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\textsuperscript{a} Rutgers University, School of Business, Camden, NJ 08102
\textsuperscript{b} University of Miami, School of Business, Coral Gables, FL 33124
\textsuperscript{c} Indiana University, Kelley School of Business, Bloomington, IN 47405

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Ivo Jansen can be reached at (856) 225-6696 or jansen@camden.rutgers.edu.
Sundaresh Ramnath can be reached at (305) 284-6668 or s.ramnath@miami.edu.
Teri Yohn can be reached at (812) 855-0430 or tyohn@indiana.edu.
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Abstract

When firms manage earnings up (down), the articulation between the income statement and the balance sheet generally forces a simultaneous increase (decrease) in net operating assets. Therefore, under ceteris paribus conditions, upward earnings management results in a contemporaneous increase in profit margin (i.e., operating income divided by sales) and decrease in asset turnover (i.e., sales divided by net operating assets), and downward earnings management results in a contemporaneous decrease in profit margin and increase in asset turnover. We provide evidence that the sign-interaction between the change in profit margin and the change in asset turnover is indeed useful for identifying earnings management with analyses that rely on the following notions: (1) earnings management reverses, (2) firms that meet or just beat analyst forecasts are more likely to have managed earnings upward, and (3) firms that miss or beat analyst forecasts by a large amount are more likely to have managed earnings downward. In all analyses our earnings management diagnostic is incrementally informative to abnormal accruals, a widely accepted measure of earnings management.

Key words: financial statement analysis, earnings management, asset turnover, profit margin
1. Introduction

Identifying earnings management is important for financial statements users to assess current economic performance, to predict future profitability, and to determine firm value. It is often difficult and time consuming, however, to identify earnings management in a generic setting (i.e., in the absence of an obvious incentive to manage earnings such as prior to an equity offering or a leveraged buyout). Academic research has used numerous proxies for (or indicators of) earnings management. Many of these are based on accruals models, where an attempt is made to isolate the normal (non-discretionary) component from the abnormal (discretionary) component of accruals (see, e.g., Healy, 1985; DeAngelo, 1986; Jones, 1991).¹ McNichols (2000) points out, however, that there is limited theory about how accruals should behave in the absence of discretion. Moreover, Fields et al. (2001, p. 289) argue that the use of existing accruals models may lead to serious inference problems.

In this study, we propose a simple diagnostic of earnings management that exploits the accounting model and the intuition that growth in assets should be corroborated by growth in sales. Specifically, we argue that the sign-interaction between the change in a firm’s asset turnover ratio (i.e., sales divided by net operating assets) and the change in its profit margin ratio (i.e., operating income divided by sales) can serve as a signal of potential earnings management. The logic of this proposition follows from the articulation between the income statement and balance sheet, which ensures that earnings management affects both operating income (i.e., the numerator of the profit margin ratio) and net operating assets (i.e., the denominator of the asset

¹ Other indicators of earnings management that have been used include changes in accounting methods (see, e.g.,
turnover ratio) in the same direction. For example, if a firm manages earnings upward by understating depreciation expense, both net income and the book value of the depreciable asset will be overstated. Thus, under ceteris paribus conditions, upward earnings management causes the profit margin ratio to go up because of the increase in operating income, and it causes the asset turnover ratio to go down because of the increase in net operating assets, and vice versa.\(^2\)

We therefore propose that a contemporaneous increase in profit margin and decrease in asset turnover can signal upward earnings management, and that a contemporaneous decrease in profit margin and increase in asset turnover can signal downward earnings management.

Because earnings management is not directly observable, we cannot perform direct tests to validate our earnings management diagnostic. We rely, instead, on the following observations about earnings management and earnings management behavior to evaluate the informativeness of our proposed diagnostic. First, earnings management merely postpones the reporting of true earnings and thus should lead to a reversal of profitability in the future (Penman, 2001, p. 609).

We therefore test whether firms with contemporaneous increases in profit margin and decreases in asset turnover (i.e., our diagnostic for upward earnings management) report lower one-year-ahead changes in return on net operating assets, and whether firms with contemporaneous decreases in profit margin and increases in asset turnover (i.e., our diagnostic for downward

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\(^2\) This relation always holds when a firm manages its income through expenses. However, this relation may not always hold when a firm manages income through revenues; for example, if the margin on managed revenues is lower than the margin on other revenues. This shortcoming of our diagnostic, however, biases us against finding a relation between earnings management and the interaction between contemporaneous changes in profit margin and asset turnover. Moreover, the abnormal accruals model in (modified versions of) Jones (1991) assumes that earnings management does not occur through revenue manipulation. In this respect, therefore, our diagnostic suffers from similar limitations as the popular abnormal accruals model.
earnings management) report higher one-year-ahead changes in return on net operating assets. Second, based on prior research which suggests that firms manage earnings upward to meet or exceed analyst forecasts (see, e.g., Burgstahler and Eames, 2002; Matsumoto, 2002), we test whether firms that meet or just beat analyst forecasts report more (fewer) contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover relative to other firms. Finally, we argue that downward earnings management is more likely to occur when the firm’s true earnings misses expectations by a wide margin. Specifically, firms that miss (beat) analyst forecasts by a very large amount have an incentive to “take a bath” (smooth earnings). Therefore, because firms that miss or beat analyst forecast by a very large amount are more (less) likely to manage earnings downward (upward), we also investigate whether these firms report more (fewer) contemporaneous decreases (increases) in profit margin and increases (decreases) in asset turnover relative to other firms. In all of our analyses, we investigate whether our diagnostic has incremental information content relative to abnormal accruals (see, e.g., Jones, 1991; Teoh et al., 1998; Guidry et al., 1999; Klein, 2002).

In each of the analyses, our findings support the conjecture that the sign-interaction between the change in profit margin and the change in asset turnover is informative about earnings management. In addition, we find that the information in this sign-interaction is incremental to the information in a set of control variables, including abnormal accruals. Interestingly, we find that abnormal accruals do a poor job of identifying earnings management in one of the most commonly accepted earnings management scenarios: when firms meet or just beat analyst forecasts. Our measure, on the other hand, is successful in identifying these
situations as potential instances of managed earnings.

We believe that our proposed diagnostic for earnings management has several appealing features. First, our earnings management diagnostic relies on fundamental relations in the accounting model, as opposed to estimated relations as in the abnormal accruals model. Second, the asset turnover and profit margin ratios are primary ratios in financial statement analysis, and are likely to be investigated by many users of financial statements, even when they are not explicitly considering earnings management.³ Our results suggest that financial statement users should consider the possibility that a firm has managed its earnings when, as part of their analysis, they observe that the asset turnover and profit margin ratios “move” in opposite directions. Another appealing feature of our diagnostic is its computational ease. Unlike abnormal accruals, which requires financial statement data from a substantial time-series or even an entire industry, our diagnostic can be computed from a single annual report. Finally, our diagnostic is comprehensive, in that it includes the effect of all earnings management, including the manipulation of earnings components that are not separately observable in the financial statements (for example, warranty expense).

We want to stress that our diagnostic is not a proxy for earnings management. Instead, we view it as a signal of potential earnings management (i.e., a red flag). In practical terms, our findings suggest that financial statement users (analysts, investors, and auditors alike) should

³ In so-called DuPont analysis, a firm’s return on assets is decomposed into asset turnover and profit margin. Financial statement analysis texts broadly advocate making this decomposition and investigating profitability changes by examining changes in the asset turnover and profit margin ratios (see, e.g., White, Sondhi and Fried, 1995; Palepu, Bernard and Healy, 1996; Penman, 2001; Stickney, Brown and Wahlen, 2004; Lundholm and Sloan 2004).
carefully investigate the possibility that a firm has managed its earnings upward (downward) when there is a contemporaneous increase (decrease) in the firm’s profit margin and decrease (increase) in its asset turnover. Because of the incremental information content of our diagnostic relative to abnormal accruals, we believe that it can also be used in academic and investment research as a complementary indicator of earnings management.

