Economic Consequences of Real and Accrual-Based Earnings Management Activities

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Abstract

We examine the relation between both real and accrual-based earnings management activities and firms' investment behavior. We find that that firms managing earnings by either means overinvest in the years up to and including the period of high earnings management, and then underinvest, indicating that each type of earnings management is associated with significant real effects. Moreover, the excess investment associated with real earnings management is at least as great as the excess investment associated with accruals earnings management, and firms that engage in both real and accrual earnings management activities have greater investment effects than firms that engage in either one alone. By providing the first evidence that real earnings management has significant real effects on firms' investment, we contribute important evidence on the consequences of earnings management.

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1. Introduction

In this paper, we examine how both real and accrual-based earnings management activities affect firms' investment activities. Although there is a large literature on earnings management, there is a dearth of evidence on how it affects firms' real activities. For example, Healy and Wahlen (1999) point out that earnings management studies have paid only minimal attention to its real economic consequences. Research on the consequences of earnings management has concentrated largely on announcement and post event stock market returns, thus focusing on the external, financial impacts. By contrast, we study the impact of earnings management on internal, real decisions firms undertake. Studying firms' real activities is important, because stock returns studies can only determine whether securities are mispriced, which causes redistribution (between different groups of shareholders), but cannot assess affects on real firm decisions. Because they affect the size of the pie, and not just its distribution, real decisions are likely more costly than share price effects.

To our knowledge, only two other papers address how earnings management affects firms' real activities. Both studies examine relatively small event-based samples and focus exclusively on *accrual-based* earnings management. Kedia and Philippon (2008) study a sample of firms that were forced by the SEC to restate previous fraudulently overstated reported earnings. They find that, relative to industry peers, overstating firms overinvested by making excessive capital investments and over hired during the earnings manipulation period, and then underinvested and shed employment after the enforcement action. Kedia and Philippon hypothesize that manipulating firms invest and hire excessively to pool with better performing firms, in order to avoid detection.

McNichols and Stubben (2008) study firms that overstated earnings and were either investigated by the SEC for accounting irregularities, sued by their shareholders for improper accounting, or restated their financial statements. Consistent with Kedia and Philippon, they find that such firms engaged in excess capital investment (relative to either industry peers or to a Q-based optimal investment model) during the misreporting period, and then underinvested during the post-event period. McNichols and Stubben hypothesize that the excessive investment is caused by the misleading signals that the misstated information sends to both internal decision makers and external suppliers of capital. Regardless of the underlying reason for the relation between earnings management activities and overinvestment, both studies find that accrual-based misreporting has significant real effects.[1]

We contribute beyond these studies in two important ways. First, we compare the consequences of both *real* and accrual-based earnings management. While there is growing evidence that firms engage in real earnings management (e.g., Gunny 2006, Roychowdhury 2006, and Zang 2006), there is no evidence on its economic consequences, and in particular, how these effects compare to those of accrual-based earnings management. However, in a recent survey of top executives, Graham et al. (2005) provide evidence suggesting that managers prefer real earnings management activities compared to accrual-based earnings management. This is the case since real management activities can be indistinguishable from optimal business decisions, and thus more difficult to detect, although the costs involved in such activities can be economically significant to the firm. For example, they report that most corporate managers would willingly sacrifice positive NPV investment opportunities in order to meet earnings targets such as consensus analysts' forecasts. Consistent with Graham et al. (2005), Cohen et al. (2008)

[1] A related study by Polk and Sapienza (2008) finds that discretionary accruals are positively related to abnormal investment. However, they use discretionary accruals as a measure of market mispricing (since high discretionary accruals are followed by negative abnormal returns), rather than as a measure of earnings management.

find that mangers have shifted away from accrual to real earnings management in the post Sarbanes-Oxley Act (SOX) period. This evidence implies that in the post-SOX period following highly publicized accounting scandals, the need to avoid detection of accrual-based earnings management is greater than in previous periods, inducing managers to shift from accrual-based to real earnings management activities. Thus, it is important to document the economic effects of real earnings management and to know how these effects compare to those of accrual management.

Second, whereas both Kedia and Philippon and McNichols and Stubben used small event-based samples that identified the most extreme cases of financial accounting misreporting, we use a large sample of firms not based on a specific event. Thus, our results are not just applicable to the most extreme firms, but widely generalizable.

To capture accrual-based earnings management we use the modified cross-sectional Jones model (Jones 1991) as described in Dechow, Sloan, and Sweeny (1995). To capture real earnings management, we follow Roychowdhury (2006) and estimate abnormal levels of cash flows from operations, discretionary expenses (advertising, R&D, and SG&A), and production costs. In addition, we combine these three measures into two comprehensive aggregate measures of real earnings management.

We rank firms by measures of both accrual and real earnings management. Similar to McNichols and Stubben and Kedia and Philippon, we find that that firms managing earnings with accruals overinvest (relative to peers) in the years up to and including the period of high earnings management, and then underinvest, indicating that the accrual management is associated with significant real effects. We also find that firms managing earnings by real activities overinvest and subsequently underinvest in the years surrounding the earnings

management. Moreover, the excess investment associated with real earnings management is at least as great as the excess investment associated with accruals earnings management, providing the first evidence that real earnings management has important economic effects.

The rest of the paper is organized as follows. Section 2 reviews the literatures on earnings management, with emphasis on real earnings management. Section 3 discusses our empirical methodology, including our sample construction and estimation equations. Section 4 discusses our empirical evidence on the real effects of earnings management. Section 5 concludes.

2. Related Literature and Research Objectives

Our paper unites two streams of research that have previously been disparate, one on real earnings management and the other on the economic consequences of earnings management. We first discuss related research, and then we build on the existing body of evidence to state our research objectives.

2.1 Consequences of Earnings Management

With the exception of the two recent papers by Kedia and Philippon (2008) and McNichols and Stubben (2008) cited above, studies on the consequences of earnings management have focused exclusively on stock price effects related to the earnings management. Research has examined earnings management around specific corporate events such as IPOs, SEOs, management buyouts, stock repurchases, and stock for stock acquisitions, and how ex-ante earnings management activities relates to observed post event abnormal stock returns. For example, Rangan (1998) and Teoh et al. (1998) find positive abnormal accruals (i.e., upwardly managed reported earnings) on average for SEO firms during the year around the SEO, followed by poor stock performance in the following year. They conclude that firms manage

earnings upward around SEOs, and that the stock market is mislead by the upwardly managed earnings, temporarily overvaluing issuing firms and then being disappointed by their predictable earnings declines, which cause their stock prices to subsequently fall. Similarly, Teoh, Wong, and Rao (1998) find upward accruals management during IPOs, followed by negative post event abnormal stock returns, which they interpret in the same manner as the SEO evidence.[2]

In addition to examining post event stock returns, researchers have also examined short-term capital market reactions around the announcements of fraudulent reporting. For example, evidence from studies by Foster (1979), Dechow, Sloan, and Sweeny (1996), Beneish (1997), and Palmrose, Richardson, and Scholz (2004) indicate that the market reaction to disclosure of manipulation is on average negative, implying that investors were surprised and interpret these as negative news.

