to provide additional insight into the state of the firm that would not otherwise show up in actual cash flows. However, as noted above, instead of providing additional clarity, discretionary accruals can also be used as a tool to mislead stakeholders, to avoid the negative reaction of missing earnings projections or to affect the outcome of some other market event. The earnings management literature primarily focuses on actions to bridge gaps between expectations and performance and to affect the outcome of capital market transactions.

2.1 Earnings Management and Performance

Burgstahler and Dichev (1997) and Burgstahler and Eames (2003) investigate the distribution of reported earnings scaled by market value and find a discontinuity around the zero earnings threshold. The papers report a high frequency of firms with small earnings increases and positive income and a low frequency of firms with small decreases in earnings and reported losses. The authors attribute this discontinuity to earnings management to report positive income gains. In these papers, earnings management identification is based solely on distributional analysis. A significant amount of subsequent research has also attributed the discontinuity of the earnings distribution around the zero thresholds to earnings management.[2] Burgstahler and Eames (2003) also find that firms manage earnings to avoid both losses and earnings decreases. In addition,

[2] The following is a list of a few of the studies: Collins, Pincus, and Xie [1999], Degeorge, Patel, and Zeckhauser [1999], Kang [1999], Easton [1999], Baber and Kang [2002], Beaver, McNichols, and Nelson [2007], Gunny, Jacob, and Jorgensen [2007], Jacob and Jorgensen [2007]

they find evidence that analysts fail to incorporate the earnings management that actually occurs into their forecasts making it beneficial for managers to "game the system."

More recently, researchers have questioned the identification and conclusion of earnings management based on distributional analysis. Durtschi and Easton (2005) and Durtschi and Easton (2009) contend that the discontinuities around the zero earnings threshold result from sample selection bias and scaling. Specifically, they argue that the discontinuity is an artifact caused by elimination of observations with missing data. They also contend that deflating earnings by market capitalization affects the resultant distribution. They observe that the market capitalization of companies reporting a loss tends to be smaller than that of companies reporting the same absolute value of profit. Therefore, larger deflators for the profit firms will cause those firms to accumulate in the smallest positive interval when scaled. For loss firms, scaling with market capitalizations that are lower in absolute value than those for the profit firms will lead to less accumulation of entries near the zero threshold. Jacob and Jorgensen (2007) challenge the Durtschi and Easton (2005, 2009) findings. By aggregating quarterly earnings over periods ending in months other than the fiscal period end month, Jacob and Jorgensen (2007) calculate alternative annual earnings measures. If there is earnings management at fiscal year end to meet targets, the discontinuity should be more apparent for fiscal year-end earnings numbers than for the alternative earnings periods. They confirm prior findings in Burgstahler and Dichev (1997) of earnings management to avoid earnings decreases and losses in all scaled earnings measures. Their analysis also indicates a discontinuity at zero in the distribution of unscaled net income. Although the debate continues about the discontinuity in the distribution of earnings around zero and whether

this discontinuity can be attributed to earnings management, other literature provides evidence of manipulation through accruals and real activities.

DeGeorge et al (1999) find evidence that managers manipulate earnings to try to "jump over the line." Using discretionary accruals as a proxy for earnings management, they identify earnings management to beat two additional benchmarks- performance relative to the prior comparable period and relative to analysts' earnings projections. Dechow et al. (2003) also investigate whether firms that just met thresholds of zero earnings and zero changes in earnings engage in accrual manipulation to meet these thresholds. They find no significant difference in accruals for small profit and loss firms and suggest that managers in the sample are instead using real actions to meet earnings targets. However, Hansen (2010) provides another rationale for the lack of confirmatory findings of accrual management to meet targets in the Dechow et al (2003) study. Hansen (2010) points out firms may be managing earnings to respond to incentives other than the incentive under investigation. After controlling for alternative benchmarks (for example, earnings changes), Hansen finds that firms with small profits have discretionary accruals that are significantly higher than firms with small losses providing additional evidence of discretionary accrual earnings management tied to various performance targets.

Other literature suggests that earnings management to meet performance benchmarks is not accomplished solely through accrual management. Gunny (2010) asserts that manipulating accruals is subject to higher risk of SEC scrutiny. She looks at R&D expense, SG&A expense, timing of the sale of fixed assets and overproduction (discussed in more detail in section 3.3) as real activity manipulation tools. She finds a

positive association between real activity manipulation and meeting earnings benchmarks. Collectively, these studies provide evidence that earnings management to meet benchmarks exists and also for the direction of this study in controlling for accrual manipulation when examining the effect of analyst following on real activity management.

2.2 Earnings Management and Capital Market Transactions

Researchers have documented valuation issues that result from earnings management. For example, Teoh et al (1998b) examine whether aggressive income-increasing accounting accruals increase investor optimism about SEOs. They find higher net income growth in the issue year for SEO firms relative to performance matched non-issuing comparable firms. Post-issue, they find that the SEO firms significantly under perform their matches. They attribute the optimism that drives the market overvaluation of SEOs to inflated earnings numbers garnered through accrual manipulation and the underperformance to a market correction back to fundamental value. Miznik and Jacobson (2007) also examine earnings management around SEOs. They find that firms tend to inflate earnings numbers using both accrual and real activity manipulation before SEOs and that the market also overvalues these firms. The long-run performance issues associated with earnings management are also prevalent in the IPO market. Teoh et al (1998a) also examine whether discretionary accruals predict the cross-sectional variation in post-IPO long run stock performance. They find evidence that firms with abnormally high accruals in the IPO year experience poor stock performance in the three years following issuance. The stock under performance is directly related to the degree of the accrual earnings management. They find that the most aggressive earnings management

firms have three-year after market stock returns that are approximately 20 percent less than the most conservative earnings management firms. Given the long-run performance outcomes associated with earnings management, an important question is what governance mechanisms can successfully mitigate the behavior.

2.3 Earnings Management and Corporate Governance

Prior research has examined the effectiveness of some corporate governance mechanisms in controlling earnings management through accruals. For example, Chung and Jeong-Bon (2002) find a negative relationship between institutional holdings and accrual management. Peasnell et al (2000) show that outside members on audit committees and governance boards reduce abnormal accruals. Similarly Matsumoto (2002) finds that firms with higher transient institutional ownership are more likely to use discretionary accruals and forecast guidance to meet or beat expectations at earnings announcement. In addition, Luez et al (2003) examine the role of investor protection in controlling earnings management. They find that the quality of minority shareholder rights and the strength of legal enforcement reduce accrual earnings management. Collectively, the results of these studies suggest that effective governance/external monitoring can reduce the agency problems of accrual management. This paper examines the relationship between analyst following and various earnings management measures to determine if analysts are successful monitors in reducing accrual and real activity management.

2.4 Accrual Manipulation and Real Activity Manipulation

A survey study by Graham, Harvey, and Rajpol (2005) suggests that real activity manipulation may be more prevalent than accrual manipulation. Eighty percent of the

managers surveyed in the Graham study reported that they would decrease spending on R&D, advertising, and maintenance to meet an earnings target. More than fifty percent of respondents stated that they would delay starting a new project to meet an earnings target, even if such a delay would be non value maximizing. These findings are significant because they suggest that not only do managers feel significant pressure to meet targets, but also that they are creative in finding mechanisms, other than accruals, to reach targets. Further evidence of this is given by Chi et al (2011) when they find that higher quality auditors and longer audit tenure constrain accrual management but with an unintended consequence that firms resort to real activities earnings management. Other literature suggests that the reliance on earnings management through real activity manipulation may also be more prevalent because of the attention that investors and other regulators give to accounting figures in the wake of major accounting scandals.

In a working paper, Zang (2007) investigates the relationship between real activity and accrual management. She finds a degree of substitutability between real activity manipulation and accrual manipulation. Specifically, she finds that an increase in the cost of one type of manipulation leads to an increase in the level of the other type. Cohen and Zarowin (2010) also examine the relationship between real and accrual earnings management. They report that SEO firms engage in both real and accrual manipulation and that as the cost of accrual management increases, firms engage in more real activity manipulation. Interestingly, they find that the decline in post-SEO performance due to the real activities management is more severe than that due to accrual management. If the long-run performance implications of real activity manipulation

expand beyond the SEO market, identifying mechanisms that can reduce this opportunistic behavior is important.

2.5 Earnings Management and Analyst Following

Most of the recent research on analyst following and earnings management focuses on discretionary accruals alone as the earnings management tool. Ahmed et al (2005) examine the effects of earnings management on analysts' forecasts. They find that analysts' forecasts do not correctly predict the difference in the persistence between non-discretionary and discretionary accruals (discretionary accruals display less persistence than non-discretionary accruals). If firms use accrual manipulation to meet performance benchmarks in one period, this inefficiency in analysts' forecasts could cause managers to engage in a cycle of accrual manipulation to meet future earnings targets.

Degeorge et al (2005) examine the role that analysts play in either reducing or exacerbating discretionary accrual earnings management. Across an international sample, they find evidence that analysts are more effective monitors in transparent environments than in opaque environments and also find that firms in transparent countries use short-term earnings management techniques to reach the consensus analyst forecast. Controlling for possible endogeneity of analyst coverage, Yu (2008) also examines analysts' influence on discretionary accruals earnings management decisions. He finds that firms followed by more analysts manage their earnings less and the result is more pronounced for more experienced analysts and for analysts from top brokers. Similarly, Knyazeva (2007) finds that the effect of analyst following on firm performance is similar to the effect of other corporate governance mechanisms and that analyst following is

associated with lower discretionary accrual earnings management. A study by Sun and Liu (2011) finds a positive relationship between analyst coverage and accounting conservatism, defined as accounting that recognizes losses as they are discovered, but defers gains until they are verified. This rule of thumb approach to recording losses and gains reduces the case by case discretion that managers have over accruals. Their results suggest that firms engage in less accrual management and choose more conservative accounting methods when they are followed by more analysts than when they are followed by fewer analysts. Collectively, these studies suggest that analysts are successful in reducing earnings manipulation through discretionary accruals. However, more research is needed to determine if analyst following is successful at reducing multiple types of earnings management behavior or if analyst following is associated with managers substituting out of discretionary accruals as the earnings management tool into other types of earnings management.