The paper proceeds as follows. In section 2, we discuss our sample, variable measurement, and descriptive statistics. In section 3, we describe our analyses and report our findings. In section 4, we summarize and conclude the paper.

2. Sample, Variable Definitions, and Descriptive Statistics

2.1. Sample

We obtain financial statement data from the 2006 Compustat Annual Industrial, Full Coverage, and Research tapes. Because funds from operations (Compustat data item #110) – which we need to compute cash from operating activities in years before 1988 – is not available prior to 1971, and because we need year-ahead data for several variables, our sample spans the years 1971 through 2005. We eliminate firm-year observations in which net operating assets are negative in year t-1 or year t, because the asset turnover ratio is undefined for negative net operating assets. We also eliminate all financial firms from our analyses (SIC 6000-6999) because it is difficult to distinguish between operating and financial activities for these firms. Finally, to control for the effect of divestitures and mergers or acquisitions on balance sheet changes, we eliminate firm-year observations in which a firm discontinued operations, or was
involved in a merger or acquisition (Compustat annual footnote code #1) in year t-1, year t, or year t+1. Our sample of non-missing financial statement data consists of 57,788 firm-year observations. When we intersect it with non-missing analyst forecast data, the sample size reduces to 16,631 observations.

2.2. Variable Measurement

We define the change in profit margin ($\Delta PM_t$) and the change in asset turnover ($\Delta ATO_t$) as follows (Compustat data item numbers are in parentheses):

$$\Delta PM_t = \frac{\text{operating incomet}}{\text{salest} (#12)} - \frac{\text{operating incomet}-1}{\text{salest}-1};$$

$$\Delta ATO_t = \frac{\text{salest} (#12)/\text{net operating assetst}}{\text{salest}-1/\text{net operating assetst-1}};$$

where

- Operating incomet = salest (#12) – (cost of goods sold (#41) + selling, general and administrative expenses (#189) + depreciation and amortization expense (#14));
- Net operating assetst = net assetst (#216) – net financial assetst;
- Net financial assetst = cash and short term investments (#1) – interest-bearing liabilities (#34 + #9).

In this study, we argue that a contemporaneous increase (decrease) in profit margin and decrease (increase) in asset turnover can signal upward (downward) earnings management. We define two corresponding indicator variables that represent our proposed diagnostic for earnings management. Specifically, we define:

$$EM_{UP} = 1 \text{ if } \Delta PM_t > 0 \text{ and } \Delta ATO_t < 0, \text{ and zero otherwise};$$

$$EM_{DN} = 1 \text{ if } \Delta PM_t < 0 \text{ and } \Delta ATO_t > 0, \text{ and zero otherwise.}$$

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4 We also delete firm-years with increases in goodwill in year t-1, year t, or year t+1 to avoid the effect of mergers and acquisitions.

5 The number of observations from Compustat with available total assets during our sample period equals 269,852. The number of available observations for the variables in our study equals 130,702. The sample size reduces to 59,605 after we delete observations for firms involved in a merger or acquisition in year t-1, year t, or year t+1. The sample size equals 57,788 once we delete financial firms.
From this point forward, for expositional ease, we will use expressions such as “a firm with EM_UP” and “a firm with a contemporaneous increase in profit margin and decrease in asset turnover” interchangeably; and similarly for EM_DN.

We define the control variables as follows:

Return on Net Operating Assets (RNOAt) = operating incomet/average net operating assetst;
where, average net operating assets = (net operating assets + net operating assetst-1)/2;

Change in RNOA (\(\Delta\text{RNOA}_t\)) = RNOAt – RNOAt-1;

Net Operating Assets (NOAt) = net operating assetst /salest; and
Change in NOA (\(\Delta\text{NOA}_t\)) = (net operating assets – net operating assetst-1)/net operating assetst-1;

We estimate abnormal accruals using the Jones (1991) model, where total accruals (TAC) are defined following Subramanyam (1996) and Xie (2001):

\[\text{TAC}_t = (\text{income before extraordinary items}_t (#18) – \text{cash from operations}_t), \text{ deflated by total assets}_{t-1} (#6);\]
where

in firm-years 1988 and forward, cash from operations is defined as net cash flow from operating activities reported under SFAS No. 95 (#308);
and where in firm-years prior to 1988, when Compustat data item #308 is unavailable, cash from operations = funds from operations (#110) – change in current assets (#4) + change in cash and short-term investments (#1) + change in current liabilities (#5) – change in short term debt (#34).

We run the following regression to estimate abnormal accruals using the Jones (1991) model:

\[\frac{TAC_t}{TA_{t-1}} = a_1(1/TA_{t-1}) + a_2(\Delta\text{REV}_t/TA_{t-1}) + a_3(PPE_t/TA_{t-1}) + e_t,\]

where:

\[TA_{t-1} = \text{total assets}_{t-1} (#6);\]
\[\Delta\text{REV}_t = \text{changes in sales}_t (#12);\]
\[PPE_t = \text{gross property, plant and equipment}_t (#7).\]
Following DeFond and Jiambalvo (1994), Subramanyam (1996) and Xie (2001), we estimate the model in cross-section, for each 2-digit SIC code and year combination. We define abnormal accruals (ABNAC_t) as the fitted residual from the model.

2.3. Descriptive Statistics

Table 1 provides descriptive statistics for our variables of study. The mean (median) change in profit margin is 0.007 (0.000) and the mean (median) change in asset turnover in our sample is 0.082 (0.023). The mean of EM_UP equals 0.182, which indicates that 18.2% of the sample observations experience contemporaneous increases in profit margin and decreases in asset turnover. The mean of EM_DN equals 0.213, which indicates that 21.3% of the sample observations experience contemporaneous decreases in profit margin and increases in asset turnover. The fact that over 60% of the firm-year observations experience simultaneous increases (or decreases) in both PM and ATO suggests that movement in the same direction is the norm, and further validates our metric for detecting earnings management.

To better understand how firm-year observations with EM_UP and EM_DN are different from each other and from all other observations, we compare the mean and median of the variables in our study between these groups. Table 2, panel A reports the results from this comparison. By construction, ΔPM and ΔATO are positive and negative, respectively, for EM_UP; whereas they are negative and positive, respectively, for EM_DN. The average ΔPM and ΔATO for “Other” observations are close to the sample averages. T-statistics (z-statistics)
for a comparison of the mean (median) in the final three columns of table 2 indicate that these
variables are significantly different between the EM_UP, EM_DN and “Other” groups.

The descriptive statistics suggest that EM_DN firms have lower profitability (PM and
RNOA), lower changes in profitability (ΔRNOA), and lower growth (ΔNOA) than other firms.
On the other hand, the EM_UP firms have higher profitability, higher changes in profitability,
and higher growth than other firms. These results are consistent with the results in Barton and
Simko (2002) that upward earnings management is positively related to profitability, changes in
profitability, and growth. The results also highlight the importance of controlling for these
fundamental variables in determining whether EM_UP and EM_DN provide incremental
information for identifying earnings management.

Consistent with the basic conjecture of this study, ABNAC is significantly positive
(negative) for observations with EM_UP (EM_DN), and close to zero for all other observations.
The difference in ABNAC between the groups is highly significant. Thus, taking abnormal
accruals as a benchmark of earnings management, it appears that EM_UP and EM_DN capture
upward and downward earnings management, respectively.

In panel B of table 2, we report the percentage of observations with EM_UP, EM_DN
and “Other” by industry. We define industries by the first digit of the firm’s primary SIC code.
The results show that while there is some variation across industries, there is no clustering of
EM_UP or EM_DN in any industries.

Table 3 reports Pearson correlation coefficients between our variables of study. As
suggested by the results in table 2, there are significant correlations between EM_UP and
EM_DN, and most other variables. None of the correlations exceed 30%, however, suggesting that EM_UP and EM_DN capture a substantial amount of unique information relative to the other variables. We note that all reported correlations are sufficiently low to mitigate concerns about multicollinearity when estimating multivariate models.