2.2 Real Earnings Management Activities

Although real earnings management has not been as widely studied as accrual-based earnings management, Graham et al.'s (2005) survey finds that managers prefer real activities manipulation, by such means as reducing discretionary expenditures, over accruals manipulation as a way to manage earnings. These real earnings management activities are significantly different than accrual-based ones as they have direct cash flows effects. Graham et al. (2005, p. 32) find

> *.....strong evidence that managers take real economic actions to maintain accounting appearances. In particular, 80% of survey participants report that they would decrease discretionary spending on R&D, advertising, and maintenance to meet an earnings target. More than half (55.3%) state that they*

[2]Shivakumar (2000) also finds evidence consistent with accrual-based earnings management around SEOs, but in contrast to Rangan and to Teoh et al., he shows that the stock market does not react inefficiently to the upwardly managed earnings, but that investors rationally undo these effects. Similarly, Brav, Geczy, and Gompers (2000) argue that the post event abnormal stock returns of IPO firms are not negative.

would delay starting a new project to meet an earnings target, even if such a delay entailed a small sacrifice in value. . . .

There are at least two reasons for executives' greater willingness to manage earnings through real activities than through accruals. First, accrual-based earnings management is more likely to draw auditor or regulatory scrutiny than real decisions, such as those related to product pricing, production, and expenditures on research and development or advertising. Second, relying on accrual manipulation alone is risky. The realized shortfall between unmanaged earnings and the desired threshold can exceed the amount by which it is possible to manipulate accruals after the end of the fiscal period. If reported income falls below the threshold and all accrual-based strategies to meet it are exhausted, managers are left with no options because real activities cannot be adjusted at or after the end of the fiscal reporting period.

Consistent with these predictions, researchers have documented variations in R&D expenditures and asset sales linked to firms meeting and/or beating earnings benchmarks. For example, Bartov (1993) finds that firms with negative earnings changes report higher profits from asset sales, suggesting that the profits are used to blunt the bad earnings news. Dechow and Sloan (1991) document that executives near the end of their tenure reduce R&D expenditures to increase reported short-term earnings. In related studies, Baber et al. (1991) and Bushee (1998) report evidence consistent with firms reducing R&D expenditures to meet earnings benchmarks such as positive earnings or positive earnings changes.

Recently, three related studies examine real earnings management activities and their capital market consequences. Roychowdhury (2006) focuses on real activities manipulations, which he defines as management actions that deviate from normal business practices, undertaken with the primary objective to mislead certain stakeholders into believing that earnings

benchmarks have been met in the normal course of operations. Focusing on the zero earnings threshold and examining annual data, he finds evidence consistent with firms trying to avoid reporting losses in three ways: (1) boosting sales through accelerating their timing and/or generating additional unsustainable sales through increased price discounts or more lenient credit terms; (2) overproducing and thereby allocating more overhead to inventory and less to cost of goods sold, which leads to lower cost of goods sold and increased operating margins; or (3) aggressively reducing aggregate discretionary expenses (defined as the sum of research and development, advertising, and SG&A expenses) to improve margins. This is most likely to occur when such discretionary expenses do not generate immediate revenues and income.

Zang (2006) analyzes the tradeoffs between accrual manipulations and real earnings management. She suggests that decisions to manage earnings through "real" actions precede decisions to manage earnings through accruals. Her results show that real manipulation is positively correlated with the costs of accrual manipulation, and that accrual and real manipulations are negatively correlated. These findings lead her to conclude that managers treat the two strategies as substitutes.

Gunny (2005) finds that real earnings management has a significant negative relation with future operating performance. Additionally, it appears that capital markets participants mostly recognize the future earnings implications of managers' myopic behaviors. In summary, there is strong evidence of real earnings management activities, achieved via multiple means, and it is likely linked to meeting certain earnings benchmarks.

Given the dearth of evidence on the economic consequences of earnings management, combined with evidence on firms' use of real earnings management tools, we examine how both

real and accrual-based earnings management activities affect firms' investment activities. Next, we discuss the empirical methodology we employ to address our research objectives.

3. Empirical Methodology

3.1 Data and Sample Description

We collect our financial data from the COMPUSTAT annual industrial and research files for a sample period spanning 1987-2006. We restrict our sample to all nonfinancial firms with available data, and require at least 8 observations in each 2-digit SIC grouping per year. Further, we require that each firm-year observation has the data necessary to calculate the discretionary accruals metrics and real earnings management proxies we employ in our analysis. This restriction is likely to introduce a survivorship bias into the sample resulting in the inclusion of larger and more successful firms. We expect that this will reduce the variation in our earnings management metrics resulting in a more conservative test of our research questions.

Following Collins and Hribar (2002), we use cash flows from operations obtained from the Statement of Cash Flows reported under the Statement of Financial Accounting Standards No. 95 (SFAS No. 95, FASB 1987).[3] The sample period of 1987-2006 permits us to use SFAS No. 95 statement of cash flow data to estimate accruals, rather than a balance sheet approach.

3.2 Earnings Management Metrics

Accrual-based Earnings Management

We use a cross-sectional model of discretionary accruals, where for each year we estimate the model for every industry classified by its 2-digit SIC code. Thus, our approach partially

[3] SFAS No. 95 requires firms to present a statement of cash flows for fiscal years ending after July 15, 1988. Some firms early-adopted SFAS No. 95, so our sample begins in 1987.

controls for industry-wide changes in economic conditions that affect total accruals while allowing the coefficients to vary across time (Kasznik, 1999; DeFond and Jiambalvo, 1994).[4]

Our primary model is the modified cross-sectional Jones model (Jones 1991) as described in Dechow et al. (1995). The modified Jones model is estimated for each 2 digit SIC-year grouping as follows:

$$\frac{TA_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{\Delta Rev_{it}}{Assets_{i,t-1}} + k_3\frac{PPE_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \qquad (1)$$

where, for fiscal year t and firm i, TA represents total accruals defined as:

$TA_{it} = EBXI_{it} - CFO_{it}$, where $EBXI$ is the earnings before extraordinary items and discontinued operations (annual Compustat data item 123) and CFO is the operating cash flows (from continuing operations) taken from the statement of cash flows (annual Compustat data item 308 – annual Compustat data item 124), $Asset_{it-1}$ represents total assets (annual Compustat data item 6), ΔREV_{it} is the change in revenues (annual Compustat data item 12) from the preceding year and PPE_{it} is the gross value of property, plant and equipment (annual Compustat data item 7).

The coefficient estimates from equation (1) are used to estimate the firm-specific normal accruals (NA_{it}) for our sample firms:

$$NA_{it} = \hat{k}_{1t}\frac{1}{Assets_{i,t-1}} + \hat{k}_2\frac{(\Delta Rev_{it} - \Delta AR_{it})}{Assets_{i,t-1}} + \hat{k}_3\frac{PPE_{it}}{Assets_{i,t-1}} \qquad (2)$$

where ΔAR_{it} is the change in accounts receivable (annual Compustat data item 2) from the preceding year. Following the methodology used in the literature, we estimate the industry-specific regressions using the change in reported revenues, implicitly assuming no discretionary

[4] We obtain qualitatively the same results when we use a time-series approach which assumes temporal stationarity of the parameters for each firm.

choices with respect to revenue recognition. However, while computing the normal accruals, we adjust the reported revenues of the sample firms for the change in accounts receivable to capture any potential accounting discretion arising from credit sales. Our measure of discretionary accruals is the difference between total accruals and the fitted normal accruals, defined as $DA_{it} = (TA_{it} / Asset_{it-1}) - NA_{it}$.