A recent study by Cohen and Zarowin (2010) provides some limited evidence that analyst following can curb both accrual and real activity manipulation. They conduct maximum likelihood estimation using an earnings management dummy variable as the dependent variable. The earnings management dummy is set to 1 if any of their earnings management proxies (accrual based or real activity based) is above the industry-year median. They find a significantly negative relationship between the earnings management dummies and analyst following. While this paper does present some evidence that analyst following can curb real earnings management behavior, the model estimated does not take into account the interplay in the relationship between accrual and real activity manipulation. An examination of analyst following on real activity earnings management

that takes into account accrual management will provide additional insight on the monitoring role of analysts. Specifically, this paper will provide insight on how analyst following affects the interplay between accrual and real activity manipulation and whether analyst coverage simply induces managers to switch between earnings management mechanisms.

2.6 Hypotheses

Because model misspecification may be influencing prior findings on analyst following and earnings management, I test that there is no relationship between analyst following and real activity manipulation while controlling for accrual management.

H1: There is no significant relationship between analyst following and real activities manipulation.

Finding support for H1 would be a significant contribution to the literature and provide information on specification of models dealing with accrual and/or real activity manipulation.

Failure to find support for H1 would indicate that either the "monitoring effectiveness" or the "capital market pressure" argument explains the relationship between analyst following and real activity manipulation. In the monitoring effectiveness hypothesis, analyst following is successful in reducing real activity manipulation. In the capital market pressure hypothesis, analyst following creates pressure to manipulate to meet benchmarks.

CHAPTER 3

Data sources, variable construction, and sample description

3.1 Data Sources

Data sources for this paper include the Center for Research in Security Prices (CRSP), Compustat, ExecuComp, the and Institutional Brokers' Estimate System (I/B/E/S) databases. I exclude banks/financial firms, utilities, and other regulated industries. Data on firm characteristics are either obtained from or calculated with data from CRSP and Compustat. Analyst following information is obtained from I/B/E/S. Compensation data is for the active CEO for the year as listed in ExecuComp. I use annual data to pick up earnings management to meet annual earnings targets, a frequently cited goal of earnings management. The sample data spans the time period from 1992-2006 with 32,117 observations across the firm-years.

3.2 Measures of Discretionary Accruals

Earnings management can be proxied using discretionary accruals. The methods for estimating discretionary accruals range from calculating simple averages to more involved estimation techniques. In most models, total accruals are calculated and then separated into nondiscretionary and discretionary components. The most frequently cited and used methods for measuring earnings management are the Jones Model (1991) and the modified Jones Model (Dechow et al, 1995). First total accruals are calculated as follows:

$$TA_t / A_{t-1} = (\Delta CA_t - \Delta CL_t - \Delta CASH_t + \Delta\ STDEBT_t - DEP_t)/A_{t-1} \quad (1)$$

where

TA is total accruals for the firm in year t;

ΔCA is the change in current assets between year t and t-1;

ΔCL is the change in current liabilities between year t and t-1;

$\Delta CASH$ is the change in cash and short term investments between year t and t-1,

$\Delta STDEBT$ is the change in debt in current liabilities between year t and t-1;

DEP is the year t depreciation and amortization expense and

A_{t-1} is lagged total assets.

The following equation is then estimated as an interim step in calculating the predicted value of accruals.

$$TA_t / A_{t-1} = \alpha_1 / A_{t-1} + \alpha_2 (\Delta SALES_t)/ A_{t-1} + \alpha_3 PPE_t/ A_{t-1} + \varepsilon_t \quad (2)$$

where $\Delta SALES$ is the change in revenues between time t and t-1, PPE is gross property, plant, and equipment, and all other variables are as defined above. The predicted values of total accruals are calculated using the parameters estimates from equation 2a, but adjusting the change in revenues by the change in receivables. This modification is necessary because the Jones model treats revenues as completely non-discretionary. If earnings are managed by shifting revenues from future periods, we need to adjust the change in revenues for the change in receivables. Therefore the predicted value of total accruals is calculated using the following equation.

$$PTA_t = \acute{\alpha}_1 / A_{t-1} + \acute{\alpha}_2 [(\Delta SALES_t - \Delta REC_t)]/ A_{t-1} + \acute{\alpha}_3 PPE_t / A_{t-1} \quad (3)$$

where PTA is the predicted value of total accruals for firm i in year t, and ΔREC is the change in net receivables between year t and t-1, and all other variables are as previously defined. Finally, the variable of interest DA, discretionary accruals, is defined as total accruals (TA) minus the predicted value of total accruals (PTA).

In order to account for industry and economy wide influences on discretionary accruals, a cross-sectional variation of the Jones model requires that sample firms are grouped according to the two-digit SIC code. Equation 2 is then estimated for each SIC group. Discretionary accruals for each firm are found using the same approach as in the times series Jones model but with the parameter estimates from the respective SIC groups. In this paper, I use the modified Jones approach to calculate discretionary accruals due to its widespread acceptance in the literature.

3.3 Measures of Real Activity Manipulation

Real activity earnings management involves the manipulation of operating variables such as R&D expenses and production levels. A study by Roychowdhury (2006) uses deviations from abnormal production costs, abnormal discretionary expenses, and abnormal cash flow from operations, as proxies for real activities manipulation that result from the following manipulation methods.

1. Sales manipulation- accelerating the timing of sales and/or generating additional unsustainable sales through increased price discounts or more lenient credit terms;
2. Reduction of discretionary expenditures
3. Overproduction, or increasing production to report lower COGS.

With sales manipulation, the cash inflow per sale is lower than normal because of price discounts or more lenient credit terms. As the additional sales are realized, total current period earnings are higher but the lower per unit margins mean that production costs relative to sales will be abnormally high. Cash flow from operations, (CFO) is abnormally low and production costs are relatively high given the level of sales. If managers reduce discretionary expenses (DISEXP) as a real activity manipulation tool,

the firm will exhibit unusually low discretionary expenses which would translate into lower cash outflows and a positive effect on current period CFO. For manufacturing firms, overproduction spreads fixed costs over a larger output and therefore can reduce total per unit costs. The firm would show better operating margins because the reported cost of goods sold (COGS) is lower. However the firm incurs production and holding costs for the excess inventory that are not recovered in the current period which results in higher production costs relative to sales level. In order to generate production costs for non manufacturing firms, Roychowdhury (2006) defines production costs (PROD) as the sum of COGS and change in inventory (INV) during the period.

In the CFO model, Roychowdhury, following Dechow et al (1998) in calculating CFO, DISEXP and PROD, uses the following equation to estimate the normal level of CFO:

$$CFO_t / A_{t-1} = \alpha_0 + \alpha_1 (1/ A_{t-1}) + \alpha_2 (SALES_t)/ A_{t-1} + \alpha_3 (\Delta SALES_t)/ A_{t-1} + \varepsilon \qquad (4)$$

where CFO_t is cash flow from operations in period t, A_{t-1} is lagged total assets at the end of period t-1, $SALES_t$ is sales for period t and $\Delta SALES_t$ is the change in sales between period t and t-1. Roychowdhury (2006) points out that it is customary to include a scaled intercept, $\alpha_1 (1/ A_{t-1})$, when estimating non-discretionary accruals to avoid a spurious correlation between scaled CFO and scaled sales due to variation in the scaling variable, total assets. Following the Roychowdhury approach, I also include a scaled intercept to ensure that the mean abnormal CFO is zero. Including the intercepts allows the average CFO_t/ A_{t-1} to be non-zero even when the primary explanatory variables in the model, sales and change-in-sales, are zero. He also includes an un-scaled intercept to ensure that the mean abnormal CFO for every industry-year is zero. He finds that eliminating the un-

scaled intercept does not materially affect the results. Abnormal cash flow is the difference between reported CFO and the estimated value of normal CFO calculated using the coefficients from equation 4. Similarly, discretionary expenditures, DISEXP, (which includes R&D, advertising, and selling, general and administrative expenses) are a function of sales and lagged sales such that:

$$DISEXP/ A_{t-1} = \alpha_0 + \alpha_1 (1/ A_{t-1}) + \alpha_2 (SALES_t)/ A_{t-1} + \alpha_3 (SALES_{t-1})/ A_{t-1} + \varepsilon \quad (5)$$

and abnormal expenses are the difference between actual DISEXP and the estimated value of normal DISEXP calculated using the coefficients from equation 5 above. Finally, production costs are estimated using the following equations for COGS and INV.

$$COGS/ A_{t-1} = \alpha_0 + \alpha_1 (1/ A_{t-1}) + \alpha_2 (SALES_t)/ A_{t-1} + \varepsilon \quad (6)$$

$$\Delta INV = \alpha_0 + \alpha_1 (1/ A_{t-1}) + \alpha_2 (\Delta SALES_t)/ A_t + \alpha_3 (\Delta SALES_{t-1})/ A_{t-1} + \varepsilon \quad (7)$$

Production costs equal the sum of COGS and ΔINV such that

$$PROD = \alpha_0 (1/ A_{t-1}) + \alpha_1 (SALES_t)/ A_{t-1} + \alpha_2 (\Delta SALES_t)/ A_{t-1} + \alpha_3 (\Delta SALES_{t-1})/ A_{t-1} + \varepsilon \quad (8)$$

Each of the variables of interest (CFO, DISEXP, PROD) are estimated and abnormal levels are defined as actual values minus the respective predicted values. The two-digit SIC code is used for cross section estimation.

Mizik and Jacobson (2007) use ROA and R&D intensity surprises to proxy real activity manipulation. Specifically they posit that firms that simultaneously report a positive ROA surprise and a negative surprise to R&D intensity are likely to have manipulated earnings. They find that ROA and R&D intensity are well approximated by a fixed effects first-order autoregressive panel data model adjusted for firm specific and time specific effects (Arellano 2003). Therefore they use the following models to estimate predicted ROA and R&D intensity:

$$ROA_{it} = \alpha_i + \varphi * ROA_{it-1} + \Sigma \delta_\tau * TIME(\tau) + \varepsilon_{it}, \quad (9)$$

$$RD_{it} = \alpha_i + \varphi * RD_{it-1} + \Sigma \delta_\tau * TIME(\tau) + \varepsilon_{it}, \quad (10)$$

ROA_{it-1} and RD_{it-1} are lagged values of return on assets and R&D spending respectively. $TIME(\tau)$ is an indicator variable that is equal to 1 if year is τ and 0 otherwise. In both equations, the variable of interest has a firm specific component (α_i) and a component that captures the broader economy (δ_τ). A value of 1 on φ, the first order autoregressive coefficient, would indicate that the series follows a random walk and a value of φ=0.00 indicates that the series returns back to its mean level within a year. Alternative models of nested specifications do not perform as well as the model indicated above.