EM_UP is positively related to earnings management as proxied by abnormal accruals (ABNAC_t); there is a significant, positive correlation of 0.122 between EM_UP and abnormal accruals. There is also a significant, negative correlation between EM_DN and abnormal accruals of -0.124. We further note that the negative correlation between EM_UP and ∆RNOA_{t+1} of -0.061 is consistent with firms with contemporaneous increases in profit margin and decreases in asset turnover having managed earnings upward in the current year, and the reversal of profitability in the following year. Similarly, the positive correlation of 0.050 between EM_DN and ∆RNOA_{t+1} is consistent with firms with contemporaneous decreases in profit margin and increases in asset turnover having managed earnings downward in the current year, and profitability reversing in the following year.

[Please place tables 2 and 3 here]

3. Analyses and Findings

The purpose of this study is to investigate whether the sign-interaction between the change in asset turnover and the change in profit margin (i.e., EM_UP and EM_DN) is informative about earnings management. Because earnings management is not directly observable, however, we cannot perform a direct test. We perform indirect analyses instead,
relying on observations about earnings management (e.g., that it reverses) and earnings management behavior (e.g., firms manage earnings upward to meet or just beat the analyst forecast) to test whether our proposed diagnostic is informative about earnings management. We discuss these analyses in the following sub-sections.

3.1. One-year-ahead Changes in RNOA

Penman (2001, p. 609) states that if a firm manipulates earnings upward (downward), future profitability should fall (rise) as the income contribution from earnings management in the current period reverses. Based on this intuition, we predict that firms with EM_UP will report more negative (or less positive) changes in RNOA one-year-ahead than other firms, and that firms with EM_DN will report more positive (or less negative) changes in RNOA one-year-ahead than other firms. To test our prediction, we use regression analysis with the change in return on net operating assets one year ahead ($\Delta RNOA_{t+1}$) as the dependent variable and EM_UP_t and EM_DN_t as explanatory variables. We expect a negative coefficient on EM_UP and a positive coefficient on EM_DN.

Following prior research and to control for the characteristics of EM_UP and EM_DN firms, we also include current return on net operating assets (RNOA_t), current net operating assets (NOA_t), current change in return on net operating assets ($\Delta RNOA_t$), and current change in net operating assets ($\Delta NOA_t$) as control variables. Finally, we include $\Delta ATO_t$, $\Delta PM_t$, and $ABNAC_t$ as explanatory variables to test whether EM_UP and EM_DN provide incremental information over these variables in explaining the one-year-ahead change in RNOA. We estimate the following models:
We report the results from estimating these models in table 4. We first estimate model (1), which includes our control variables RNOA, NOA, ∆RNOA, and ∆NOA. We include RNOA to control for the well documented mean reversion in profitability (Freeman, Ohlson and Penman, 1982; and Fairfield, Sweeney and Yohn, 1996). We expect a negative coefficient estimate on RNOA. We include NOA since Barton and Simko (2002) suggest that firms with “bloated” balance sheets are more likely to have engaged in upward earnings management in prior years. We expect a negative coefficient estimate on NOA. We include ∆RNOA to control for serial correlation in profitability changes. Relying on the argument that there is serial correlation in profitability changes, we expect a positive coefficient on ∆RNOA. Finally, we include ∆NOA to control for the negative relation between growth in net operating assets and future profitability changes (Fairfield and Yohn, 2001). We expect a negative coefficient estimate on ∆NOA. The results show that the coefficient estimates on all variables have the expected sign and are significantly different from zero.

In model (2), we add EM_UP and EM_DN to the model. We find, consistent with our
prediction, that there is a significant negative relation between $\Delta \text{RNOA}_{t+1}$ and EM\_UP, and a significant positive relation between $\Delta \text{RNOA}_{t+1}$ and EM\_DN. These findings are consistent with our argument that EM\_UP (EM\_DN) identifies upward (downward) earnings management, and that earnings management at least partially reverses in the next fiscal year. Thus, using future profitability changes as a benchmark for earnings management, our findings suggest that the sign interaction between $\Delta \text{ATO}$ and $\Delta \text{PM}$ is successful in identifying earnings management.

In model (3), we include ABNAC as an explanatory variable to test if EM\_UP and EM\_DN provide incremental information over this widely used proxy for earnings management. We find a significant negative coefficient on ABNAC, which is consistent with the idea that ABNAC identifies earnings components that will likely reverse in the next year. The coefficient estimate on EM\_UP is still significantly negative in model (3). The coefficient estimate on EM\_DN, however, while still positive, is only marginally significant (one-tailed $p<0.065$). These results suggest that our diagnostic is incremental to ABNAC for identifying upward earnings management, but perhaps not so powerful in identifying downward earnings management. The lower information content of EM\_DN could be driven by the use of operating income in the profit margin ratio since downward earnings management is often associated with non-operating and non-recurring items that are not included in this income measure. The incremental information content of our diagnostic is further supported by a comparison of the explanatory power of model (3) including and excluding EM\_UP and EM\_DN. The Vuong Z-statistic (not reported in the table) for this comparison equals 2.78 ($p<0.01$), indicating that EM\_UP and EM\_DN add information to ABNAC and the other control variables in explaining
future earnings changes.

Finally, in model (4), we include $\Delta \text{ATO}$ and $\Delta \text{PM}$. We include $\Delta \text{ATO}$ and $\Delta \text{PM}$ to investigate whether the results on EM_UP and EM_DN are driven by the sign-interaction between $\Delta \text{ATO}$ and $\Delta \text{PM}$ (as we conjecture), or whether they are driven by $\Delta \text{ATO}$ and $\Delta \text{PM}$ themselves. This investigation is particularly relevant since Fairfield and Yohn (2001) demonstrate that decomposing $\Delta \text{RNOA}$ into $\Delta \text{ATO}$ and $\Delta \text{PM}$ is informative about one-year-ahead profitability changes. We find that the coefficient estimate on $\Delta \text{ATO}$ is significantly positive and that the coefficient estimate on $\Delta \text{PM}$ is significantly negative. These results are largely consistent with Fairfield and Yohn (2001). More importantly, we find that the coefficient estimate on EM_UP is still significantly negative, but that the coefficient estimate on EM_DN is now insignificant. Taken together, the results in table 4 suggest that EM_UP and EM_DN provide information for identifying earnings management, and that EM_UP provides incremental information relative to abnormal accruals, the change in asset turnover, and the change in profit margin.

3.2. Firms with Small Positive Earnings Surprises

For our next set of analyses, we rely on the idea that firms manage earnings toward certain benchmarks. Prior research (Burgstahler and Eames, 2002; Matsumoto, 2002; Moehrle, 2002; Cheng and Warfield 2005) provides evidence that firms manage earnings upward to avoid missing analyst forecasts of earnings. This suggests that firms that meet or just beat analyst forecasts are more (less) likely to have managed their earnings upward (downward) than other
firms. We use this observation for our second test of whether the sign-interaction between ΔATO and ΔPM is informative about earnings management. Specifically, we predict that firms that meet or just beat analyst forecasts have more (fewer) incidences of EM_UP (EM_DN) than other firms.