In our robustness tests, we used two alternative measures of discretionary accruals. In one alternative measure we estimated the following in the first stage:

$$\frac{TA_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{(\Delta REV_{it} - \Delta AR_{it})}{Assets_{i,t-1}} + k_3\frac{PPE_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \qquad (3)$$

Using the coefficient estimates obtained from (3), we calculated the level of normal accruals (NA_{it}) as a percent of lagged total assets. We also repeat our tests by using a measure based on the performance-matched discretionary accruals advanced in Kothari Leone, and Wasley (2005). As suggested by Kothari et al. (2005), we match each firm-year observation with another from the same two-digit SIC code and year with the closest return on assets in the current year, ROA_{it} (net income divided by total assets).[5]

Real Earnings Management

We rely on prior studies to develop our proxies for real earnings management. As in Roychowdhury (2006), we consider three metrics: the abnormal levels of cash flow from operations (CFO), discretionary expenses, and production costs to study the level of real activities manipulations. Subsequent studies, such as Zang (2006) and Gunny (2006), provide

[5]We also carry out performance matching based on two-digit SIC code, year and ROA (both current ROA and lagged ROA) and obtain results similar to those reported in the paper. Our results using these alternate measures of accruals are consistent with those reported in the paper.

evidence of the construct validity of these proxies. We focus on three manipulation methods and their impact on the above three variables:

1. Acceleration of the timing of sales through increased price discounts or more lenient credit terms. Such discounts and lenient credit terms will temporarily increase sales volumes, but these are likely to disappear once the firm reverts to old prices. The additional sales will boost current period earnings, assuming the margins are positive. However, both price discounts and more lenient credit terms will result in lower cash flows in the current period.
2. Reporting of lower cost of goods sold through increased production. Managers can increase production more than necessary in order to increase earnings. When managers produce more units, they can spread the fixed overhead costs over a larger number of units, thus lowering fixed costs per unit. As long as the reduction in fixed costs per unit is not offset by any increase in marginal cost per unit, total cost per unit declines. This decreases reported COGS and the firm can report higher operating margins. However, the firm will still incur other production and holding costs that will lead to higher annual production costs relative to sales, and lower cash flows from operations given sales levels.
3. Decreases in discretionary expenses which include advertising expense, research and development, and SG&A expenses. Reducing such expenses will boost current period earnings. It could also lead to higher current period cash flows (at the risk of lower future cash flows) if the firm generally paid for such expenses in cash.

We first generate the normal levels of CFO, discretionary expenses and production costs using the model developed by Dechow, Kothari and Watts (1998) as implemented in Roychowdhury (2006). We express normal CFO as a linear function of sales and change in sales. To estimate this model, we run the following cross-sectional regression for each industry and year:

$$\frac{CFO_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{Sales_{it}}{Assets_{i,t-1}} + k_3\frac{\Delta Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (4)$$

Abnormal CFO is actual CFO minus the normal level of CFO calculated using the estimated coefficients from (4).

Production costs are defined as the sum of cost of goods sold (COGS) and change in inventory during the year. We model COGS as a linear function of contemporaneous sales:

$$\frac{COGS_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (5)$$

Next, we model inventory growth as a linear function of the contemporaneous and lagged change in sales:

$$\frac{\Delta INV_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{\Delta Sales_{it}}{Assets_{i,t-1}} + k_3\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (6)$$

Using (5) and (6), we estimate the normal level of production costs as:

$$\frac{\mathrm{Pr}od_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{Sales_{it}}{Assets_{i,t-1}} + k_3\frac{\Delta Sales_{it}}{Assets_{i,t-1}} + k_4\frac{\Delta Sales_{it-1}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (7)$$

The normal level of discretionary expenses can be expressed as a linear function of sales:

$$\frac{DiscExp_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (8)$$

Modeling discretionary expenses as a function of current sales creates a mechanical problem if firms manage sales upwards to increase reported earnings in a certain year, resulting in significantly lower residuals from running a regression as specified in (8). To address this issue, we model discretionary expenses as a function of lagged sales and estimate the following model to derive 'normal' levels of discretionary expenses:

$$\frac{DiscExp_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it} \qquad (9)$$

In the above equations *CFO* is cash flow from operations in period *t* (Compustat data item 308 – annual Compustat data item 124); *Prod* represents the production costs in period *t*, defined as the sum of COGS (annual Compustat data item 41) and the change in inventories (annual Compustat data item 3); *DiscExp* represents the discretionary expenditures in period *t*, defined as the sum of advertising expenses (annual Compustat data item 45), and SG&A (annual Compustat data item 189). The abnormal CFO (*R_CFO*), abnormal production costs (*R_PROD*) and abnormal discretionary expenses (*R_DISX*) are computed as the difference between the actual values and the normal levels predicted from equations (4) (7) and (9). We use these three variables as proxies for real earnings management. Given sales levels, firms that manage earnings upwards are likely to have one or all of these: unusually low cash flow from operations, and/or unusually low discretionary expenses, and/or unusually high production costs.

In order to capture the total effects of real earnings management, we combine the three individual tools to compute two comprehensive measures of real earnings management activities. For our first measure, *RM1*, consistent with Zang (2006), we first multiply abnormal discretionary expenses by negative one (so that the higher amount, the more likely it is that the

firm is cutting discretionary expenses) and add it to abnormal production costs.[6] The higher the amount of this aggregate measure, the more likely the firm engaged in real earnings management activities.

For the second measure, *RM2*, again consistent with Zang (2006), we first multiply abnormal cash flows from operations and abnormal discretionary expenses by negative one and then aggregate them into one measure. As for *RM1*, we multiply by negative one, so that the higher these amounts the more likely that the firm is engaging in sales manipulations and cutting discretionary expenditures to manage reported earnings upwards.

We acknowledge that the three individual variables underlying *RM1* and *RM2* may have different implications for earnings which may dilute any results using these aggregated measures. We thus report results corresponding to both the aggregated measures as well as the three individual real earnings management proxies (*R_CFO*, *R_PROD* and *R_DISX*).

4. Results

4.1 Sample Statistics and Correlations

Table 1 shows characteristics of our sample. Panel A reports sample statistics, while Panel B reports correlations. Since we use all COMPUSTAT observations with available data, our sample size of 82,039 observations is much larger than the event based samples of Kedia and Philippon (2008, 700-800 observations) or McNichols and Stubben (2008, 207-535 observations).[7] Thus, our results may be more generalizable than either of these two studies.