While the Mizik and Jocobson (2007) measure is appealing because it does not force a specification on real activity manipulation, the Roychowdhury (2010) measures are more frequently used in the literature. I use the Roychowdhury measures as the primary proxies for real activity manipulation. My primary proxies for real activity manipulation are abnormal production costs, ABPROD, and abnormal discretionary expenses, ABDISEXP. Rather than including analysis for abnormal cash flow from operations, ABBCFO, as a standalone proxy, I perform analysis using ABCFO as a composite proxy due to some problems in interpreting results for the ABCFO measure. Remember that sales manipulation (through price discounts and more lenient credit terms), overproduction, and reduction of discretionary expenses all have an effect on current period CFO. Sales manipulation causes current period CFO to be abnormally low as fewer dollars are logged per sale on average. If spending on discretionary items is in the form of cash, reducing these expenditures to artificially prop up earnings lowers cash outflows and will have a positive effect on abnormal CFO. Roychowdhury (2006) also

points out that with overproduction, the firm incurs production and holding costs on the over-produced items that are not recovered in the same period. The outcome is that cash flows from operations are lower than normal. Because the manipulation strategies under consideration have inconsistent directional effects on abnormal CFO, it would be difficult to draw definitive conclusions from the analysis of ABCFO as a standalone measure.

Following Zang (2007) and Cohen and Zarowin (2010), I also create composite proxies using ABPROD, ABDISEXP, and ABCFO and test the relationships with these proxies as a robustness check. I use the individual components as my primary proxies because the processes that generate abnormal production costs, abnormal discretionary expenses, and abnormal cash flow from operations are different, which may make it more difficult to identify relationships for the composite measures. Tables 1 and 2 contain descriptive statistics and correlation tables for variables of interest.

CHAPTER 4

Models and Analysis

In this paper, I am testing the effect of analyst coverage[3] on earnings management through real activity manipulation. Because analyst coverage is associated with many factors that may also affect the firms' earnings management decision, I control for these factors by first running the following equation.

$$\mathbf{NAF = \beta 1 + \beta 2\ SIZE + \beta 3\ VOL + \beta 4\ Q + \beta 5\ RISK + \beta 6\ NAF\ (-1)} \qquad \mathbf{(11)}$$

NAF is the number of analysts following the firm. SIZE, measured by the natural logarithm of the total value of sales, is included because Bhushan (1998) shows that larger firms are more intensely followed by analysts. VOL, the volume of trading over the year, is included because of the incentive that analysts have to follow firms that have lots of trading activity. Tobins Q is a proxy for analysts' apriori opinion of the firm. McNichols and Obrien (1997) show that analysts are more likely to follow firms for which they have a favorable opinion because this lessens the probability that they will have to issue negative recommendations. RISK, the variance of the daily stock returns calculated over the current year, is included to capture the benefits of following firms with greater volatility (McNichols and Obrien, 1997). Previous year analyst following, NAF (-1) is included to capture competition among analysts in following firms and is expected to be positive. The results are displayed in Table 3. The relationships for the variables in the model are consistent with the extant literature. There is a significant positive relationship between SIZE and NAF confirming that analysts tend to follow larger firms. In addition, the coefficient on VOL suggests that analyst following is

[3] Analyst coverage and analyst following are used interchangeably in this paper.

positively associated with the volume of trading over the year. Analysts' apriori opinion of the firm, as proxied by Tobin's Q, positively impacts analyst coverage. The variance of daily stock returns, RISK, is found to have a positive impact on analyst coverage supporting the idea that there is an incentive for analysts to follow firms with greater volatility. Not surprisingly, previous year analyst following, NAF (-1) has a positive relationship with current analyst following. Overall, the model explains eighty-seven percent of analyst following and all variables are statistically significant. The results are consistent with extant literature.

Following the approach in Yu (2008), I use the residuals from the above regression estimation as the main proxy for analyst following in the main equation of interest below, equation 12. The residual coverage is the component of analyst coverage that is uncorrelated with the controls in equation 11 and is the unexpected component of analyst coverage. I perform OLS regression using the real activity manipulation proxies as the dependent variables, residual analyst following, NAFRESID, as the proxy for analyst following and include various control variables. To control for the relationship between real activity manipulation and accrual manipulation, the proxy for accrual manipulation, the value of discretionary accruals, DA, is included as an explanatory variable.

$$\mathbf{RM = \alpha 1 + \alpha 2\ NAFRESIDUAL + \alpha 3\ M/B + \alpha 4\ LTD + \alpha 5\ SIZE + \alpha 6 DA + \alpha 7\ DELTA + \alpha 8\ VEGA} \quad (12)$$

[4] Although not listed as a variable in equation 12, I also run regressions including institutional ownership as an explanatory dummy that is equal to 1 if the proportion of shares held by institutional owners is greater than fifty percent. While the results that include institutional ownership are not significantly different from the presented results, including the institutional ownership significantly limits the analysis because of the number of observations missing this data point.

RM represents real activity manipulation as measured by each of the proxies. NAFRESIDUAL is residual analyst coverage, the component of analyst coverage that cannot be explained by the controls in equation 2. Under the monitoring effectiveness hypothesis, the relationship between NAFRESDIUAL and RM as measured by ABPROD will be negative. However, if analyst following creates capital market pressure to meet targets, the relationship between NAFRESIDUAL and ABPROD will be positive. The relationship between NAFRESIDUAL and the proxy ABDISEXP will be positive under the monitoring effectiveness hypothesis and negative under the capital market pressure hypothesis. I have no prior assumption on the relationship between NAFRESIDUAL and the RM proxies. M/B is the market to book ratio and is included to pick up growth opportunities of the firm. I expect a negative relationship between M/B and real activity manipulation because firms with more growth opportunities are less likely to engage in earnings management. LTD, long term debt scaled by total assets, is included to capture the influence of the presence of debt holders on real activity manipulation. I expect a negative relationship between LTD and earnings management given the monitoring role of debt holders in the literature. SIZE, measured by the natural logarithm of the total value of sales, is included as a control because it is correlated with many of the variables of interest. If firms manage earnings through multiple channels, DA, discretionary accruals, should pick up the accounting based earnings management and provide additional insight on the relationship between real activity and accrual manipulation. DELTA, the lagged value of the sensitivity of CEO option grants to price changes, and VEGA, the lagged value of the sensitivity of CEO option grants to stock volatility, are included to further capture managerial incentives to manage earnings. Therefore I expect

both DELTA and VEGA to be associated with more earnings management. Descriptions of how DELTA and VEGA are calculated are outlined in Appendix A. Table 4 presents the results of the OLS regressions of the various measures of real activity manipulation.

The results from the OLS model show a statistically significant, positive relationship between analyst following and abnormal production costs. Higher abnormal production costs result from earnings management using the overproduction strategy. Therefore, the results provide support for the capital market pressure hypothesis where analyst following creates pressure for managers to manipulate to meet benchmarks. This finding is important because extant literature has found that analyst following is associated with lower earnings management through discretionary accruals. Given that managers have discretion in determining whether to use accrual management or real activities strategies, this finding suggests that analyst following might induce managers to use real activity manipulation strategies more intensively. As a control, I also included DA, discretionary accruals. The significant negative relationship between DA and ABPROD suggests that the two manipulation strategies are substitutes. The coefficients on LTD and SIZE are also significant and positive suggesting that the presence of debt holders and the size of the firm creates capital market pressure to meet earnings targets as captured in the ABPROD proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant negative effect on earnings management through overproduction.

Table 4 also presents results for the ABDISEXP proxy for real activity manipulation. A significant negative relationship between analyst following and abnormal discretionary expenditures indicates that firms are more cautious with

discretionary spending in the presence of analyst following. When reduction of discretionary expenses is used as the real activity manipulation strategy, discretionary spending is lower than normal. In this case, the lower the value of discretionary spending, the more likely earnings management to meet some benchmark is occurring. If we assume that discretionary expenses are bounded at zero, the negative coefficient means that analyst following is associated with a lower level of discretionary expenditures. Either firms are abnormally cautious or analyst following creates capital market pressure to meet some target. Discretionary accruals, DA, is positively associated with abnormal discretionary expenses indicating that the two earnings management strategies are substitutes (remember higher levels of discretionary expenses are associated with less earnings management). Although not significant in this model, the coefficients on LTD and SIZE are negative, suggesting that the presence of debt holders and a large market may create capital market pressure to meet earnings targets as captured in the ABDISEXP proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant positive effect on abnormal discretionary expenses indicating that growth opportunities are associated with less earnings management through discretionary spending.

4.1 Endogeneity

I test the effect of analyst coverage on earnings management through real activity manipulation. However, earnings management can adversely affect the information environment, which might itself affect the level of analyst following. Therefore, to address the potential endogeneity, I use a two-stage least squares (2SLS) approach. The estimated model is as follows.

$$\mathbf{NAF = \beta 1 + \beta 2\ RM + \beta 3\ SIZE + \beta 4\ VOL + \beta 5\ Q + \beta 6\ RISK + \beta 8\ NAF\ (-1)}$$

$$RM = \alpha 1 + \alpha 2\ NAF + \alpha 3\ M/B + \alpha 4\ LTD + \alpha 5\ SIZE + \alpha 6\ DA + \alpha 7\ DELTA + \alpha 8\ VEGA \quad (13)$$

All the variables are as previously defined. I use the exogenous variables and the lag of the endogenous variables as instruments. Table 5 presents the results of the 2SLS regression of the various measures of real activity manipulation. The results are consistent with the OLS results. The 2SLS results show a statistically significant, positive relationship between analyst following and abnormal production costs which provides support for the capital market pressure hypothesis where analyst following creates pressure for managers to manipulate earnings to meet benchmarks. The significant negative relationship between DA and ABPROD again suggests that the two manipulation strategies are substitutes. The coefficients on LTD and SIZE are also significant and positive providing additional support that the presence of debt holders and the size of the firm creates capital market pressure to meet earnings targets as captured in the ABPROD proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant negative effect on earnings management through overproduction. This makes sense because firms with more growth opportunities are likely to focus efforts on realizing the potential rather than in overproduction. DELTA, the CEO pay-performance sensitivity measure is positively associated with earnings management through overproduction.