To provide empirical evidence on this issue, we include observations for all sample firms followed by I/B/E/S. We calculate the earnings surprise by subtracting the median analyst forecast closest to the earnings announcement from actual reported earnings. We define earnings surprises to be small positive surprises (i.e., meet or just beat) if the forecast error is greater than or equal to zero but less than $0.02. The sample for the analyses in this section consists of 16,631 observations, 3,769 of which meet or just beat the analyst forecast. In addition to comparing EM_UP and EM_DN across the two groups, we also examine the change in asset turnover, the change in profit margin, abnormal accruals, net operating assets, and the change in net operating assets. The results of this analysis are reported in table 5. Our results show that 26.13% of firms that meet or just beat analyst forecasts have EM_UP compared to only 17.98% of all other firms. This difference is statistically significant at the one percent level. Our results also show that only 16.37% of firms that meet or just beat analyst forecasts have EM_DN

7 Barton and Simko (2002) point out that the pressure to meet analyst forecasts appears to be a relatively recent phenomenon and that I/B/E/S changed the formulae to calculate actual earnings per share in 1993. Given this, we also performed the analysis with the years prior to 1993 excluded. The results are similar to those reported in the tables.
8 We also defined earnings surprises to be small positive surprises if the forecast error is greater than or equal to zero but less than $0.01. The results are similar to those reported in the tables.
9 We also performed the analysis including only those firm-year observations with earnings surprises between -0.02 and +0.02 in case those firm-years in which the firm missed the analyst forecast by a large amount reflect significant economic changes. When we eliminate observations where the forecast error is greater than 0.02 or less than -0.02, the results are similar to those reported in the tables.
compared to 21.31% of all other firms. This difference is also significant at the one percent level. These results indicate, consistent with our prediction, that firms that meet or just beat analyst forecasts are more (less) likely to report EM_UP (EM_DN) than other firms.

We note that firm-years that meet or just beat analyst forecasts have significantly higher changes in profit margin. They also have significantly lower net operating assets and higher growth in net operating assets than other firms. In addition, abnormal accruals for the meet or beat group are significantly higher than abnormal accruals for the control group.

[Please place table 5 here]

In table 6, we use logistic regression to evaluate whether the ability of EM_UP and EM_DN to identify firms that meet or just beat analyst forecasts is incremental to that of RNOA, NOA, ΔRNOA, ΔNOA, ABNAC, ΔATO, and ΔPM. We run a logistic regression in which the dependent variable (MBE) is an indicator of whether the firm meets or just beats the analyst forecast. We estimate the following models:

\[
MBE_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \xi_{t+1}, 
\]

\[
MBE_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \gamma_5 EM_UP_t + \gamma_6 EM_DN_t + \xi_{t+1}, 
\]

\[
MBE_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \gamma_5 ABNAC_t + \gamma_6 EM_UP_t + \gamma_7 EM_DN_t + \xi_{t+1}, 
\]

\[
MBE_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \gamma_5 \Delta ATO_t + \gamma_6 \Delta PM_t + \gamma_7 ABNAC_t + \gamma_8 EM_UP_t + \gamma_9 EM_DN_t + \xi_{t+1}. 
\]

In model (5), we find that firms that report higher RNOA, higher changes in RNOA, and higher growth in NOA are more likely to meet or just beat analyst forecasts than other firms.
Consistent with Barton and Simko (2002), we also find that firms with higher net operating assets are less likely to meet or beat analyst forecasts. In model (6), consistent with our univariate results in table 5, we document a positive and significant coefficient (at the one percent level) on EM_UP and a negative and significant coefficient on EM_DN. The results suggest that EM_UP and EM_DN provide incremental information over RNOA, NOA, ΔRNOA, and ΔNOA in identifying firms that meet or just beat analyst forecasts. Our diagnostic for earnings management is successful in identifying earnings management as proxied by a well accepted measure of earnings management, meeting or beating analyst forecasts.

In model (7), we include ABNAC as a control variable to determine whether EM_UP and EM_DN provide incremental information over this widely used proxy for earnings management. We find that the coefficient estimate on ABNAC is insignificant. Interestingly, traditional abnormal accrual estimates provide no incremental information for identifying firms that meet or just beat analyst forecasts in our sample. The results for model (8) suggest that the information in EM_UP is also incremental to the information in ΔATO and ΔPM for identifying firms that meet or just beat analyst forecasts.

The results suggest that EM_UP and EM_DN are useful for identifying firms that are more and less likely, respectively, to have managed earnings to meet or just exceed analyst forecasts. Our findings also suggest that abnormal accruals do not provide incremental

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10 We also estimated the model with an indicator variable equal to one when ABNAC is positive, and zero otherwise, instead of the continuous specification of ABNAC. We investigated this alternative to assess the possibility that a continuous specification of ABNAC contains more noise than the indicator variables EM_UP and EM_DN, and that the incongruent variable specifications bias against finding results for ABNAC. The results using the indicator variable for ABNAC, however, are similar to those reported in table 6.
information using this widely accepted indicator of earnings management.

[Please place table 6 here]

3.3. Extreme Earnings Surprises

In the previous section, we described analyses based on the observation that firms manage earnings upward to meet or just beat analyst forecasts. In this section, we further argue that firms that miss or beat the analyst forecast by a large amount are more likely to have managed earnings downward. That is, firms with surprisingly low earnings have an incentive to “take a bath,” while firms with surprisingly high earnings have an incentive to save earnings for the future (i.e., create "cookie-jar" reserves). We rely on this argument for our third and final test of whether the sign-interaction between $\Delta$ATO and $\Delta$PM is informative about earnings management.

Specifically, we predict that firms that miss or beat the analyst forecast by a large margin have more (fewer) incidences of EM_DN (EM_UP) than all other firms.

In table 7, we investigate this prediction for extreme earnings surprises. We sort all earnings surprises into deciles. We label the observations in the top and bottom deciles as extreme earnings surprises. We compare those observations to the ones from the other deciles. The mean (median) earnings surprise in the extreme deciles is -$0.45 (-$0.06). The mean (median) earnings surprise for the remaining deciles is -$0.02 ($0.00).

Our results show that 14.37% of firms with extreme earnings surprises have EM_UP, compared to 21.18% for other firms. On the other hand, 25.74% of the firms in the extreme sample have EM-DN compared to 11.53% for all other firms. These univariate results support our prediction and suggest that our diagnostic is successful in identifying firms with extreme
unexpected earnings as firms that are more likely to have managed earnings downward.

We further note that almost all of the other variables in table 8 are significantly different between firms with extreme and “other” earnings surprises which makes it important that we control for these attributes in a multivariate context. Accordingly, we perform logistic regression analysis to determine if EM_UP and EM_DN provide incremental information, relative to the other variables, for identifying extreme earnings surprises.

[Please place table 7 here]

In table 8, we define EXTR as an indicator variable equal to one if the observation is in the top or bottom decile of earnings surprises, and zero otherwise. We use logistic regression with these indicator variables as dependent variables. We include EM_UP, EM_DN and control variables as explanatory variables. We estimate the following models:

$$EXTR_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \xi_{t+1},$$  \hspace{1cm} (9)

$$EXTR_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \gamma_5 EM_{\text{UP}}t + \gamma_6 EM_{\text{DN}}t + \xi_{t+1},$$  \hspace{1cm} (10)

$$EXTR_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \gamma_5 \Delta \text{ABNAC}_t + \gamma_6 EM_{\text{UP}}t + \gamma_7 EM_{\text{DN}}t + \xi_{t+1},$$  \hspace{1cm} (11)

$$EXTR_t = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 NOA_t + \gamma_3 \Delta RNOA_t + \gamma_4 \Delta NOA_t + \gamma_5 \Delta \text{ATO}_t + \gamma_6 \Delta \text{PM}_t + \gamma_7 \text{ABNAC}_t + \gamma_8 EM_{\text{UP}}t + \gamma_9 EM_{\text{DN}}t + \xi_{t+1}.$$  \hspace{1cm} (12)

We argue that firms manage earnings downward when they miss or beat analyst forecasts by a large amount (i.e., when the earnings surprise relative to the analyst forecast is large). We thus expect a negative coefficient on EM_UP and a positive coefficient on EM_DN. The estimation results are reported in table 8.
The results are consistent with our prediction for extreme earnings surprises. We find a significant negative coefficient on EM_UP, suggesting that as firms beat or miss the analyst forecast by a larger amount, they are less likely to report increases in profit margin and decreases in asset turnover. We also find a significant positive coefficient on EM_DN, suggesting that when firms beat or miss the analyst forecast by a large amount, they are more likely to report decreases in profit margin and increases in asset turnover. These findings are incremental to the relation between EXTR and the control variables, including abnormal accruals. Taken together, our results are consistent with firms managing earnings downward when earnings are far above or below analyst forecasts, and with contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover capturing upward (downward) earnings management, even after controlling for abnormal accruals.11