[6] We do not multiply *R_PROD* by negative one since higher production costs, as noted earlier, is indicative of overproduction to reduce cost of goods sold. We do not combine abnormal production costs and abnormal CFO, because in Roychowdhury (2006), the same activities that lead to abnormally high production costs also lead to abnormally low CFO; thus, adding these two amounts leads to double counting.

[7] Kedia and Philippon's observations vary by test; 750-850 is based on their regressions in Table 3. McNichols and Stubben use 3 samples of different events, with a total of 1,055 observations.

Panel A shows that our sample has mean (median) growth rate of total assets of .14 (.084), similar to McNichols and Stubbens' .13 (.08), and our sample has a mean employee growth rate of .051, similar to Kedia and Philippon's mean of .06 for restating firms. In Panel B, we report a positive Spearman correlation between investment and growth (.297), which is similar to McNichols and Stubbens' (Table 2, Panel B) of .39 between investment and growth, despite differences in variable definitions. Thus, our sample appears to have some similar characteristics to theirs. [8]

Most important for our study are the correlations between measures of earnings management and measures of real business activity. Table 1, panel B shows significant Spearman correlations between investment and discretionary accruals (.107), abnormal CFO (-.054), abnormal production (.094), and abnormal discretionary expenditures (-.076). Correlations between the capital expenditure component of investment and these measures of earnings management are similar, as are Pearson correlations. Thus, similar to Kedia and Philippon and McNichols and Stubben, we find that firms with higher than average accruals also invest more than other firms. Furthermore, we also find that firms with above average measures of real earnings management invest more.

4.2 Preliminary Evidence

As a prelude to our primary analysis, we first examine firms' raw investments. Table 2 shows the investment behavior from years t-3 thru t+3, of the top quintile of firms ranked by our various earnings management metrics in year 0. Investment figures are relative to control groups of firms ranked by size and industry. Results are shown for total investment and its components,

[8] McNichols and Stubben report sample statistics and correlations for their entire sample of both event firms and comparison firms from COMPUSTAT; they do not report separate statistics for their event samples. Kedia and Philippon do not report correlations.

capital expenditures, and non-capital expenditures. Consistent with Kedia and Philippon and McNichols and Stubben, columns 1 thru 3 suggest that firms with extreme discretionary accruals are increasing their investments thru year 0, after which their investments decline. For example, column 1 (total investment) shows that in the rank year, firms with extreme discretionary accruals invest 12% more than comparable firms (as a percentage of their total assets), and then invest 3% less than comparable firms in the subsequent year. Thus, relative to peers, high accrual earnings management firms have a relative investment decline of 15%. The results in columns 2 and 3 (capital expenditures and non-capital expenditures, respectively) are similar, but the effects are a little smaller. Together, these results imply that firms upwardly managing earnings via accruals overinvest during the period of upward management, and then subsequently underinvest.

Columns 4 thru 18 report the same information as columns 1 thru 3, but based on our measures of real earnings management. Columns 4 thru 6, where abnormal CFO is the real earnings management metric, shows similar investment behavior to columns 1 thru 3: overinvest in the pre-earnings management and earnings management period, and then subsequent underinvestment. However, the results with abnormal CFO, with a relative investment decline of 3.9% (.027 + .012), are not nearly as dramatic as the results with discretionary accruals.

Columns 7 thru 9, where the real earnings management metrics are abnormal production costs, show even more dramatic results than accruals management in columns 1 thru 3. For example, column 7 shows that firms with extreme production invest over 14% more than comparable firms in year 0, and then underinvest by 8.4% in year +1, for a relative investment decline of 21.5%.

Firms with extreme discretionary expenses in year 0, columns 10 thru 12, also show the buildup and reversal pattern, but effects are small, similar to the results with abnormal CFO. Finally, results with our two aggregate measures of real earnings management, *RM1* in columns 13 thru 15 and *RM2* in columns 16-18, also show the same pattern, but again with small effects. The small results with the aggregate measures may reflect the fact that some of the components are offsetting. Nevertheless, the results in Table 2 suggest that firms that manage earnings by accruals and firms that manage earnings by real means both overinvest in the years preceding the extreme earnings management year, and then underinvest in the subsequent years. Moreover, the largest relative investment decline is associated with abnormal production.

4.3 Measures of Overinvestment

In Tables 1 and 2, we have used a firm's actual expenditures as our investment measure. However, it is well known that investment is a function of many factors, such as investment opportunities and liquidity (availability of funds). If these factors are correlated with our measures of earnings management, then any relation we find between investment and earnings management may be due to these omitted factors. Moreover, in order to measure excess investment, we need a measure of "normal" investment based on firms' fundamental factors. Thus, we now control for these factors and construct a measure of excess investment, with a two stage analysis. In the first stage, we regress firms' investment expenditures against firm specific characteristics. In the second stage, we use the residuals from our first stage investment model as our measure of excess (i.e., over- or under) investment, which we relate to our earnings management metrics.

Our first stage investment model is:

$$Y_{i,t} = \beta_0 + \beta_1 LOG\_ASSET_{i,t-1} + \beta_2 MKT\_BK_{i,t-1} + \beta_3 LEVERAGE_{i,t-1} + \beta_4 SLACK_{i,t-1} + \beta_5 AGE_{i,t-1} + \beta_6 OP\_CYCLE_{i,t-1} + \beta_7 LOSS_{i,t-1} + \beta_8 TANGIBLE_{i,t-1} + \beta_9 DIVIDEND_{i,t-1} + \varepsilon_{i,t} \quad (10)$$

Where the dependent variable is either *INVEST*, *CAPEX*, or *NONCAPEX*. *INVEST* is the sum of capital expenditures, research and development expenses, and acquisition expenditures less cash receipts from sale of property, plant and equipment, scaled by total assets. *CAPEX* is capital expenditures scaled by total assets, whereas *NONCAPEX* is the sum of research and development expenditures and acquisition expenditures scaled by total assets. *LOG_ASSET* is the log of total assets; *MKT_BK* is the ratio of the market value of equity divided by the book value of total assets; *LEVERAGE* is the ratio of long term debt to the market value of equity; *SLACK* is the ratio of cash to property plant, and equipment; *AGE* is the difference between the first year when the firm appeared on CRSP and the current year; *OP_CYCLE* is the log of receivables to sales plus inventory to cost of goods sold multiplied by 360; *LOSS* is a dummy variable that takes the value of one if net income before extraordinary items is negative and zero otherwise; *TANGIBLE* is the ratio of property, plant and equipment to total assets; *DIVIDEND* is a dummy variable that takes the value of one if the firm paid dividends and zero otherwise.

We base our first stage regression on the evidence in Biddle, Hilary, and Verdi (2008), who model firms' investment as a function of firm size, the market-to-book ratio, leverage, financial slack, age, length of operating cycle, a loss firm dummy, tangibility, and dividend payout. As Biddle, Hilary, and Verdi point out, these variables have been found to be related to investment. The market-to-book ratio is a widely use proxy for investment opportunities, with higher market-to-book ratios having greater opportunities. Thus, we expect a positive coefficient on the market-to-book ratio. Slack and dividend payout are proxies for availability of funds; firms with a lot of

slack likely have sufficient funds for investment, while firms that pay dividends may be cash constrained. Thus, we expect a positive (negative) coefficient on slack (dividend).[9] Similarly, leverage and tangibility relate to investment thru liquidity. More highly levered firms have fewer available funds, constraining investment, and tangible investments have greater access to funds, since they are more liquid than intangible investments. Thus, we expect a negative (positive) coefficient on leverage (tangibility).