Table 5 also presents results for the ABDISEXP proxy. A significant negative relationship between analyst following and abnormal discretionary expenditures provides more evidence that analyst following is associated with earnings management through reduction of discretionary expenses. DA, discretionary accruals, is positively associated

with abnormal discretionary expenses indicating again that the two earnings management strategies are substitutes. The coefficients on LTD and SIZE are significant and negative. This suggests that the presence of debt holders and a large market may create capital market pressure to meet earnings targets by lowering discretionary spending as captured in the ABDISEXP proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant positive effect on abnormal discretionary expenses indicating that growth opportunities are associated with less earnings management through reduction of discretionary spending.

CHAPTER 5

Robustness Checks

To capture additional information on the relationship between analyst following and real activity manipulation, I perform the following robustness checks. First, I partition the sample to provide analysis for the post Sarbanes-Oxley (SOX) period. Cohen et al (2007) find evidence that firms switched from accrual-based earnings management to real activities earnings management after the passage of SOX. Therefore, analysis of the post SOX data could provide additional information on whether analyst following is associated with less real activity manipulation. I provide analysis from OLS and 2SLS regressions in tables 6 and 7 respectively. The post SOX results are consistent with the full sample results.

For the post SOX OLS model, I observe a statistically significant, positive relationship between analyst following and abnormal production costs. The magnitude of the effect is similar to the full sample results. Again, this supports the capital market pressure hypothesis where analyst following is associated with higher measures of earnings management, in this case in the form of abnormal production costs. The significant negative relationship between DA and ABPROD again suggests that the two manipulation strategies are substitutes. However, the magnitude of the relationship is smaller post SOX. This may be attributable to a reduction in the use of discretionary accruals earnings management in the post SOX period as documented in Cohen et al (2007). The coefficients on LTD and SIZE are again significant and positive providing additional support that the presence of debt holders and the size of the firm create capital market pressure to meet earnings targets as captured in the ABPROD proxy for real

activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant negative effect on earnings management through overproduction. The coefficient on DELTA, the CEO pay-performance sensitivity, is negative but was positive in the full sample results. Although I do not investigate the reasons here, it is possible that changes in CEO compensation resulting from accounting scandals that led to the enhancement of SOX changed the structure of CEO incentives. VEGA, the sensitivity of CEO option grants to stock volatility measure is positively associated with earnings management through overproduction.

Table 6 also presents post SOX OLS results for the ABDISEXP proxy. A significant negative relationship between analyst following and abnormal discretionary expenditures provides more evidence that analyst following is associated with earnings management through reduction of discretionary expenses. DA, discretionary accruals, is positively associated with abnormal discretionary expenses indicating again that the two earnings management strategies are substitutes. However, again the magnitude of the relationship between DA and the real activity manipulation proxy is smaller when compared to the full sample results. This provides support for a reduced substitutability between discretionary accruals and earnings management through reduction of discretionary accruals post SOX. The coefficients on LTD and SIZE are significant and negative. This suggests that the presence of debt holders and a large market may create capital market pressure to meet earnings targets as captured in the ABDISEXP proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant positive effect on abnormal discretionary expenses indicating that growth

opportunities are associated with less earnings management through reduction of discretionary spending.

The post SOX, 2SLS model results in table 7 are consistent with the post SOX OLS results. The model in panel 7A shows a statistically significant, positive relationship between analyst following and abnormal production costs which provides support for the capital market pressure hypothesis. The significant negative relationship between DA and ABPROD again suggests that the two manipulation strategies are substitutes. The coefficients on LTD and SIZE are significant and positive providing additional support that the presence of debt holders and the size of the firm create capital market pressure to meet earnings targets as captured in the ABPROD proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant negative effect on earnings management.

The model in panel 7B shows a significant negative relationship between analyst following and abnormal discretionary expenditures providing more evidence that analyst following is associated with earnings management through reduction of discretionary expenses. DA, discretionary accruals, is positively associated with ABDISEXP, abnormal discretionary expenses, indicating again that the two earnings management strategies are substitutes. The coefficients on LTD and SIZE are significant and negative suggesting that the presence of debt holders and size of the firm may create capital market pressure to meet earnings targets as captured in the ABDISEXP proxy for real activity manipulation. Growth opportunities, as proxied by the M/B ratio, have a significant positive effect on abnormal discretionary expenses indicating that growth

opportunities are associated with less earnings management through reduction of discretionary spending.

Finally, following Roychowdhury (2006), I combine the primary proxies (ABPROD and ABDISEXP) with ABCFO, abnormal cash flow from operations, into composite measures. Consistent with Zang (2006), I multiply abnormal discretionary expenditures, ABDISEXP, by negative one and add it to abnormal production costs, ABPROD, to construct the RM1 proxy. Therefore, the higher this measure, the more likely real activity manipulation has occurred. For the next measure, RM2, I multiply abnormal cash flows from operations, ABCFO, and abnormal discretionary expenses, ABDISEXP, by negative one and add them together. Because the processes that generate abnormal CFO, abnormal production costs and abnormal discretionary expenses are different, composite measures may make it more difficult to identify relationships. The analysis for the composite proxies, RM1 and RM2, is presented in tables 8 and 9 for the OLS and 2SLS models respectively.

Panels 8A and 8B present the OLS results for the RM1 and RM2 proxies. The relationships are consistent across both proxies. The results from the model show a statistically significant, positive relationship between analyst following and the proxies. Given that higher levels of the proxies are associated with more earnings management behavior, analyst following is again associated with more earnings management behavior. Therefore, the results on the composite proxy provide support for the capital market pressure hypothesis where analyst following creates pressure for managers to manipulate to meet benchmarks. This affect is moderated by growth opportunities, as measured by the market to book ratio, M/B. One explanation is that firms with growth opportunities

are less likely to engage in real activities manipulation because managers are focused on realizing the potential of the opportunities. The coefficient on discretionary accruals indicates a substitution effect between earnings management through accruals and the real activity manipulation composite proxies consistent with recent findings. The 2SLS results in panels 9A and 9B are also consistent with the previous findings in this paper.

CHAPTER 6

Conclusions

This study analyzes the impact of analyst following on real activities manipulation, while controlling for the level of discretionary accrual earnings management. The proxies for real activities earnings management in this paper are based on using overproduction to lower the costs of goods sold to report higher margins and reducing discretionary expenses below normal levels to bolster earnings. For each of the real activities management proxies, I find that analyst following is associated with more earnings management. I control for time to ensure that these relationships are not spurious across time. This results holds for all proxies in OLS and while controlling for endogeneity, through the use of 2SLS.

I also find evidence that discretionary accrual manipulation and real activity manipulation are used as substitutes for all real activity manipulation proxies. This finding provides valuable information for model specification for future research that investigates earnings management and is consistent with findings in Cohen and Zarowin (2010) and Zang (2007). I also find evidence that the degree of substitutability between real activity manipulation and accrual manipulation is lower for the post SOX period than for the pre SOX period. I attribute this to a general reluctance to use accrual management strategies post SOX due to increased attention on the accrual accounts from regulators post SOX.

APPENDIX A

VARIABLE DEFINITIONS

Variables	Name	Source	Notes on Calculations
Proxies			
ABPRODCOST	Abnormal Production Costs	Calculated	Production Costs minus predicted value of production costs PROD-PPRODCOST
ABDISEXP	Abnormal Discretionary Expense	Calculated	Discretionary Expense minus predicted value of discretionary expense DISEXP-PDISEXP
ABCFO	Abnormal CFO	Calculated	Cash flow from operations minus predicted value of cash flow from operations CFO-PCFO
RM1 *RM2*	Composite Proxies	Calculated	RM1: Abnormal production costs + (-1) Abnormal discretionary expenses or APROD+ (-1) ADISEXP RM2: (-1) Abnormal cash flows from operations + (-1) abnormal discretionary expenses or (-1) ACFO + (-1) ADISEXP
DA	Discretionary Accruals	Calculated	Total accruals minus the predicted value of total accruals TA-PTA
Predicted Values			
PPRODCOST	Predicted Production Costs	Calculated	Calculate parameter estimates of the following equation and then use parameter estimates to calculate predicted values $PROD = + \alpha_1 (1/ A_{t-1}) + \alpha_2 (SALES_t)/ A_{t-1} + \alpha_3 (\Delta SALES_t)/ A_{t-1} + \alpha_4 (\Delta SALES_{t-1})/ A_{t-1} + \varepsilon$

Variables	Name	Source	Notes on Calculations
PDISEXP	Predicted Discretionary Expense	Calculated	Calculate parameter estimates of the following equation and then use parameter estimates to calculate predicted values $DISEXP/ A_{t-1} = \alpha_0 + \alpha_1 (1/ A_{t-1}) + \alpha_2 (SALES_t)/ A_{t-1} + \alpha_3 (SALES_{t-1})/ A_{t-1} + \varepsilon$
PCFO	Predicted Cash Flow from Operations	Calculated	Calculate parameter estimates of the following equation and then use parameter estimates to calculate predicted values $CFO_t/ A_{t-1} = \alpha_0 + \alpha_1 (1/ A_{t-1}) + \alpha_2 (SALES_t)/ A_{t-1} + \alpha_3 (\Delta SALES_t)/ A_{t-1} + \varepsilon$
PRODCOST	Production Costs	Calculated	Cost of goods sold plus the change in inventory $COGS + \Delta INV$
DISEXP	Discretionary Expense	Calculated	Research and development expense plus advertising expense plus selling, general and administration expense. RD + ADV + SGA
CFO	Cash Flow from Operation	Compustat	
SGA	Selling, General and Administrative Expense	Compustat	
ADV	Advertising Expense	Compustat	
COGS	Cost of goods sold	Compustat	
INV	Inventory	Compustat	
SALES	Revenues	Compustat	

Variables	Name	Source	Notes on Calculations
TA	Total Accruals	Calculated	Total Accruals calculated as $TA/ A_{t-1} = (\Delta CA - \Delta CL - \Delta CASH + \Delta STDEBT - DEP)/A_{t-1}$ where ΔCA is the change in current assets between year t and t-1; ΔCL is the change in current liabilities between year t and t-1; $\Delta CASH$ is the change in cash and short term investments between year t and t-1, $\Delta STDEBT$ is the change in debt in current liabilities between year t and t-1; DEP is the year t depreciation and amortization expense and A_{t-1} is lagged total assets
PTA	Predicted Value of Total Accruals	Calculated	Calculate parameter estimates of the following equation for each 3 digit SIC group $TA/ A_{t-1} = d_1 / A_{t-1} + d_2 (\Delta SALES_t)/ A_{t-1} + d_3 PPE/ A_{t-1} + \varepsilon$ then plug parameter estimates into the following equation to calculate predicted values $PTA = d_1 / A_{t-1} + d_2 [(\Delta SALES - \Delta REC)]/ A_{t-1} + d_3 PPE/ A_{t-1}$
CA	Current Assets	Compustat	ΔCA is the change in current assets between year t and t-1;
CL	Current Liabilities	Compustat	ΔCL is the change in current liabilities between year t and t-1;
CASH	Cash	Compustat	$\Delta CASH$ is the change in cash and short term investments between year t and t-1,
STDEBT	Short term debt	Compustat	$\Delta STDEBT$ is the change in debt in current liabilities between year t and t-1;
DEP	Depreciation	Compustat	DEP is the year t depreciation and amortization expense
A_{t-1}	Compustat	Compustat	A_{t-1} is lagged total assets.