[Please place table 8 here]

4. Summary and Conclusions

In this study, we document that the sign-interaction between the change in profit margin and the change in asset turnover is informative about potential earnings management. We draw this conclusion based on the following findings. First, we show that the change in one-year-ahead profitability is lower (higher) for firms with contemporaneous increases (decreases) in

11 We also performed the analysis with an indicator variable equal to one if ABNAC is positive, and zero otherwise, instead of ABNAC; as well as an indicator variable equal to one if ΔNOA is positive, and zero otherwise, instead of ΔNOA. We investigated this alternative to assess the possibility that a continuous specification of ABNAC and ΔNOA contain more noise than the indicator variables EM_UP and EM_DN, and that the incongruent variable specifications bias against finding results for ABNAC and ΔNOA. The results using the indicator variables for
profit margin and decreases (increases) in asset turnover. Second, we show that firms that meet or just beat analyst forecasts are more (less) likely to report contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover. Finally, we show that firms that beat or miss analyst forecasts by a large amount are less (more) likely to report contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover.

Relying on the notion that (1) earnings management at least partly reverses in the next year, (2) firms that meet or just beat analyst forecasts are more likely to have managed earnings upward, and (3) firms that beat or miss analyst forecasts by a large amount are more likely to have managed earnings downward, these findings provide support for the argument that firms with contemporaneous increases in profit margin and decreases in asset turnover are more likely to have managed earnings upward, while firms with contemporaneous decreases in profit margin and increases in asset turnover are more likely to have managed earnings downward. In each of our analyses, we document that the sign-interaction between the change in profit margin and the change in asset turnover provides incremental information over a set of control variables, including abnormal accruals.

The results contribute to the academic earnings management literature (Schipper, 1989; Healy and Wahlen, 1999) by identifying a signal of earnings management, especially when there is no obvious incentive for management to manipulate earnings. Prior research has attempted to identify signals of, and proxies for, earnings management. We document that the sign-interaction

ABNAC and ∆NOA, however, are similar to those reported in table 8.
between the change in profit margin and the change in asset turnover is incremental to a widely used proxy for earnings management: abnormal accruals. In particular, we note that in our sample, the sign-interaction between the change in asset turnover and the change in profit margin identifies firms that meet or just beat analyst forecasts, while abnormal accruals does not.

The paper also contributes to the research on predicting future profitability. Prior research (Fairfield and Yohn, 2001; Soliman, 2005) shows that decomposing the change in RNOA into the change in asset turnover and the change in profit margin provides information for predicting the change in return on assets one year ahead. The results in this study contribute to the research by suggesting that the interaction between the sign of the change in these two ratios provides incremental information over these ratios for predicting future profitability and for identifying earnings management.

Finally, the results provide practitioners with a simple and comprehensive method to detect possible earnings management. This is especially relevant since changes in profit margin and changes in asset turnover are frequently evaluated as part of standard financial statement analysis, and are the building blocks to the popular DuPont analysis. The results should, therefore, benefit both teachers and practitioners of financial statement analysis. The results may also be useful for audit committees. Recommendation 8 of the Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees requires a company’s outside auditor to probe the quality, not just the acceptability, of a company’s accounting principles as they are applied. In response, the Auditing Standards Board amended SAS No. 61 to require auditors to engage the audit committee in an assessment of earnings quality. It goes on to say
that “objective criteria have not been developed to aid in the consistent evaluation of the quality of an entity’s accounting measurements and disclosures.” The results of this study suggest that the sign-interaction between the change in profit margin and the change in asset turnover may provide a useful signal of earnings management, and, therefore, earnings quality.
References


Table 1
Descriptive statistics

This table reports the mean, standard deviation (Std Dev), first quartile (Q1), median, and third quartile (Q3) of the following variables: change in profit margin (ΔPM\textsubscript{t}), change in asset turnover (ΔATO\textsubscript{t}), return on net operating assets (RNOA\textsubscript{t}), the change in return on net operating assets (ΔRNOA\textsubscript{t}), net operating assets (NOA\textsubscript{t}), the change in net operating assets (ΔNOA\textsubscript{t}), abnormal accruals (ABNAC\textsubscript{t}), the change in return on net operating assets one-year-ahead (ΔRNOA\textsubscript{t+1}), and indicator variables for firm-years with increases in profit margin and decreases in asset turnover (EM\textsubscript{UP}) and for firm-years with decreases in profit margin and increases in asset turnover (EM\textsubscript{DN}). The sample consists of 57,788 firm-year observations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔPM\textsubscript{t}</td>
<td>0.007</td>
<td>0.281</td>
<td>-0.027</td>
<td>0.000</td>
<td>0.025</td>
</tr>
<tr>
<td>ΔATO\textsubscript{t}</td>
<td>0.082</td>
<td>1.311</td>
<td>-0.211</td>
<td>0.023</td>
<td>0.274</td>
</tr>
<tr>
<td>RNOA\textsubscript{t}</td>
<td>0.073</td>
<td>0.450</td>
<td>0.010</td>
<td>0.123</td>
<td>0.238</td>
</tr>
<tr>
<td>ΔRNOA\textsubscript{t}</td>
<td>-0.007</td>
<td>0.303</td>
<td>-0.074</td>
<td>-0.001</td>
<td>0.062</td>
</tr>
<tr>
<td>NOA\textsubscript{t}</td>
<td>0.812</td>
<td>1.272</td>
<td>0.312</td>
<td>0.479</td>
<td>0.762</td>
</tr>
<tr>
<td>ΔNOA\textsubscript{t}</td>
<td>0.139</td>
<td>0.466</td>
<td>-0.057</td>
<td>0.062</td>
<td>0.216</td>
</tr>
<tr>
<td>ABNAC\textsubscript{t}</td>
<td>0.005</td>
<td>0.218</td>
<td>-0.060</td>
<td>0.002</td>
<td>0.064</td>
</tr>
<tr>
<td>ΔRNOA\textsubscript{t+1}</td>
<td>-0.013</td>
<td>0.342</td>
<td>-0.075</td>
<td>-0.001</td>
<td>0.062</td>
</tr>
<tr>
<td>EM\textsubscript{UP}</td>
<td>0.182</td>
<td>0.386</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EM\textsubscript{DN}</td>
<td>0.213</td>
<td>0.409</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ΔPM\textsubscript{t} = (operating incom\textsubscript{e} /sales\textsubscript{e} (Compustat data item #12); where:
operating incom\textsubscript{e} = sales\textsubscript{e} (#12) – (cost of goods sold (#41) + selling, general and administrative expenses (#189) + depreciation and amortization expense (#14));
ΔATO\textsubscript{t} = (sales\textsubscript{t} (Compustat data item #12)/net operating assets\textsubscript{t}) – (sales\textsubscript{t-1}/net operating assets\textsubscript{t-1}); where
net operating assets\textsubscript{t} = net assets\textsubscript{t} (#216) – net financial assets\textsubscript{t}; and
net financial assets\textsubscript{t} = cash and short term investments (#1) – interest – bearing liabilities\textsubscript{t} (#34 + #9).
RNOA\textsubscript{t} = operating incom\textsubscript{e}/average net operating assets\textsubscript{t}; where
average net operating assets\textsubscript{t} = (net operating assets\textsubscript{t} + net operating assets\textsubscript{t-1})/2;
ΔRNOA\textsubscript{t} = RNOA\textsubscript{t} – RNOA\textsubscript{t-1}.
NOA\textsubscript{t} = net operating assets\textsubscript{t}/sales\textsubscript{t}
ΔNOA\textsubscript{t} = (net operating assets\textsubscript{t} – net operating assets\textsubscript{t-1})/net operating assets\textsubscript{t-1};
ΔRNOA\textsubscript{t+1} = (RNOA\textsubscript{t+1} – RNOA\textsubscript{t});
ABNACₜ = the fitted residual from the Jones (1991) model. The Jones (1991) model we estimate is:

\[
\frac{TACₜ}{TAₜ₋₁} = a₁(1/TAₜ₋₁) + a₂(\Delta REVₜ / TAₜ₋₁) + a₃(PPEₜ / TAₜ₋₁) + eₜ,
\]

where \( TAₜ₋₁ \) = total assets \(_{t-1}\) (#6),
\( \Delta REVₜ \) = changes in sales \(_{t} (#12)\), and
\( PPEₜ \) = gross property, plant and equipment \(_{t} (#7)\).