Biddle et al. (2008) point out that age, length of operating cycle, and loss capture factors related to different stages of the business cycle that may give rise to different discretionary accruals unrelated to earnings management, and size is a proxy for many things that affect investment, including opportunities and access to funds. Thus, it is important to control for these factors. We expect the coefficient on loss to be negative, since loss firms have both poorer opportunities and less access to funds. Since age, length of operating cycle, and size may proxy for multiple factors, we make no prediction about their coefficients. [10]

Table 3, Panel A, reports the results of the three first stage regressions, for each one of the three investment measures. As expected, the coefficients on market-to-book are positive, while the coefficients on leverage and dividend are negative in all regressions. The coefficients on slack and tangible are mixed, but generally significant. The coefficients on the controls age and loss are uniformly significantly negative, while the coefficients on size and operating cycle are mixed but generally significant, indicating the importance of including these controls. Overall,

[9] However, dividends may be a signal of cash availability, in which case we expect a positive relation.

[10] Biddle, Hillary, and Verdi (2008) also include σ(CFO), Z-score, Industry debt/assets, CFO/Sales, and Cash in their model. We do not include the cash or cash flow variables, to avoid inducing a relation with our abnormal CFO measure of earnings management. We don't include Z-score, since it is highly correlated with leverage and profitability, which we already have, and we don't include industry capital structure, since we benchmark our firms relative to their industry.

the results are consistent with expectations, and the regressions explain about 25% of the cross-firm variation in investment.

Table 3, Panel B uses the residuals from the models in Panel A as the measures of excess investment (i.e., investment not explained by the fundamental factors in the model). Like Table 2, Panel B of Table 3 documents the investment behavior from years t-3 thru t+3 for the top quintile of firms ranked by our various earnings management metrics in year 0. Investment figures are relative to control groups of firms ranked by size and industry. Results are shown for total investment and its components, capital expenditures, and non-capital expenditures.

Again, consistent with Kedia and Philippon and McNichols and Stubben, columns 1 thru 3 show that firms with extreme discretionary accruals are increasing their investments thru year 0, after which their investments decline. For example, column 1 (total investments) shows that in the rank year, firms with extreme discretionary accruals invest over 9% more than comparable firms (as a percentage of their total assets), and then invest almost 4% less than comparable firms in the subsequent year. Thus, relative to peers, high accrual earnings management firms have a relative investment decline of .13 (.093 + .037). Columns 2 and 3 (capital expenditures and non-capital expenditures, respectively) show similar results, but the magnitudes are not quite as large. The evidence in columns 1 thru 3 implies that firms upwardly managing earnings via accruals overinvest during the period of upward management, and then subsequently underinvest.

Columns 4 thru 18 report the same information as columns 1 thru 3, but based on our measures of real earnings management. Columns 4 thru 6, where abnormal CFO is the real earnings management metric, shows similar investment behavior to columns 1 thru 3: overinvestment in the pre-earnings management and earnings management periods, and then subsequent underinvestment. However, the results with abnormal CFO, with a relative

investment decline of 3% to 4% are not nearly as large as the results with discretionary accruals in columns 1 thru 3.

Columns 7 thru 9, where the real earnings management metrics are abnormal production costs, show even more dramatic results than columns 1 thru 3. For example, column 7 (total investment) shows that firms with extreme production invest over 8% more than comparable firms in year 0, and then underinvest by 5.9% in year +1, for a relative investment decline of 14.1%. Our results with abnormal production costs are related to Kedia and Philippon's evidence that restating firms expand and then contract employment, since both production and employment are forms of short-term investment.

Firms with extreme discretionary expenses in year 0, columns 10 thru 12, also show the buildup and reversal pattern, but effects are small, similar to the results with abnormal CFO. Finally, results with our two aggregate measures of real earnings management, *RM1* in columns 13 thru 15 and *RM2* in columns 16-18, also show the same pattern, but again with small effects. The small results with the aggregate measures may reflect the fact that some of the components are offsetting. Nevertheless, the results in Table 3, Panel B show that firms that manage earnings by accruals and firms that manage earnings by real means both overinvest in the years preceding the extreme earnings management year, and then underinvest in the subsequent years.

Kedia and Philippon and McNichols and Stubben were the first papers to document the economic consequences of accruals earnings management by linking it to firms' investment behavior. Recall that both these two studies focused on small event-based samples that identified the most extreme cases of financial accounting misreporting. Our evidence linking real earnings management to firms' investments is the first evidence on the economic consequences of real earnings management. Moreover, since we use a large sample of firms not based on a

specific event, our results are not just applicable to the most extreme firms, but widely generalizable.

4.4 Additional Evidence

Up to this point, we have examined firms' investment behavior conditional on their earnings management activities. We now examine the earnings management behavior of firms over time, conditional on their excess investments in year 0.[11] This issue is important to examine, because it shows how firms' earnings management behavior varies intertemporally relative to their excess investments, and in particular, whether earnings management precedes the over or under investment.

The results are reported in Table 4. The left half of the table (columns 1 thru 7) documents the average quintile ranks, from years t-3 thru t+3, of excess investment (*XINV*) and the earnings management metrics of firms in the top quintile of excess investment in year zero. By construction, the average rank of *XINV* is 5.0 in year 0. Like McNichols and Stubben, we find that discretionary accruals (column 2) peak in year t-1, indicating that high levels of overinvestment are preceded by accruals earnings management. We find similar evidence abnormal production and for both aggregate real earnings management metrics, *RM1* and *RM2*, indicating that high levels of overinvestment are also preceded by real earnings management.

Analogous to columns 1 thru 7, columns 8 thru 14 show the average quintile ranks, from years t-3 thru t+3, of excess investment and the earnings management metrics of firms in the bottom quintile of excess investment in year zero. By construction, the average rank of *XINV* is 1.0 in year 0. Discretionary accruals, abnormal production costs, and both aggregate real

[11] McNichols and Stubben (Table 5, Panel A) perform a similar analysis.

earnings management metrics peak in year t-1, again indicating that high levels of overinvestment are preceded by both accrual and real earnings management.

As further evidence on the intertemporal relation between earnings management and investment, in Table 5 we present results of the investment model (equation (10)), augmented with various measures of earnings management activities. Reading across the columns of Table 5 suggests that current investments are significantly associated to current and past earnings management activities (both accrual-based and real), but to a less extent with future earnings management. The results suggest that the relationship between investments and earnings management activities is the strongest in the concurrent year. The evidence we report implies that earnings management leads or occurs contemporaneously with over investments. Finally, the smaller statistical significant association between investments and earnings management activities in the subsequent year is consistent with some portion of earnings management to offset poor returns from over investments made in past periods.