Variables	Name	Source	Notes on Calculations
SIC			3 digit SIC
SALES	Revenues	Compustat	
REC	Receivables	Compustat	
PPE	Gross Property Plant and Equipment	Compustat	
[illegible]			
NAF	Analyst Following	IBES	Number of Analyst Following
M/B	Market-to-Book	Compustat	(Number of shares outstanding times share price at fiscal year-end, minus book value of common equity plus book value of total assets) to the book value of total assets.
SIZE	Size	Compustat	Calculated as natural logarithm of total assets or natural logarithm of total sales.
Q	Tobin's Q	Compustat	Sum of the market value of equity, liquidating value of the firm's outstanding preferred stock, value of the firm's short term liabilities net of its short term assets, and book value of the firm's long-term debt divided by the total assets of the firm.
VOL	Volume	Compustat	Total volume of trading for the year.
RISK	RISK	CRSP	Variance of the daily stock returns calculated over the current year.
INST	Institutional Ownership		Dummy variable equal to 1 if the percentage of stock held by institutional investors is greater than 50 percent.
LTD	Long-Term Debt	Compustat	Long term debt scaled by total assets
DELTA	ExecuComp	ExecuComp	Sensitivity of CEO option grants to price changes, See Appendix A
VEGA	ExecuComp	ExecuComp	Sensitivity of CEO option grants to stock volatility,

Variables	Name	Source	Notes on Calculations
			See Appendix A

APPENDIX B

DELTA AND VEGA CALCULATIONS*

This appendix explains the calculation of DELTA and VEGA. The calculation follows the methodology discussed in Core and Guay (2002) and Guay (1999). The explanation is from Coles, Daniel, and Naveen (2006).

Value and sensitivities for a single option

The option value is calculated based on the Black-Scholes formula (Black and Scholes, 1973) for valuing European call options, as modified by Merton (1973) to account for dividend payouts.

Option value = $Se^{-dt}N(Z) - Xe^{-rt}N(Z-\sigma T^{(1/2)})$

where $Z = [\ln(S/X) + T(r-d+\sigma^2/2)]/\sigma T^{(1/2)}$

S = price of the underlying stock

X = exercise price of the option

T = time to maturity of the option in years

r = log of risk-free interest rate

σ = expected stock-return volatility over the life of the option

N( ) = cumulative probability function for the normal distribution

DELTA= the sensitivity of the option value with respect to a 1% change in stock price

$= e^{-dt}N(Z)*(price/100)$

VEGA = the sensitivity of the option value with respect to a 0.01 change in stock volatility

$= e^{-dt}N'(Z)*ST^{(1/2)}*0.01$

where N'(Z) is the normal density function.

Value and sensitivities for portfolio of options

Fiscal year end value and sensitivities of executives' option portfolios are calculated using the Core and Guay (2002) approximation method from ExecuComp data, which gives the realizable value (the potential gains from exercising all options on the fiscal year end price) and the number of options separately for both exercisable and unexercisable options and details of the current year's option grant.

1. For the current year's grant, the Black-Scholes value and sensitivities are calculated using the above formulas.

1. For previously granted options, the Black-Scholes value and sensitivities for exercisable and unexercisable options are computed separately.

    a. The average exercise price is computed separately for the portfolio of exercisable options and unexercisable options. This is done in two steps. First, the realizable value is divided by the number of options, which gives the average of (stock price – exercise price). Then this number is subtracted from the stock price to arrive at the average exercise price.

    b. For exercisable options, the time to maturity is set to three years less than the time to maturity of the current year's options grants, or six years if no grant was made in the current year.

    c. For unexercisable options, the time to maturity equal is set to one year less than the time to maturity of the current year's options grants, or nine years if no grant was made in the current year.

    d. The Black-Scholes option value, delta and vega is calculated using the average exercise price and time to maturity.

3. The delta of the manager's portfolio of stocks and options is calculated by adding the delta of restricted stock and shares held by the CEO to the delta of his options portfolio. The delta of stock = the fractional shareholding * 0.01 * stock price. The vega of the manager's portfolio of stock and options = vega of new options granted + vega of all exercisable options held + vega of all unexercisable options held. Following Guay (1999) the vega of restricted stock and shares is not calculated separately.

* This appendix and data is taken in its entirety from Pennywell (2009).

REFERENCES

Abarbanell, J. and R. Lehavy, 2003, "Can Stock Recommendations Predict Earnings Management and Analysts' Earnings Forecast Errors?," *Journal of Accounting Research*, Vol 41, 1-31.

Abarbanell, J. and R. Lehavy, 2003, "Biased forecasts or biased earnings? The Role of Earnings Management in Explaining Apparent Optimism and Inefficiency in Analysts' Earnings Forecasts," *Journal of Accounting and Economics*, 36, (1-3), 105-146.

Aggarwal, R. and A. Samick, 1999, "Empire Builders and Shirkers: Investment, Firm Performance, and Managerial Incentives," *NBER Working Paper* 7335.

Agrawal, A. and C. Knoeber, 1996, "Firm Performance and Mechanisms to Control Agency Problems Between Managers and Shareholders," *Journal of Financial and Quantitative Analysis* 31, 3, 377-397.

Ahmed, A. S.M. Kahlid, and J Zhou, 2005, "Do Analysts' Earnings Forecasts Duly Reflect the Information in Accruals," *Canadian Journal of Administrative Sciences*, 22, 4, 329-342.

Anderson, T. and C. Hsiao, 1982, "Formulation and Estimation of Dynamic Models Using Panel Data," *Journal of Econometrics*, 18, 47-82.

Bartov, E., D.Givoly, and C. Hayn, 2002, "The Rewards to Meeting or Beating Earnings Expectations," *Journal of Accounting and Economics*, 33, 173-204.

Broussard, J., S. Bucheroth, and E. Pilotte, 2004, "CEO Incentives, Cash Flow, and Investment," *Financial Management* 33, 51-70.

Brown, L., 1996, "Analyst Forecasting Errors and Their Implications for Security Analysis: An Alternative Perspective," *Financial Analysts Journal* 52, 1, 40-47.

Brown, L., 1997, "Analyst Forecasting Errors: Additional Evidence," *Financial Analysts Journal* 53, 6, 81-88.

Brown, L., 2001, "How Important is Past Analyst Forecast Accuracy," *Financial Analysts Journal* 57, 6, 44-48.

Bhushan, R.,1989, "Firm Characteristics and Analyst Following," *Journal of Accounting and Economics* 11, 255-274.

Burns, N and S. Kedia, 2006, "The impact of performance-based compensation on misreporting" Journal of Financial Economics, 79, 1, 35-

Burgstahler, D. and L. Dichev, 1997, "Earnings Management to Avoid Earnings Decreases and Losses," *Journal of Accounting and Economics*, 24, 99-126.

Burgstahler, D. and M. Eames, 2003, "Earnings Management to Avoid Losses and Earnings Decreases: Are Analysts Fooled?" *Contemporary Accounting Research, 20, 2, 253-294.*

Chan, K. N. Jegadeesh, T. Sougiannis, (2004), "The Accrual Effect on Future Earnings," *Review of Quantitative Finance and Accounting*, 22, 2, 97-121.

Chi, W., L. Lisic, and M. Pevzner, 2011, "Is Enhanced Audit Quality Associated with Greater Real Earnings Management?" *Accounting Horizons*, 25, 2, 315–335.

Chung, K and H. Jo, 1996, "The Impact of Security Analysts' Monitoring and Marketing Functions on the Market Value of Firms," *Journal of Financial and Quantitative Analysis* 31, 4, 493-512.

Chung, R.F., K. Jeong-Bon, 2002, "Institutional Monitoring and Opportunistic Earnings Management," *Journal of Corporate Finance*, 8.

Cohen, D., A. Dey and T. Lys, 2008, "Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley," *The Accounting Review*,83, 3, 757-787.

Cohen, D. and P. Zarowin, 2010, "Accrual-Based and Real Earnings Management Activities Around Seasoned Equity Offerings." *Journal of Accounting and Economics*, 50, 2-19

Das, S., Jin Guo, and Huai Zhang, 2006, "Analysts' Selective Coverage and Subsequent Performance of Newly Public Firms," *The Journal of Finance*, 61, No. 3, 1159-1185

Dechow, P.M., S.P. Kothari, and R.L. Watts, 1998, "The Relation Between Earnings and Cash Flows," *Journal of Accounting and Economics*, 25, 133–168.

Dechow P., and D.Skinner, 2000, "Earnings Management: Reconciling the Views of Accounting Academics, Practitioners, and Regulators," *Accounting Horizons,* 14, 2, 235-251.

Dechow P., and R. Sloan, 1991, "Executive Incentives and the Horizon Problem: An Empirical Investigation," *Journal of Accounting & Economics,* Vol. 14, 1, 51-90. (39 pages)

Dechow P., R. Sloan, and A. Sweeney, 1995, "Detecting Earnings Management," *The Accounting Review,* 70, 2,193-225.

Dechow, P., S. Richardson, and I. Tuna, 2003, "Why Are Earnings Kinky? An Examination of the Earnings Management Explanation," *Review of Accounting Studies,* 8, 355–384.

Degeorge, F., Y. Ding, T. Jeanjean, and H. Stolowy, 2005, "Does Analyst Following Curb Earnings Management? International Evidence", working paper

DeGeorge, F., J. Patel, and R. Zeckhasuer, 1999, "Earnings Management to Exceed Thresholds," *The Journal of Business*, 72, 1, 1-33.