TACₜ = income before extraordinary items \(_{t} (#18)\) – cash from operations \(_{t} \); where all above variables are deflated by total assets \(_{t-1}\) (#6); in firm-years 1988 and forward, cash from operations \(_{t} \) is defined as net cash flow from operating activities reported under SFAS No. 95 (#308); and where in firm-years prior to 1988, when Compustat data item #308 is unavailable, cash from operations \(_{t} \) = funds from operations \(_{t} (#110)\) – change in current assets \(_{t} (#4)\) + change in cash and short-term investments \(_{t} (#1)\) + change in current liabilities \(_{t} (#5)\) – change in short term debt \(_{t} (#34)\).

EM_UP = 1 if \( \Delta PMₜ > 0 \) and \( \Delta ATOₜ < 0 \), and zero otherwise.

EM_DN = 1 if \( \Delta PMₜ < 0 \) and \( \Delta ATOₜ > 0 \), and zero otherwise.
Table 2
A comparison of firms with EM_UP, EM_DN and all other firms

This table compares characteristics for firm-year observations with EM_UP, EM_DN and all other observations. Panel A reports the mean and median of the variables in our study. Medians are reported in parentheses. The final three columns of Panel A report t-statistics (z-statistics) for a comparison of the mean (median) between the groups. Panel B reports the percentage of observations with EM_UP, EM_DN and other, by industry.

*Panel A: Comparing Financial Characteristics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>EM_UP</th>
<th>EM_DN</th>
<th>All Other</th>
<th>EM_UP vs EM_DN</th>
<th>EM_UP vs Other</th>
<th>EM_DN vs Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆PM</td>
<td>0.080</td>
<td>-0.087</td>
<td>0.017</td>
<td>57.62</td>
<td>22.94</td>
<td>-41.29</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(-0.022)</td>
<td>(0.002)</td>
<td>(139.92)</td>
<td>(50.54)</td>
<td>(-75.09)</td>
</tr>
<tr>
<td>∆ATO</td>
<td>-0.632</td>
<td>0.642</td>
<td>0.100</td>
<td>-79.90</td>
<td>-58.72</td>
<td>39.27</td>
</tr>
<tr>
<td></td>
<td>(-0.229)</td>
<td>(0.208)</td>
<td>(0.026)</td>
<td>(-139.92)</td>
<td>(-76.98)</td>
<td>(55.76)</td>
</tr>
<tr>
<td>PM</td>
<td>0.038</td>
<td>-0.079</td>
<td>-0.042</td>
<td>19.79</td>
<td>17.86</td>
<td>-6.60</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.034)</td>
<td>(0.057)</td>
<td>(35.84)</td>
<td>(20.67)</td>
<td>(-23.09)</td>
</tr>
<tr>
<td>ATO</td>
<td>2.789</td>
<td>3.157</td>
<td>2.671</td>
<td>-9.74</td>
<td>4.14</td>
<td>15.25</td>
</tr>
<tr>
<td></td>
<td>(2.131)</td>
<td>(2.260)</td>
<td>(2.011)</td>
<td>(-5.95)</td>
<td>(7.24)</td>
<td>(13.88)</td>
</tr>
<tr>
<td>RNOA</td>
<td>0.179</td>
<td>-0.019</td>
<td>0.073</td>
<td>33.99</td>
<td>22.73</td>
<td>-18.94</td>
</tr>
<tr>
<td></td>
<td>(0.177)</td>
<td>(0.079)</td>
<td>(0.122)</td>
<td>(39.34)</td>
<td>(26.53)</td>
<td>(-22.65)</td>
</tr>
<tr>
<td>∆RNOA</td>
<td>0.111</td>
<td>-0.125</td>
<td>-0.001</td>
<td>64.84</td>
<td>34.05</td>
<td>-44.28</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(-0.041)</td>
<td>(0.008)</td>
<td>(86.51)</td>
<td>(24.58)</td>
<td>(-47.50)</td>
</tr>
<tr>
<td>NOA</td>
<td>0.791</td>
<td>0.694</td>
<td>0.860</td>
<td>6.34</td>
<td>-4.88</td>
<td>-14.27</td>
</tr>
<tr>
<td></td>
<td>(0.469)</td>
<td>(0.443)</td>
<td>(0.497)</td>
<td>(5.95)</td>
<td>(-7.24)</td>
<td>(-13.88)</td>
</tr>
<tr>
<td>∆NOA</td>
<td>0.429</td>
<td>-0.076</td>
<td>0.127</td>
<td>76.77</td>
<td>46.11</td>
<td>-63.19</td>
</tr>
<tr>
<td></td>
<td>(0.225)</td>
<td>(-0.039)</td>
<td>(0.060)</td>
<td>(83.99)</td>
<td>(58.80)</td>
<td>(-47.89)</td>
</tr>
<tr>
<td>ABNAC</td>
<td>0.061</td>
<td>-0.047</td>
<td>0.006</td>
<td>37.60</td>
<td>21.83</td>
<td>-24.86</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(-0.030)</td>
<td>(0.003)</td>
<td>(51.21)</td>
<td>(31.58)</td>
<td>(-31.89)</td>
</tr>
</tbody>
</table>
### Panel B: EM_UP, EM_DN and “Other” by Industry

<table>
<thead>
<tr>
<th>Industry by first digit of SIC code</th>
<th>n</th>
<th>EM_UP</th>
<th>EM_DN</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Agriculture and fishing</td>
<td>204</td>
<td>16.2%</td>
<td>21.1%</td>
<td>62.7%</td>
</tr>
<tr>
<td>1 Extraction and construction</td>
<td>5,351</td>
<td>16.4%</td>
<td>19.5%</td>
<td>64.1%</td>
</tr>
<tr>
<td>2 Commodity production</td>
<td>10,740</td>
<td>18.0%</td>
<td>20.8%</td>
<td>61.2%</td>
</tr>
<tr>
<td>3 Manufacturing</td>
<td>22,519</td>
<td>17.4%</td>
<td>19.4%</td>
<td>63.2%</td>
</tr>
<tr>
<td>4 Utilities and transportation</td>
<td>2,642</td>
<td>17.6%</td>
<td>24.6%</td>
<td>57.8%</td>
</tr>
<tr>
<td>5 Wholesale and retail</td>
<td>9,425</td>
<td>21.3%</td>
<td>24.7%</td>
<td>53.9%</td>
</tr>
<tr>
<td>7 Business services and entertainment</td>
<td>5,044</td>
<td>19.4%</td>
<td>23.4%</td>
<td>57.3%</td>
</tr>
<tr>
<td>8 Health and other services</td>
<td>1,320</td>
<td>18.2%</td>
<td>24.7%</td>
<td>57.1%</td>
</tr>
<tr>
<td>9 Public administration</td>
<td>543</td>
<td>14.0%</td>
<td>23.4%</td>
<td>62.6%</td>
</tr>
<tr>
<td>total</td>
<td>57,788</td>
<td>18.2%</td>
<td>21.3%</td>
<td>60.5%</td>
</tr>
</tbody>
</table>