Combined with our evidence in Tables 2, 3, and 4, the results in Table 5 suggest that both accrual and real earnings management lead to excess investment. Moreover, the magnitude of excess investment associated with real earnings management is at least as great as the magnitude associated with accrual earnings management, thus indicating that real earnings management has important real effects.

Finally, Table 6 reports the results of analyzing the relationship between investments and combined measures of earnings management, that is, based on both accrual-based and real activities. We define the variable *COMB*, as our proxy for combined earnings management activities. *COMB* is an indicator variable that takes the value of one if the firm-year observation's real earnings management activities aggregate proxy (either *RM1* or *RM2*) *and*

discretionary accruals fall within their corresponding most extreme quintile simultaneously. In addition, we use another measure, *COMB2*, that takes the value of one if the firm-year observation belongs to the most extreme quintile of discretionary accruals *and* the most extreme quintile of abnormal production costs simultaneously. We use this alternative measure since the results in Tables 2 thru 5 suggest that abnormal production costs seems to be the most statistically significant real earnings management proxy associated with over investment activities.

The results in Table 6 indicate that firms that engage in both real and accrual earnings management activities have greater economic effects than firms that engage in one or the other alone. For example, Table 5 showed that firms in the extreme quintiles of discretionary accruals, abnormal production costs, and combined real earnings management activities (*RM1*) overinvest by statistically significant amounts of 6.7%, 7.9%, and 7.9%, respectively, relative to peers, in the year of the extreme earnings management. Table 6 reports that when firms engage in both real and accrual earnings management, they overinvest 11.2% based on *COMB* and 13.6% based on *COMB2*. Thus, the real, economic effects of both types of earnings management combined are greater than the effects of either alone.

5. Conclusion

We examine the relation between both real and accrual-based earnings management activities and firms' investment behavior. Our research is important, because studies on the effects of earnings management have focused almost exclusively on stock returns, ignoring the effects on real economic activity. While two recent papers by Kedia and Philippon (2008) and McNichols and Stubben (2008), address how earnings management affects firms' real activities, both studies

examine relatively small event-based samples and focus exclusively on *accrual-based* earnings management. Ours is the first paper to examine the economic effects of real earnings management activities.

We rank firms by measures of both accrual and real earnings management. Similar to McNichols and Stubben and Kedia and Philippon, we find that that firms managing earnings with accruals overinvest in the years up to and including the period of high earnings management, and then underinvest, indicating that the accrual management is associated with significant real effects. We also find that firms managing earnings by real activities overinvest and subsequently underinvest in the years surrounding the earnings management. Moreover, the excess investment associated with real earnings management is at least as great as the excess investment associated with accruals earnings management. Finally, we find that firms that engage in both real and accrual earnings management activities have greater investment effects than firms that engage in one or the other alone.

By providing the first evidence that real earnings management has significant effects on firms' investment, we contribute important evidence on the consequences of earnings management.

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Appendix 1 – Main Variable Definitions

INVEST = the sum of capital expenditures, research and development expenses, and acquisition expenditures less cash receipts from sale of property, plant and equipment, scaled by total assets.

CAPEX = capital expenditures scaled by total assets.

NONCAPEX = the sum of research and development expenditures and acquisition expenditures scaled by total assets.

GROW = the growth rate in total assets.

EMPL =the growth rate in the total number of employees.

DA = discretionary accruals computed using the Modified Jones model.

A_CFO =abnormal cash flows from operations, estimated as the deviations from the predicted values from the following industry-year regression: $\frac{CFO_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{Sales_{it}}{Assets_{i,t-1}} + k_3\frac{\Delta Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it}$; CFO are cash flow from operations; Sales are annual sales revenues and Assets are total assets.

A_PROD =abnormal production costs, estimated as the deviations from the predicted values from the following industry-year regression: $\frac{PROD_{jq}}{Asset_{jq-1}} = \delta_{jq} + \alpha_0\frac{1}{Asset_{jq-1}} + \beta_1\frac{(\Delta Sales_{jq})}{Asset_{jq-1}} + \beta_2\frac{SALES_{jq}}{Asset_{jq-1}} + \varepsilon_{jq}$ PROD are production costs defined as the sum of costs of goods sold and change in inventory during the year.

A_DISX =the level of abnormal discretionary expenses, estimated as the deviations from the predicted values from the following industry-year regression: $\frac{DISX_{jq}}{Asset_{jq-1}} = \delta_{jq} + \alpha_0\frac{1}{Asset_{jq-1}} + \beta_1\frac{(\Delta Sales_{jq})}{Asset_{jq-1}} + \beta_2\frac{SALES_{jq}}{Asset_{jq-1}} + \varepsilon_{jq}$ DISX are discretionary expenses calculated as the sum of advertising expenses and SG&A expenses.

R_M1 =an aggregate measure of real earning management activities and is calculated as the sum of abnormal discretionary expenses multiplied by negative one and abnormal production costs.

R_M2 = an aggregate measure of real earnings management activities and is the sum of abnormal cash flows and abnormal discretionary expenses, both multiplied by negative one.

Table 1. Sample Summary Statistics

Panel A: Descriptive Statistics

Variable	No. of Obs.	Mean	Std. Dev.	25%	Median	75%
INVEST	82,039	0.165	0.148	0.038	0.097	0.194
CAPEX	82,039	0.237	0.264	0.078	0.186	0.306
NONCAPEX	82,039	0.061	0.086	0.034	0.024	0.079
GROW	82,039	0.143	0.387	-0.031	0.084	0.243
EMPL	82,039	0.051	0.327	0.008	0.024	0.084
DA	82,039	0.008	0.184	-0.048	0.004	0.041
A_CFO	82,039	-0.021	0.349	-0.071	0.014	0.083
A_PROD	82,039	-0.051	0.313	-0.152	0.068	0.074
A_DISX	82,039	0.057	0.367	-0.091	0.024	0.015

Panel B: Correlation Matrix

	INVEST	CAPEX	NONCAPEX	GROW	EMPL	DA	A_CFO	A_PROD	A_DISX
INVEST	1	0.437***	0.764***	0.315***	0.214***	0.126***	-0.062***	0.108***	-0.081***
CAPEX	0.461***	1	0.254***	0.246***	0.217***	0.146***	-0.074***	0.154***	-0.064***
NONCAPEX	0.743***	0.239***	1	0.316**	0.213***	0.167***	-0.124***	0.214***	-0.046***
GROW	0.297***	0.221***	0.283***	1	0.467***	0.104***	-0.048***	0.157***	-0.074***
EMPL	0.194***	0.210***	0.196***	0.462***	1	0.014**	-0.016**	0.012***	-0.104***
DA	0.107***	0.137***	0.143***	0.096**	0.009**	1	-0.249***	0.038***	-0.186***
A_CFO	-0.054***	-0.061**	-0.113***	-0.042**	-0.013***	-0.217***	1	-0.274***	-0.157***
A_PROD	0.094***	0.146***	0.204***	0.146***	0.009**	0.024***	-0.196***	1	-0.298***
A_DISX	-0.076***	-0.041***	-0.038***	-0.062***	-0.098***	-0.163***	-0.236***	-0.206***	1