Demetz, H., and K. Lehn, 1985, "The Structure of Corporate Ownership: Causes and Consequences," *The Journal of Political Economy* 93, 1155-1177.

Doukas, J., C. Kim, and C. Pantzalis, 2000, "Security Analysis, Agency Costs, and Company Characteristics," *Financial Analysts Journal,* 56, 6, 54-63.

Drewman and Berry, 1995, "Analyst Forecasting Errors and Their Implications for Security Analysis," *Financial Analysts Journal* 51, 3, 30-41.

Durtschi, C. and P. Easton, 2005, "Earnings Management? The Shapes of the Frequency Distributions of Earnings Metrics are not Evidence *Ipso Facto.*" *Journal of Accounting Research*, 557-592.

Durtschi, C. and P. Easton, 2009, "Earnings Management? Erroneous Inferences Based on Earnings Frequency Distributions," *Journal of Accounting Research*, 47, 5, 1249-1281.

Easterwood, J. and S. Nutt, 1999, "Inefficiency in Analysts' Forecasts: Systematic Misreaction or Systematic Optimism?" *The Journal of Finance*, LIV, 5, 1777-1797.

Gomez-Mejia, L., T. Welbourne, and R. Wiseman, 2000, "The Role of Risk Sharing and Risk Taking Under Gainsharing," *The Academy of Management Review.* 25,3, 492-508.

Graham, J., C. Harvey and S. Tajgopal, 2005, "The Economic Implications of Corporate Financial Reporting," *Journal of Accounting and Economics*, 40, 3-73.

Gunny, K., 2005, " What are the Consequences of Real Earnings Management?," Working paper, Universit of Colorado.

Gunny, K., 2010, "The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks," Contemporary Accounting Research, 27, 3, 855-888.

Hadlock, C., 1998, "Ownership, Liquidity, and Investment," *The Rand Journal of Economics* 29, 487-507.

Hansen, J., 2010, "The Effect of Alternative Goals on Earnings Management Studies: An Earnings Benchmark Examination," *Journal of Accounting and Public Policy,* 29, 5, 459-480.

Hayn, C., 1995, "The Information Content of Losses," *Journal of Accounting and Finance*, 20, 125-153.

Healy, P., 1985, "The Effect of Bonus Schemes on Accounting Decisions", *Journal of Accounting and Economics,* 7 p 85-107.

Healy, P. and J. Wahlen,1999, "A Review of the Earnings Management Literature and Its Implications for Standard Setting", *Accounting Horizons*, 13,4, 365-383.

Hong, H. and J. Kubik, 2003, "Analyzing the Analysts: Career Concerns and Biased Earnings Forecasts," *The Journal of Finance*, LVIII, 1, 313-351.

Jensen, M., 1986, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *The American Economic Review,* 76, 323-329.

Jensen, M., 2005, "Agency Costs of Overvalued Equity," *Financial Management,* 34, 1, 5-19.

Jensen, M and W. Meckling, 1976, "Theory of the Firm: Management Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics,* 3, 305-360.

Jacob. J. and B. Jorgensen, 2007, "Earnings Management and Accounting Income Aggregation," *Journal of Accounting and Economics,* 43, 369-390.

Jeter, D. and L. Shivakumar, 1999, "Cross-Sectional Estimation of Abnormal Accruals Using Quarterly and Annual Data: Effectiveness in Detecting Event-Specific Earnings Management," *Accounting and Business Research*, 29,4.

Jones, J., 1991, "Earnings Management During Import Relief Investigations," *The Journal of Accounting Research,* 29, Autumn, 193-228.

Kang, S. and K. Sivaramakrishnan (1995), "Issues in Testing Earnings Management and an Instrumental Variable Approach," *Journal of Accounting Research*, 33, No. 2, 353-367.

Knyazeva, D., 2007, "Corporate Governance, Analyst Following, and Firm Behavior," Working Paper.

Lee, B. and B Choi (2000), "Discretionary Accruals, the Dispersion of Earnings Forecasts, and the Accuracy of Earnings Forecasts Over the Forecasting Horizon," *American Business Review*, 18,2, 34-42.

Levitt, A.,1998, Center for Law and Business at New York University, speech

Leuz, C., D. Nanda, and P. Wysocki, (2003), Earnings Management and investor protection : An International Comparison," *Journal of Financial Economics*, 69, 505-527.

Matsumoto, D., 2002, "Management's Incentives to Avoid Negative Earnings Surprises," *The Accounting Review*, 77, 3, 483-514.

McNichols, M, and P. Obrien, 1997, "Self-Selection and Analyst Coverage," *Journal of Accounting Research* 35, 167-199.

Merton, R., 1987, "A Simple Model of Capital Market Equilibrium with Incomplete Information," *The Journal of Finance*, Vol. 42, No. 3, Papers and Proceedings of the Forty-Fifth Annual Meeting of the American Finance Association, New Orleans, Louisiana, December 28-30, 1986. (Jul., 1987), pp. 483-510.

Mizik, N. and R. Jacobson, 2007, "Earnings Inflation through Accruals and Real Activity Manipulation: Its Prevalence at the Time of an SEO and the Financial Market Consequences, Working Paper

Morck, R., A. Shleifer, and R. Vishny, 1986, "Management Ownership and Corporate Performance: An Empirical Analysis," *NBER Working Paper* 2055.

Moyer, R.C., R.E. Chatfield, and P.M. Sisneros, 1989, "Security Analyst Monitoring Activity: Agency Costs and Information Demands," *Journal of Financial and Quantitative Analysis*, vol. 24, no. 4 (December):503–512.

Obrien, P. and R. Bhushan, 1990, "Analyst Following and Institutional Ownership," *Journal of Accounting Research* 28, 55-76.

Peasnell, K.V., P.F. Pope, and S. Young, 2000, "Board Monitoring and Earnings Management: Do outside Directors Influence Abnormal Accruals?," Working Paper

Pennywell, G., 2009, "Transparency, Risk and Managerial Actions," unpublished working paper, University of South Alabama.

Roychowdhury, S., 2006, "Earnings Management through Real Activities Manipulation," *Journal of Accounting and Economics*, 42, 335-370.

Shivakumar, L., 1996, "Essays related to equity offerings and earnings management," Dissertation, Vanderbilt University

Shores, D., 1990, "The Association Between Interim Information and Security Returns Surrounding Earnings Announcements," *Journal of Accounting Research* 28, 1164-181.

Sun, J., and Guoping Liu , 2011, "The effect of analyst coverage on accounting conservatism." *Managerial Finance*. 37, 1, 5-20.

Tamura, H., 2002, "Individual-Analyst Characteristics and Forecast Error," *Financial Analysts Journal*

Teoh, S., I. Welch, and T.J. Wong, 1998, "Earnings Management and the Long Run Performance of Initial Public Offerings," *Journal of Finance*, *The Journal of Finance*, LIII, 6, 1935-1974.

Teoh, S., I. Welch, and T.J. Wong, 1998, " Earnings Management and the Underperformance of Seasoned Equity Offerings," Journal of Financial Economics, 50, 1, 63-99.

Teoh, S., and T.J. Wong, 2002, "Why New Issues and High-Accrual Firms Underperform: The Role of Analysts' Credulity," *The Review of Financial Studies*, 15, 3, 869-900.

Yu, F., 2008, "Analyst Coverage and Earnings Management," *Journal of Financial Economics*, 88, 245–271.

Zang, A., 2007, "Evidence on the Tradeoff between Real Manipulation and Accrual Manipulation," Working paper, Hong Kong University of Science and Technology.

TABLE 1: DESCRIPTIVE STATISTICS

This table presents descriptive statistics. Accounting data are obtained from Compustat. ABPROD, ABDISEXP and ABCFO are abnormal production costs, abnormal discretionary expenditures and abnormal cash flow from operations, respectively, where abnormal levels of all variables are defined as actual values minus the respective predicted values. DA is the value of discretionary accruals calculated using the modified Jones approach. RM1 and RM2 are the composite real activities manipulation proxies. RM1 is abnormal discretionary expenditures multiplied by negative one and added to production costs. RM2 is the sum of abnormal cash flows from operations multiplied by negative one and abnormal discretionary expenses multiplied by negative one. NAF is the number of analysts following the firm and M/B is the market to book ratio, calculated as the number of shares outstanding times share price at fiscal year-end, minus book value of common equity plus book value of total assets to the book value of total assets. SIZE is measured by the natural logarithm of total sales and LTD is long term debt scaled by total assets. DELTA is the lagged dollar sensitivity of the CEO's option value with respect to a 1% change in stock price. VEGA is the lagged dollar sensitivity of the CEO's option value with respect to a 1% change in stock volatility.

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
[illegible]					
ABPROD	15170	-0.0002815	1.23773	-79.28614	92.74367
ABDISEXP	12646	-0.0005966	1.02945	-34.61654	51.80737
ABDCFO	15297	-0.0004516	1.14316	-76.65733	81.75821
RM1	12558	-0.00475	1.87505	-88.98814	90.23312
RM2	12640	0.00573	1.82053	-115.74879	93.81378
[illegible]					
NAF	11841	10.92864	7.68666	1	47
M/B	15393	2.07548	2.35945	0.29831	105.09039
LTD	15364	0.18877	0.17219	0	4.39409
SIZE	15392	7.18434	1.64465	-2.7181	12.65503
DELTA	15444	724.85	73.4	250.19	998.6
VEGA	15444	64.38543	51.29405	0.02927	1579

TABLE 2: CORRELATION MATRIX

This table presents correlation statistics. Accounting data are obtained from Compustat. ABPROD, ABDISEXP, and ABCFO are abnormal production costs, abnormal discretionary expenditures and abnormal cash flow from operations, respectively, where abnormal levels of all variables are defined as actual values minus the respective predicted values. DA is the value of discretionary accruals calculated using the modified Jones approach. RM1 and RM2 are the composite real activities manipulation proxies. RM1 is abnormal discretionary expenditures multiplied by negative one and added to production costs. RM2 is the sum of abnormal cash flows from operations multiplies by negative one and abnormal discretionary expenses multiplied by negative one. NAF is the number of analysts following the firm and M/B is the market to book ratio, calculated as the number of shares outstanding times share price at fiscal year-end, minus book value of common equity plus book value of total assets to the book value of total assets. LTD is long term debt scaled by total assets and SIZE is measured by the natural logarithm of total sales. DELTA is the dollar sensitivity of the option value with respect to a 1% change in stock price. VEGA is the dollar sensitivity of the option value with respect to a 0.01 change in stock volatility.