All differences in panel A are significant at the 1% level (two-tailed).
See Table 1 for variable definitions.
Table 3
Correlations

This table reports the Pearson correlation coefficients between the following variables: change in profit margin ($\Delta$PM$_t$), change in asset turnover ($\Delta$ATO$_t$), return on net operating assets ($\text{RNOA}_t$), the change in return on net operating assets ($\Delta$RNOA$_t$), net operating assets ($\text{NOA}_t$), the change in net operating assets ($\Delta$NOA$_t$), abnormal accruals ($\text{ABNAC}_t$), the change in return on net operating assets one-year-ahead ($\Delta$RNOA$_{t+1}$), and indicator variables for firm-years with increases in profit margin and decreases in asset turnover (EM_UP) and for firm-years with decreases in profit margin and increases in asset turnover (EM_DN). The sample consists of 57,788 firm-year observations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\Delta$PM$_t$</th>
<th>$\Delta$ATO$_t$</th>
<th>$\text{RNOA}_t$</th>
<th>$\Delta$RNOA$_t$</th>
<th>$\text{NOA}_t$</th>
<th>$\Delta$NOA$_t$</th>
<th>$\text{ABNAC}_t$</th>
<th>$\Delta$RNOA$_{t+1}$</th>
<th>EM_UP$_t$</th>
<th>EM_DN$_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta$PM$_t$</td>
<td>1.00</td>
<td>0.084</td>
<td>0.047</td>
<td>0.493</td>
<td>-0.057</td>
<td>0.100</td>
<td>0.043</td>
<td>-0.023</td>
<td>0.123</td>
<td>-0.173</td>
</tr>
<tr>
<td>$\Delta$ATO$_t$</td>
<td>1.00</td>
<td>-0.114</td>
<td>0.098</td>
<td>-0.074</td>
<td>-0.559</td>
<td>-0.218</td>
<td>0.102</td>
<td>-0.257</td>
<td>0.222</td>
<td></td>
</tr>
<tr>
<td>$\text{RNOA}_t$</td>
<td>1.00</td>
<td>0.262</td>
<td>0.113</td>
<td>0.062</td>
<td>-0.224</td>
<td>0.112</td>
<td>-0.106</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta$RNOA$_t$</td>
<td>1.00</td>
<td>0.002*</td>
<td>0.115</td>
<td>0.039</td>
<td>-0.058</td>
<td>0.184</td>
<td>-0.203</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{NOA}_t$</td>
<td>1.00</td>
<td>0.094</td>
<td>-0.003</td>
<td>0.000†</td>
<td>-0.008</td>
<td>-0.048</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta$NOA$_t$</td>
<td>1.00</td>
<td>0.243</td>
<td>-0.090</td>
<td>0.294</td>
<td>-0.240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{ABNAC}_t$</td>
<td>1.00</td>
<td>-0.061</td>
<td>0.122</td>
<td>-0.124</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta$RNOA$_{t+1}$</td>
<td>1.00</td>
<td>-0.061</td>
<td>0.050</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EM_UP$_t$</td>
<td>1.00</td>
<td>-0.246</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EM_DN$_t$</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* indicates that the correlation coefficient estimate is not significantly different from zero at conventional levels (two-tailed). All remaining correlation coefficient estimates are significantly different from zero at the 1% level (two-tailed). See Table 1 for variable definitions.
Table 4
The association between the one-year-ahead change in RNOA and the interaction between the sign of the change in profit margin and the change in asset turnover.

This table reports estimation results from the following models:

\[ \Delta \text{RNOA}_{t+1} = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \xi_{t+1}, \]  

\[ \Delta \text{RNOA}_{t+1} = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \text{EM UP}_t + \gamma_6 \text{EM DN}_t + \xi_{t+1}, \]  

\[ \Delta \text{RNOA}_{t+1} = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \text{ABNAC}_t + \gamma_6 \text{EM UP}_t + \gamma_7 \text{EM DN}_t + \xi_{t+1}, \]  

\[ \Delta \text{RNOA}_{t+1} = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \Delta \text{ATO}_t + \gamma_6 \Delta \text{PM}_t + \gamma_7 \text{ABNAC}_t + \gamma_8 \text{EM UP}_t + \gamma_9 \text{EM DN}_t + \xi_{t+1}. \]  

The models provide insight as to whether contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover provide incremental information for identifying reversals in one-year-ahead return on net operating assets. The models are estimated using pooled regression, on 57,788 firm-year observations. T-statistics are reported in parentheses.

<table>
<thead>
<tr>
<th>Model</th>
<th>Intercept</th>
<th>RNOA</th>
<th>NOA</th>
<th>ΔRNOA</th>
<th>ΔNOA</th>
<th>ΔATO</th>
<th>ΔPM</th>
<th>ABNAC</th>
<th>EM_UP</th>
<th>EM_DN</th>
<th>Adj.R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0129***</td>
<td>-0.1707***</td>
<td>-0.0085***</td>
<td>0.0087***</td>
<td>-0.0458***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.55%</td>
</tr>
<tr>
<td></td>
<td>(7.51)</td>
<td>(-52.52)</td>
<td>(-7.69)</td>
<td>(1.84)</td>
<td>(-15.20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.0139***</td>
<td>-0.1698***</td>
<td>-0.0086***</td>
<td>0.0137***</td>
<td>-0.0403***</td>
<td></td>
<td>0.0182***</td>
<td>0.0072**</td>
<td></td>
<td></td>
<td>5.60%</td>
</tr>
<tr>
<td></td>
<td>(6.73)</td>
<td>(-52.19)</td>
<td>(-7.75)</td>
<td>(2.81)</td>
<td>(-12.67)</td>
<td></td>
<td>(-4.72)</td>
<td>(2.02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.0137***</td>
<td>-0.1691***</td>
<td>-0.0088***</td>
<td>0.0132***</td>
<td>-0.0351***</td>
<td>-0.0511***</td>
<td>-0.0169***</td>
<td>0.0055</td>
<td></td>
<td></td>
<td>5.70%</td>
</tr>
<tr>
<td></td>
<td>(6.62)</td>
<td>(-52.01)</td>
<td>(-7.92)</td>
<td>(2.72)</td>
<td>(-10.82)</td>
<td>(-7.82)</td>
<td>(-4.40)</td>
<td>(1.54)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.0097***</td>
<td>-0.1667***</td>
<td>-0.0086***</td>
<td>0.0099†</td>
<td>-0.0147***</td>
<td>0.0143***</td>
<td>-0.0227***</td>
<td>-0.0444***</td>
<td>-0.0115***</td>
<td>-0.0002</td>
<td>5.90%</td>
</tr>
<tr>
<td></td>
<td>(4.57)</td>
<td>(-50.66)</td>
<td>(-7.74)</td>
<td>(1.76)</td>
<td>(-3.90)</td>
<td>(10.67)</td>
<td>(-3.94)</td>
<td>(-6.76)</td>
<td>(-2.96)</td>
<td>(-0.06)</td>
<td></td>
</tr>
</tbody>
</table>

***, **, and † - significantly different from zero at the 1%, 5% and 10% level, respectively (two-tailed).
See Table 1 for variable definitions.
Table 5
An examination of whether firms that meet or just beat analyst forecasts are more (less) likely to have contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover relative to other firms.

This table reports the percentage of firms with contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover for firm-year observations where the firm meets or just beats the analyst forecast of earnings. This analysis is in the spirit of Matsumoto (2002), who documents that firms manage earnings to meet or just beat analyst forecasts. In the context of our study, we thus expect that firm-year observations in which the firm meets or just beats the analyst forecast to have a higher (lower) percentage of contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover. We define firms that meet or just beat analyst forecasts to be those with earnings surprises greater than zero and less than $0.02.