Table 2. Investments Activities partitioned by Alternative Earnings Management Strategies throughout Time

Year	Extreme quintile of discretionary accruals			Extreme quintile of abnormal cash flow from operations			Extreme quintile of abnormal production costs		
	INVEST	**CAPEX**	**NONCAPEX**	**INVEST**	**CAPEX**	**NONCAPEX**	**INVEST**	**CAPEX**	**NONCAPEX**
-3	**0.012**	**0.011**	0.003	0.002	0.001	0.002	0.004	0.003	0.002
-2	**0.021**	**0.016**	0.007	0.001	0.002	0.001	0.013	0.002	0.001
-1	**0.068**	**0.033**	**0.027**	**0.012**	**0.008**	0.003	**0.024**	**0.013**	0.006
0	**0.121**	**0.102**	**0.096**	**0.027**	**0.018**	**0.013**	**0.143**	**0.092**	**0.036**
1	**-0.028**	**-0.017**	**-0.023**	**-0.012**	**-0.012**	**-0.009**	**-0.084**	**-0.036**	**-0.042**
2	**-0.024**	**-0.015**	**-0.015**	-0.004	-0.011	0.003	**-0.016**	**-0.021**	**-0.019**
3	**-0.025**	**-0.011**	**-0.08**	0.003	0.002	0.001	-0.008	-0.003	-0.001

Table 2 reports the median values of several proxies for investments. All investment variables are relative to the median of a control group matched by size and industry. Bold values are significant at the 5% significance level.

Table 2. Investments Activities partitioned by Alternative Earnings Management Strategies throughout Time, Continued

Year	Extreme quintile of abnormal discretionary expenses			Extreme quintile of aggregate real earnings management (RM1)			Extreme quintile of aggregate real earnings management (RM2)		
	INVEST	**CAPEX**	**NONCAPEX**	**INVEST**	**CAPEX**	**NONCAPEX**	**INVEST**	**CAPEX**	**NONCAPEX**
-3	0.001	0.002	0.001	0.001	0.003	0.001	0.001	0.002	0.001
-2	0.003	0.002	0.001	0.002	0.008	0.003	0.002	0.001	0.002
-1	**0.013**	0.004	0.003	**0.011**	**0.018**	**0.014**	**0.013**	**0.017**	**0.012**
0	**0.016**	**0.012**	**0.013**	**0.017**	**0.023**	**0.027**	**0.019**	**0.021**	**0.017**
1	**-0.021**	**-0.024**	**-0.017**	**-0.023**	**-0.029**	**-0.015**	**-0.024**	**-0.032**	**-0.027**
2	**-0.019**	**-0.012**	**-0.011**	-0.014	**-0.018**	**-0.012**	**-0.013**	**-0.018**	-0.003
3	-0.004	-0.003	-0.002	-0.006	-0.002	**-0.009**	-0.003	-0.002	-0.001

Table 2 reports the median values of several proxies for investments. All investment variables are relative to the median of a control group matched by size and industry. Bold values are significant at the 5% significance level.

Table 3. Relation between Over Investments and Alternative Earnings Management Strategies

Panel A: Determinants of Investments

	INVEST		**CAPEX**		**NONCAPEX**	
	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic
LOG_ASSET	0.092	0.69	-0.492	-3.68	0.277	3.07
MKT-BK	2.381	12.37	4.676	15.37	1.673	14.38
LEVERAGE	-5.878	-14.38	-9.373	-12.49	-3.052	-9.85
SLACK	-0.043	-0.68	1.232	7.26	0.092	2.07
AGE	-0.072	-8.34	-0.121	-7.68	-0.251	-5.13
OP_CYCLE	-0.915	-3.69	1.374	2.96	-1.392	-4.92
LOSS	-3.567	-14.39	-5.681	-15.21	-1.864	-7.69
TANGIBLE	11.082	12.65	-15.256	-9.56	-4.374	-7.25
DIVIDEND	-0.472	-3.04	-2.071	-3.82	-0.417	-3.49
Adj R^2	0.216		0.241		0.278	
N	82,039		82,039		82,039	

Panel B: Over Investments Partitioned by Alternative Earnings Management Strategies throughout Time

Year	Extreme quintile of discretionary accruals			Extreme quintile of abnormal cash flow from operations			Extreme quintile of abnormal production costs		
	XINV	**XCAPX**	**XNONCPX**	**XINV**	**XCAPX**	**XNONCPX**	**XINV**	**XCAPX**	**XNONCPX**
-3	0.008	0.007	0.002	-0.003	-0.001	0.001	0.002	0.003	0.001
-2	**0.014**	**0.011**	0.003	-0.008	-0.003	0.002	0.006	0.002	0.002
-1	**0.048**	**0.029**	**0.021**	0.003	0.002	0.002	**0.018**	**0.011**	0.006
0	**0.093**	**0.087**	**0.073**	**0.027**	**0.029**	**0.018**	**0.082**	**0.063**	**0.013**
1	**-0.037**	**-0.022**	**-0.031**	**0.016**	**-0.011**	**-0.012**	**-0.059**	**-0.041**	**-0.029**
2	**-0.029**	**-0.018**	**-0.021**	**-0.023**	**-0.013**	0.004	**-0.022**	**-0.019**	**-0.026**
3	**-0.021**	**-0.014**	**-0.009**	0.007	0.002	0.001	-0.002	-0.001	-0.001

Panel B. Over Investments Activities Partitioned by Alternative Earnings Management Strategies throughout Time, Continued

Year	Extreme quintile of abnormal discretionary expenses			Extreme quintile of aggregate real earnings management (RM1)			Extreme quintile of aggregate real earnings management (RM2)		
	XINV	**XCAPX**	**XNONCPX**	**XINV**	**XCAPX**	**XNONCPX**	**XINV**	**XCAPX**	**XNONCPX**
-3	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.002	0.001
-2	0.002	0.001	0.002	0.002	0.004	0.002	0.001	0.002	0.002
-1	**0.009**	0.003	0.001	**0.012**	**0.021**	**0.016**	**0.015**	**0.018**	**0.014**
0	**0.011**	**0.009**	**0.007**	**0.019**	**0.022**	**0.024**	**0.021**	**0.024**	**0.019**
1	**-0.017**	**-0.015**	**-0.013**	**-0.021**	**-0.026**	**-0.012**	**-0.027**	**-0.029**	**-0.029**
2	**-0.011**	**-0.009**	**-0.008**	**-0.017**	**-0.013**	**-0.011**	**-0.015**	**-0.016**	-0.002
3	-0.002	-0.002	-0.001	-0.006	-0.002	**-0.007**	-0.002	-0.003	-0.001