TABLE 2 CONTINUED

	AB-PROD	AB-DISEXP	AB-CFO	DA	RM1	RM2	NAF	M/B	LTD	SIZE	DELTA	VEGA
AB-PROD	1	-0.22729 <.0001	-0.85197 <.0001	-0.05024 <.0001	0.01181 0.1881	0.01682 0.0595	-0.02871 0.0019	-0.01489 0.0668	0.00988 0.2242	0.0236 0.0037	0.00028 0.9729	-0.00138 0.865
AB-DISEXP	-0.22729 <.0001	1	0.32523 <.0001	-0.01322 0.154	-0.017 0.058	0.01282 0.1494	-0.02121 0.0359	0.12067 <.0001	0.03878 <.0001	-0.12212 <.0001	-0.00736 0.4079	-0.04014 <.0001
ABCFO	-0.85197 <.0001	0.32523 <.0001	1	0.16485 <.0001	-0.01101 0.2195	-0.02145 0.0159	0.04266 <.0001	0.01567 0.0526	-0.01198 0.1391	-0.01125 0.1641	-0.0018 0.8238	0.01506 0.0625
DA	-0.05024 <.0001	-0.01322 0.154	0.16485 <.0001	1	-0.005 0.5918	-0.00552 0.5515	0.00873 0.358	0.00204 0.8093	-0.01037 0.2205	-0.00458 0.5881	0.01894 0.0251	0.00254 0.7635
RM1	0.01181 0.1881	-0.017 0.058	-0.01101 0.2195	-0.005 0.5918	1	-0.68263 <.0001	0.27899 <.0001	-0.03667 <.0001	0.02758 0.0021	0.52338 <.0001	0.02987 0.0009	0.1682 <.0001
RM2	0.01682 0.0595	0.01282 0.1494	-0.02145 0.0159	-0.00552 0.5515	-0.68263 <.0001	1	-0.4045 <.0001	-0.03522 <.0001	-0.00591 0.507	-0.4882 <.0001	-0.05925 <.0001	-0.22643 <.0001
NAF	-0.02871 0.0019	-0.02121 0.0359	0.04266 <.0001	0.00873 0.358	0.27899 <.0001	-0.4045 <.0001	1	0.0918 <.0001	-0.04164 <.0001	0.56017 <.0001	0.04134 <.0001	0.32892 <.0001
M/B	-0.01489 0.0668	0.12067 <.0001	0.01567 0.0526	0.00204 0.8093	-0.03667 <.0001	-0.03522 <.0001	0.0918 <.0001	1	-0.1103 <.0001	-0.17106 <.0001	0.02081 0.0098	0.31153 <.0001
LTD	0.00988 0.2242	0.03878 <.0001	-0.01198 0.1391	-0.01037 0.2205	0.02758 0.0021	-0.00591 0.507	-0.04164 <.0001	-0.1103 <.0001	1	0.0973 <.0001	-0.03789 <.0001	-0.09454 <.0001
SIZE	0.0236 0.0037	-0.12212 <.0001	-0.01125 0.1641	-0.00458 0.5881	0.52338 <.0001	-0.4882 <.0001	0.56017 <.0001	-0.17106 <.0001	0.0973 <.0001	1	0.055 <.0001	0.35402 <.0001
DELTA	0.00028 0.9729	-0.00736 0.4079	-0.0018 0.8238	0.01894 0.0251	0.02987 0.0009	-0.05925 <.0001	0.04134 <.0001	0.02081 0.0098	-0.03789 <.0001	0.055 <.0001	1	0.19919 <.0001
VEGA	-0.00138 0.865	-0.04014 <.0001	0.01506 0.0625	0.00254 0.7635	0.1682 <.0001	-0.22643 <.0001	0.32892 <.0001	0.31153 <.0001	-0.09454 <.0001	0.35402 <.0001	0.19919 <.0001	1

TABLE 3: OLS REGRESSION TO GENERATE RESIDUAL FOLLOWING

This table presents the results of the ordinary least squares regression that generates residual analyst coverage. NAF is the number of analysts following the firm. SIZE is measured by the natural log of total sales. VOL is the volume of trading over the year and Q is Tobin's Q. RISK is measured as the variance of the daily stock returns calculated over the current year and NAF (-1) is lagged analyst following. *, **, and *** represent significance at the 10%, 5%, and 1% levels respectively.

$$\mathbf{NAF = \beta 1 + \beta 2\ SIZE + \beta 3\ VOL + \beta 4\ Q + \beta 5\ RISK + \beta 7\ NAF\ (-1)}$$

Variable	Predicted Sign	Coefficient	Standard Error
INTERCEPT		-1.07484***	0.23363
SIZE	+	0.29861***	0.02865
VOL	+	0.000363***	3.11E-05
Q	+	0.11446***	0.01481
RISK	+/-	0.39394*	0.19321
NAF(-1)	+	0.86297***	0.00567
R^2	0.87		

TABLE 4: OLS REGRESSION OF ANALYST FOLLOWING ON REAL ACTIVITIES MANIPULATION

This table presents the results of the ordinary least squares regression that estimates the effect of analyst coverage on real activity earnings management using residual coverage as the proxy for analyst following. RM represents the various real activity manipulation proxies as indicated in the table where ABPROD and ABDISEXP are abnormal production costs and abnormal discretionary expenses, respectively. NAFRESIDUAL is residual analyst coverage, the component of analyst coverage that cannot be explained by the controls. M/B is the market to book ratio and LTD is long term debt scaled by total assets. SIZE is measured by the natural log of total sales and DA represents the value of discretionary accruals. DELTA, the lagged sensitivity of CEO option grants to price changes, and VEGA, the lagged sensitivity of CEO option grants to stock volatility capture managerial incentives to manage earnings. *, ** and *** represent significance at the 10%, 5% and 1% levels respectively. The significance levels represent standard errors that are heteroskedasticity robust.

$$RM = \alpha 1 + \alpha 2\ NAFRESIDUAL + \alpha 3\ M/B + \alpha 4\ LTD + \alpha 5\ SIZE + \alpha 6 DA + \alpha 7\ DELTA + \alpha 8\ VEGA$$

Variable	Predicted Sign	ABPROD Coefficient (Standard Error)	ABDISEXP Coefficient (Standard Error)
INTERCEPT	+/-	-0.13048 (0.05999)	0.10801 (0.08894)
NAFRESIDUAL	+/-	0.02575*** (0.00378)	-0.06277*** (0.01522)
M/B	+	-0.00699*** (0.00112)	0.02753*** (0.00857)
LTD	-	0.06763*** (0.0198)	-0.08767 (0.06744)
SIZE	+	0.00375*** (0.000723)	-0.00521 (0.00517)
DA	+/-	-5.08457*** (0.42095)	9.91653*** (3.4142)
DELTA	+	0.8537 (0.0898)	-0.02907 (0.11727)
VEGA	+	0.00002166 (0.00010341)	-0.00032*** (0.00012)
Year Dummies		Yes	Yes
R^2		.06	0.08

TABLE 5: 2SLS REGRESSION OF ANALYST FOLLOWING AND REAL ACTIVITIES MANIPULATION

This table reports the results of the two stage least squares (2SLS) regression of real activities manipulation and analyst following. 2SLS is used to address the potential endogeneity between real activity manipulation and analyst following. I am interested in the effect of analyst coverage on earnings management through real activity manipulation. However, earnings management can adversely affect the information environment, which might itself affect the level of analyst following. In the first stage, I estimate analyst following (NAF). NAF is endogenized with the exogenous variables and the lag of the endogenous variables as instruments. RM represents the various real activity manipulation proxies as indicated in the table, where ABPROD and ABDISEXP are abnormal production costs and abnormal discretionary expenses respectively. M/B is the market to book ratio and LTD is long term debt scaled by total assets. SIZE is measured by the natural log of total sales and DA represents the value of discretionary accruals. DELTA, the lag of the sensitivity of CEO option grants to price changes, and VEGA, lag of the sensitivity CEO option grants to stock volatility capture managerial incentives to manage earnings. *, ** and *** represent significance at the 10%, 5% and 1% levels respectively. The significance levels represent standard errors that are heteroskedasticity robust.

$$NAF = \beta 1 + \beta 2\ RM + \beta 3\ SIZE + \beta 4\ VOL + \beta 5\ Q + \beta 6\ RISK + \beta 8\ NAF(-1)$$

$$RM = \alpha 1 + \alpha 2\ NAFFIT + \alpha 3\ M/B + \alpha 4\ LTD + \alpha 5\ SIZE + \alpha 6\ DA + \alpha 7\ DELTA + \alpha 8\ VEGA$$

Variable	Predicted Sign	ABPROD Coefficient (Standard Error)	ABDISEXP Coefficient (Standard Error)
INTERCEPT	+/-	-0.10333 (0.039268)	0.066908 (0.074016)
NAF	+/-	0.001364*** (0.000424)	-0.00235*** (0.000815)
M/B	+	-0.00684*** (0.001472)	0.026174*** (0.002888)
LTD	-	0.072121*** (0.15208)	-0.09437*** (0.030355)
SIZE	+	0.005443*** (0.002061)	-0.01191*** (0.004112)
DA	+/-	-5.11320*** (0.423805)	9.956167*** (0.841568)
DELTA	+	0.083823** (0.038362)	-0.02646 (0.075436)
VEGA	+	0.000036 (0.000061)	-0.00036*** (0.000121)
Year Dummies		Yes	Yes
R^2		0.06	0.08

TABLE 6: POST SOX PARTITION: OLS REGRESSION OF ANALYST FOLLOWING ON REAL ACTIVITIES MANIPULATION

This table presents post SOX (after 2002) partitioned sample results of the ordinary least squares regression that estimates the effect of analyst coverage on real activity earnings management using residual coverage as the proxy for analyst following. RM represents the various real activity manipulation proxies as indicated in the table, where ABPROD and ABDISEXP are abnormal production costs and abnormal discretionary expenses respectively. NAFRESIDUAL is residual analyst coverage, the component of analyst coverage that cannot be explained by the controls. M/B is the market to book ratio and LTD is long term debt scaled by total assets. SIZE is measured by the natural log of the total value of sales and DA represents the value of discretionary accruals. DELTA, the lagged sensitivity of CEO option grants to price changes, and VEGA, the lagged sensitivity of CEO option grants to stock volatility capture managerial incentives to manage earnings. *, ** and *** represent significance at the 10%, 5% and 1% levels respectively. The significance levels represent standard errors that are heteroskedasticity robust.