Table 4. Excess Investments and Earnings Management Strategies

Ranked Values Sorted by Excess Investments

Year	XINV = HIGH							XINV = LOW						
	XINV	**DA**	**A_CFO**	**A_PROD**	**A_DISX**	**RM1**	**RM2**	**XINV**	**DA**	**A_CFO**	**A_PROD**	**A_DISX**	**RM1**	**RM2**
-3	3.27	2.98	2.45	2.94	2.08	2.47	2.64	2.41	2.72	2.42	2.83	2.25	2.31	2.38
-2	3.69	3.14	2.26	3.01	1.97	2.57	2.79	2.24	2.74	2.51	2.82	1.98	2.34	2.31
-1	3.86	**3.59**	**1.74**	**3.61**	**1.31**	**2.89**	**3.21**	1.96	**2.61**	**2.12**	**2.62**	**1.68**	**2.21**	**2.27**
0	**5.00**	3.41	1.89	3.47	1.49	2.84	3.06	**1.00**	2.93	2.27	2.74	1.86	2.42	2.48
1	3.76	3.26	2.03	3.03	1.94	2.75	2.97	1.84	3.01	2.43	2.62	2.35	2.49	2.59
2	3.21	3.14	2.41	2.89	2.18	2.91	2.84	2.48	2.98	2.59	2.66	2.29	2.51	2.51
3	2.17	3.01	2.69	2.74	2.27	2.43	2.57	2.67	3.04	2.72	2.71	2.18	2.54	2.54

Table 4 presents quintile assignments (1 = low, 5 = high, ranked by industry and year) for excess investments (XINV), discretionary accruals (DA), abnormal cash flows from operations (A_CFO), abnormal production costs (A_PROD), abnormal discretionary expenses (A_DISX), and aggregate measures of real earnings management activities (RM1 and RM2) through time. Mean quintiles are presented through time conditional on XINV being in the highest or lowest quintile in year 0.

Table 5. Investments and Earnings Management Strategies

	EM = DA		EM=A_CFO		EM=A_PROD	
	(1)		(2)		(3)	
	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic
LOG_ASSET	0.086	0.54	-0.474	-3.74	0.242	3.12
MKT-BK	2.412	11.54	4.875	14.23	1.574	13.54
LEVERAGE	-5.743	-13.69	-8.617	-11.64	-3.164	-8.17
SLACK	-0.054	-0.47	1.314	7.89	0.083	2.11
AGE	-0.068	-8.07	-0.171	-7.17	-0.242	-5.67
OP_CYCLE	-0.874	-3.72	1.398	2.99	-1.421	-4.99
LOSS	-3.608	-12.67	-5.754	-14.37	-1.791	-7.41
TANGIBLE	11.247	1213.64	-14.378	-8.03	-4.674	-5.96
DIVIDEND	-0.427	-3.12	-2.207	-3.87	-0.423	-3.57
EM_RANK $_{t-2}$	0.061	12.47	-0.042	-8.67	0.051	6.98
EM_RANK $_{t-1}$	0.084	11.24	-0.047	-6.98	0.058	7.06
EM_RANK $_{t}$	0.067	12.67	-0.074	-9.91	0.079	11.36
EM_RANK $_{t+1}$	0.014	3.28	-0.017	-3.07	0.011	3.17
Adj R^2	0.248		0.253		0.284	
N	82,039		82,039		82,039	

Table 5. Investments and Earnings Management Strategies, Continued

	(4)		(5)		(6)	
	EM = A_DISX		EM = RM1		EM = RM2	
	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic
LOG_ASSET	0.074	0.73	-0.642	-3.91	0.287	3.21
MKT-BK	2.506	12.08	4.709	13.57	1.608	12.34
LEVERAGE	-5.072	-12.35	-8.541	-10.24	-3.204	-7.68
SLACK	-0.048	-0.56	1.304	7.71	0.076	2.74
AGE	-0.074	-7.05	-0.154	-7.29	-0.234	-4.98
OP_CYCLE	-0.702	-3.61	1.408	3.06	-1.308	-5.14
LOSS	-3.704	-11.94	-5.641	-13.17	-1.806	-7.39
TANGIBLE	10.374	14.06	-13.64	-8.54	-4.403	-4.67
DIVIDEND	-0.462	-3.26	-2.234	-3.92	-0.437	-3.61
EM_RANK $_{t-2}$	-0.046	13.07	0.049	-8.78	0.058	6.84
EM_RANK $_{t-1}$	-0.061	11.86	0.054	6.57	0.058	7.22
EM_RANK $_{t}$	-0.072	12.67	0.076	9.91	0.079	11.36
EM_RANK $_{t+1}$	-0.012	2.96	0.017	3.07	0.018	3.17
Adj R^2	0.243		0.286		0.291	
N	82,039		82,039		82,039	

Table 6. Relation between Over Investments and Combined Earnings Management Strategies

Panel A: Relation between COMB and Investments

	INVEST		CAPEX		NONCAPEX	
	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic
LOG_ASSET	0.087	0.56	-0.472	-3.73	0.261	3.37
MKT-BK	2.412	11.34	4.694	15.42	1.706	13.07
LEVERAGE	-5.743	-13.67	-9.405	-12.04	-3.071	-9.12
SLACK	-0.039	-0.75	1.243	6.24	0.087	2.23
AGE	-0.079	-8.46	-0.117	-7.04	-0.267	-5.04
OP_CYCLE	-0.924	-3.72	1.412	3.04	-1.406	-4.27
LOSS	-3.564	-14.73	-5.534	-14.39	-1.913	-7.16
TANGIBLE	11.095	12.75	-15.463	-9.02	-4.247	-7.37
DIVIDEND	-0.484	-3.24	-2.097	-3.56	-0.429	-3.75
COMB $_{t-2}$	0.063	5.04	0.057	4.03	0.038	4.41
COMB $_{t-1}$	0.078	8.14	0.062	7.14	0.045	5.37
COMB $_{t}$	0.112	12.37	0.093	12.34	0.085	6.07
COMB $_{t+1}$	0.049	4.09	0.034	4.19	0.037	3.51
Adj R^2	0.314		0.301		0.313	
N	82,039		82,039		82,039	

Panel B: Relation between COMB2 and Investments

	INVEST		CAPEX		NONCAPEX	
	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic	Coefficient	Robust t-statistic
LOG_ASSET	0.082	0.46	-0.453	-3.62	0.247	3.42
MKT-BK	2.436	10.26	4.708	14.03	1.724	12.85
LEVERAGE	-5.642	-12.48	-9.509	-12.78	-3.204	-9.84
SLACK	-0.043	-0.81	1.347	6.53	0.092	2.29
AGE	-0.074	-8.12	-0.107	-6.27	-0.234	-4.39
OP_CYCLE	-0.949	-3.86	1.501	3.27	-1.541	-4.76
LOSS	-3.403	-13.47	-5.607	-13.97	-1.904	-7.53
TANGIBLE	12.201	11.03	-14.204	-8.34	-4.101	-6.79
DIVIDEND	-0.501	-3.89	-2.229	-3.96	-0.512	-3.94
COMB2 $_{t-2}$	0.069	5.27	0.062	3.86	0.046	3.97
COMB2 $_{t-1}$	0.086	7.06	0.074	6.05	0.054	5.63
COMB2 $_{t}$	0.136	11.67	0.113	10.94	0.108	5.61
COMB2 $_{t+1}$	0.042	4.27	0.047	4.96	0.049	4.02
Adj R^2	0.381		0.351		0.327	
N	82,039		82,039		82,039	