Panel 6A

ABPROD = α1 + α2 NAFRESIDUAL + α3 M/B + α4 LTD + α5 SIZE + α6DELTA + VEGA

Variable	Predicted Sign	Post SOX ABPROD Coefficient	Post SOX ABPROD Standard Error
INTERCEPT	+/-	-0.04326	0.00831
NAFRESIDUAL	+/-	0.02128***	0.00126
M/B	+	-0.00755***	0.000698
LTD	-	0.04591***	0.00425
SIZE	+	0.00226***	0.000421
DA	+/-	-0.73283***	0.12841
DELTA	+	-0.01861*	0.01031
VEGA	+	0.000130***	0.000012
Year Dummies		Yes	
R^2		0.46	

TABLE 6 CONTINUED

Panel 6B

ABDISEXP = α1 + α2 NAFRESIDUAL + α3 M/B + α4 LTD + α5 SIZE + α6DELTA + VEGA

Variable	Predicted Sign	Post SOX ABDISEXP Coefficient	Post SOX ABDISEXP Standard Error
INTERCEPT	+/-	0.05458	0.06416
NAFRESIDUAL	+/-	-0.03888***	0.00826
M/B	+	0.02796***	0.00763
LTD	-	-0.02971	0.05915
SIZE	+	-0.00109	0.00425
DA	+/-	2.55658***	0.90545
DELTA	+	-0.05647	0.0771
VEGA	+	-0.00041129***	0.00007939
Year Dummies		Yes	
R^2		0.08	

TABLE 7: POST SOX PARTITION: 2SLS REGRESSIONS OF REAL ACTIVITY MANIPULATION AND ANALYST FOLLOWING

This table reports SOX (after 2002) partitioned sample results of the two stage least squares (2SLS) regression of real activities manipulation and analyst following. 2SLS is used to address the potential endogeneity between real activity manipulation and analyst following. I am interested in the effect of analyst coverage on earnings management through real activity manipulation. However, earnings management can adversely affect the information environment, which might itself affect the level of analyst following. In the first stage, I estimate analyst following (NAF). NAF is endogenized with the exogenous variables and the lag of the endogenous variables as instruments. RM represents the various real activity manipulation proxies as indicated in the table, where ABPROD and ABDISEXP are abnormal production costs and abnormal discretionary expenses respectively. M/B is the market to book ratio and LTD is long term debt scaled by total assets. SIZE is measured by the natural log of total sales and DA represents the value of discretionary accruals. DELTA, the lag of the sensitivity of CEO option grants to price changes, and VEGA, lag of the sensitivity CEO option grants to stock volatility capture managerial incentives to manage earnings. *, ** and *** represent significance at the 10%, 5% and 1% levels respectively. The significance levels represent standard errors that are heteroskedasticity robust.

Panel 7A

NAF= $\beta 1 + \beta 2$ RM + $\beta 3$ SIZE + $\beta 4$ VOL + $\beta 5$ Q + $\beta 6$ RISK + $\beta 8$ NAF (-1)

RM = $\alpha 1 + \alpha 2$ NAF + $\alpha 3$ M/B + $\alpha 4$ LTD + $\alpha 5$ SIZE + $\alpha 6$ DA + $\alpha 7$ DELTA + $\alpha 8$ VEGA

Variable	Predicted Sign	Post SOX ABPROD Coefficient	Post SOX ABPROD Standard Error
INTERCEPT	+/-	-0.02059	0.007978
NAF	+/-	0.001294***	0.000084
M/B	+	-0.00742***	0.00046
LTD	-	0.050182***	0.003151
SIZE	+	0.003441***	0.000397
DA	+/-	-0.77102***	0.102655
DELTA	+	-0.02189**	0.010027
VEGA	+	0.000144***	0.000014
Year Dummies		Yes	
R^2		.43	

TABLE 7 CONTINUED

Panel 7B

NAF= β1 + β2 RM + β3 SIZE + β4 VOL + β5 Q + β6 RISK + β8 NAF (-1)

RM = α1 + α2 NAF + α3 M/B + α4 LTD + α5 SIZE + α6 DA + α7 DELTA + α8 VEGA

Variable	Predicted Sign	Post SOX ABDISEXP Coefficient	Post SOX ABDISEXP Standard Error
INTERCEPT	+/-	0.01572	0.052549
NAF	+/-	-0.00181***	0.000538
M/B	+	0.026843***	0.00292
LTD	-	-0.03466**	0.020722
SIZE	+	-0.00449**	0.002608
DA	+/-	2.644375***	0.687321
DELTA	+	-0.04813	0.066183
VEGA	+	-0.00043***	0.000092
Year Dummies		Yes	
R^2		0.05	

TABLE 8: COMPOSITE PROXIES: OLS REGRESSION OF ANALYST FOLLOWING ON REAL ACTIVITIES MANIPULATION

This table reports the results of the ordinary least squares regression of the composite proxies, RM1 and RM2. RM1 is abnormal discretionary expenditures multiplied by negative one and added to production costs. RM2 is the sum of abnormal cash flows from operations multiplies by negative one and abnormal discretionary expenses multiplied by negative one. NAFRESIDUAL is residual analyst coverage, the component of analyst coverage that cannot be explained by the controls. M/B is the market to book ratio and LTD is long term debt scaled by total assets. SIZE is measured by the natural log of total sales and DA represents the value of discretionary accruals. DELTA, the sensitivity of CEO option grants to price changes, and VEGA, the sensitivity CEO option grants to stock volatility capture managerial incentives to manage earnings. *, ** and *** represent significance at the 10%, 5% and 1% levels respectively. The significance levels reflect significance using standard errors that are heteroskedasticity robust.

Panel 8A

RM1 = α1 + α2 NAFRESIDUAL + α3 M/B + α4 LTD + α5 SIZE + α6 DA + α7 DELTA + α8 VEGA

Variable	Predicted Sign	RM1 Coefficient	RM1 Standard Error
INTERCEPT	+/-	-0.25483	0.1387
NAFRESIDUAL	+/-	0.0894***	0.017
M/B	+	-0.03428***	0.0094
LTD	-	0.14888**	0.0743
SIZE	+	0.00845	0.0061
DA	+/-	-15.43077**	6.6788
DELTA	+	0.14018	0.2009
VEGA	+	0.00032192	0.0002
Year Dummies		Yes	
R^2		0.09	

TABLE 8 CONTINUED

Panel 8B

RM2 = α1 + α2 NAFRESIDUAL + α3 M/B + α4 LTD + α5 SIZE + α6 DA + α7 DELTA + α8 VEGA

Variable	Predicted Sign	RM2 Coefficient	RM2 Standard Error
INTERCEPT	+/-	-0.14263	0.0907
NAFRESIDUAL	+/-	0.06413***	0.01561
M/B	+	-0.03264***	0.00899
LTD	-	0.11026**	0.06771
SIZE	+	0.01231**	0.00576
DA	+/-	-11.5494**	3.55719
DELTA	+	0.03393***	0.11988
VEGA	+	0.00028963**	0.0001226
Year Dummies		Yes	
R^2		0.11	

TABLE 9: COMPOSITE PROXIES: 2SLS REGRESSION OF ANALYST FOLLOWING AND REAL ACTIVITIES MANIPULATION

This table reports the results of the 2SLS regression of the composite proxies, RM1 and RM2. I am interested in the effect of analyst coverage on earnings management through real activity manipulation. However, earnings management can adversely affect the information environment, which might itself affect the level of analyst following. RM1 is abnormal discretionary expenditures multiplied by negative one and added to production costs. RM2 is the sum of abnormal cash flows from operations multiplies by negative one and abnormal discretionary expenses multiplied by negative one. In the first stage, I estimate analyst following (NAF). NAF is endogenized with the exogenous variables and the lag of the endogenous variables as instruments. RM represents the various real activity manipulation proxies as indicated in the table, where ABPROD and ABDISEXP are abnormal production costs and abnormal discretionary expenses respectively. M/B is the market to book ratio and LTD is long term debt scaled by total assets. SIZE is measured by the total value of sales and DA represents the value of discretionary accruals. DELTA, the lag of the sensitivity of CEO option grants to price changes, and VEGA, lag of the sensitivity CEO option grants to stock volatility capture managerial incentives to manage earnings. *, ** and *** represent significance at the 10%, 5% and 1% levels respectively. The significance levels represent standard errors that are heteroskedasticity robust.

Panel 9A

NAF= $\beta 1 + \beta 2$ RM + $\beta 3$ SIZE + $\beta 4$ VOL + $\beta 5$ Q + $\beta 6$ RISK + $\beta 8$ NAF (-1)

RM1 = $\alpha 1 + \alpha 2$ NAF + $\alpha 3$ M/B + $\alpha 4$ LTD + $\alpha 5$ SIZE + $\alpha 6$ DA + $\alpha 7$ DELTA + $\alpha 8$ VEGA

Variable	Predicted Sign	RM1 Parameter Estimate	RM1 Standard Error
INTERCEPT	+/-	-0.17612	0.105829
NAF	+/-	0.003745***	0.001108
M/B	+	-0.03278***	0.003929
LTD	-	0.159897***	0.041271
SIZE	+	0.016878***	0.005589
DA	+/-	-15.5172***	1.145602
DELTA	+	0.135378	0.103427
VEGA	+	0.000376**	0.000165
Year Dummies		Yes	
R^2		0.09	

TABLE 9 CONTINUED

Panel 9B

NAF= β1 + β2 RM + β3 SIZE + β4 VOL + β5 Q + β6 RISK + β8 NAF (-1)

RM2 = α1 + α2 NAF + α3 M/B + α4 LTD + α5 SIZE + α6 DA + α7 DELTA + α8 VEGA

Variable	Predicted Sign	RM2 Parameter Estimate	RM2 Standard Error
INTERCEPT	+/-	-0.1026	0.075681
NAF	+/-	0.002257***	0.000834
M/B	+	-0.0311***	0.002953
LTD	-	0.116573***	0.031037
SIZE	+	0.019562***	0.004205
DA	+/-	-11.5793***	0.860494
DELTA	+	0.031545	0.077133
VEGA	+	0.000331***	0.000124
Year Dummies		Yes	
R^2		0.10	