<table>
<thead>
<tr>
<th></th>
<th>Firms that meet or just beat the consensus analyst forecast (MBE)</th>
<th>All Other Firms</th>
<th>Statistical significance of difference in means (top row) and medians (bottom row)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>3,769</td>
<td>12,862</td>
<td></td>
</tr>
<tr>
<td>Mean SURP</td>
<td>0.0064***</td>
<td>-0.1422***</td>
<td>-5.65***</td>
</tr>
<tr>
<td>Median SURP</td>
<td>0.0050***</td>
<td>-0.0100***</td>
<td>55.95***</td>
</tr>
<tr>
<td>Mean ΔATO</td>
<td>0.0012</td>
<td>0.0419***</td>
<td>-1.89*</td>
</tr>
<tr>
<td>Median ΔATO</td>
<td>0.0055</td>
<td>0.0060</td>
<td>-0.09</td>
</tr>
<tr>
<td>Mean ΔPM</td>
<td>0.0211***</td>
<td>-0.0014</td>
<td>6.12***</td>
</tr>
<tr>
<td>Median ΔPM</td>
<td>0.0039***</td>
<td>-0.0014***</td>
<td>13.95***</td>
</tr>
<tr>
<td>Mean ABNAC</td>
<td>0.0127***</td>
<td>0.0037*</td>
<td>2.21**</td>
</tr>
<tr>
<td>Median ABNAC</td>
<td>0.0063***</td>
<td>0.0006</td>
<td>3.06***</td>
</tr>
<tr>
<td>Mean NOA</td>
<td>0.6413***</td>
<td>0.7721***</td>
<td>-7.84***</td>
</tr>
<tr>
<td>Median NOA</td>
<td>0.4429***</td>
<td>0.4948***</td>
<td>-8.09***</td>
</tr>
<tr>
<td>Mean ΔNOA</td>
<td>0.2423***</td>
<td>0.1601***</td>
<td>9.42***</td>
</tr>
<tr>
<td>Median ΔNOA</td>
<td>0.1350***</td>
<td>0.0790***</td>
<td>12.43***</td>
</tr>
<tr>
<td>Mean EM_UP</td>
<td>0.2613***</td>
<td>0.1798***</td>
<td>10.29***</td>
</tr>
<tr>
<td>Mean EM_DN</td>
<td>0.1637***</td>
<td>0.2131***</td>
<td>-7.04***</td>
</tr>
</tbody>
</table>

***, ** and * - significantly different from zero at the 1%, 5% and 10% level, respectively (two-tailed).
SURP is defined as actual earnings less the median analyst forecast of earnings closest to the earnings announcement date. We define “extreme” earnings surprises as those in the extreme deciles of SURP.
See Table 1 for definitions of the other variables.
Table 6

The incremental contribution of the interaction between the sign of the change in profit margin and asset turnover for identifying firms that meet or just beat analyst forecasts.

This table reports the estimation results from the following models:

\[ \text{MBE}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \xi_{i+1}, \]  
\[ \text{MBE}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \text{EM_UP}_t + \gamma_6 \text{EM_DN}_t + \xi_{i+1}, \]  
\[ \text{MBE}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \text{ABNAC}_t + \gamma_6 \text{EM_UP}_t + \gamma_7 \text{EM_DN}_t + \xi_{i+1}, \]  
\[ \text{MBE}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \Delta \text{ATO}_t + \gamma_6 \Delta \text{PM}_t + \gamma_7 \text{ABNAC}_t + \gamma_8 \text{EM_UP}_t + \gamma_9 \text{EM_DN}_t + \xi_{i+1}. \]

where the dummy variable (MBE) equals one when a firm-year observation reports a zero or a small positive earnings surprise, and zero otherwise. The models provide insight as to whether contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover provide incremental information for identifying firm-year observations where the firm meets or just beats analyst forecasts. We estimate the models using logistic regression. Chi-square statistics are in parentheses. (n=13,333)

<table>
<thead>
<tr>
<th>Model</th>
<th>Intercept</th>
<th>RNOA</th>
<th>NOA</th>
<th>ΔRNOA</th>
<th>ΔNOA</th>
<th>ΔATO</th>
<th>ΔPM</th>
<th>ABNAC</th>
<th>EM_UP</th>
<th>EM_DN</th>
<th>Pseudo R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>-1.3786***</td>
<td>0.8350***</td>
<td>-0.0968***</td>
<td>0.3652***</td>
<td>0.3189***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.19%</td>
</tr>
<tr>
<td></td>
<td>(-2131.22)</td>
<td>(213.05)</td>
<td>(-15.76)</td>
<td>(26.69)</td>
<td>(64.21)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-1.3938***</td>
<td>0.8087***</td>
<td>-0.0943***</td>
<td>0.2967***</td>
<td>0.2296***</td>
<td></td>
<td></td>
<td></td>
<td>0.2538***</td>
<td>-0.10.38**</td>
<td>4.52%</td>
</tr>
<tr>
<td></td>
<td>(-1673.24)</td>
<td>(197.12)</td>
<td>(-14.83)</td>
<td>(16.94)</td>
<td>(28.73)</td>
<td></td>
<td></td>
<td></td>
<td>(27.80)</td>
<td>(-3.96)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>-1.3938***</td>
<td>0.8089***</td>
<td>-0.0943***</td>
<td>0.2967***</td>
<td>0.2291***</td>
<td></td>
<td></td>
<td>0.0053</td>
<td>0.2537***</td>
<td>-0.1037**</td>
<td>4.52%</td>
</tr>
<tr>
<td></td>
<td>(-1673.13)</td>
<td>(196.71)</td>
<td>(-14.83)</td>
<td>(16.94)</td>
<td>(27.39)</td>
<td></td>
<td></td>
<td></td>
<td>(0.01)</td>
<td>(27.75)</td>
<td>(-3.94)</td>
</tr>
<tr>
<td>8</td>
<td>-1.4242***</td>
<td>0.8344***</td>
<td>-0.0965***</td>
<td>0.0171</td>
<td>0.3151***</td>
<td>0.0900***</td>
<td>0.4439***</td>
<td>0.0305</td>
<td>0.2853***</td>
<td>-0.1175**</td>
<td>4.77%</td>
</tr>
<tr>
<td></td>
<td>(-1713.49)</td>
<td>(210.25)</td>
<td>(-15.66)</td>
<td>(0.04)</td>
<td>(37.39)</td>
<td>(16.82)</td>
<td>(12.09)</td>
<td>(0.11)</td>
<td>(34.12)</td>
<td>(-4.94)</td>
<td></td>
</tr>
</tbody>
</table>

***, **, and * - significantly different from zero at the 1%, 5% and 10% level, respectively (two-tailed).

See Table 1 for variable definitions.
Table 7
An examination of whether firms with extreme earnings surprises are more (less) likely to have contemporaneous decreases (increases) in profit margin and increases (decreases) in asset turnover relative to other firms.

This table reports the percentage of firms with contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover for firm-year observations where the firm has an earnings surprise in the top/bottom decile of earnings surprises. We expect that firm-year observations with extreme earnings surprises have a higher (lower) percentage of contemporaneous decreases (increases) in profit margin and increases (decreases) in asset turnover.

<table>
<thead>
<tr>
<th>Firms with extreme earnings surprises (in the top/bottom decile of earnings surprises)</th>
<th>Other firms</th>
<th>Statistical significance of difference in means (top) and medians (bottom) between extreme earnings surprises and “other firms”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>3,298</td>
<td>13,333</td>
</tr>
<tr>
<td>Mean SURP</td>
<td>-0.4589***</td>
<td>-0.0219***</td>
</tr>
<tr>
<td>Median SURP</td>
<td>0.0600***</td>
<td>0.0000***</td>
</tr>
<tr>
<td>Mean ΔATO</td>
<td>0.1233***</td>
<td>0.0102</td>
</tr>
<tr>
<td>Median ΔATO</td>
<td>0.0307***</td>
<td>-0.0009</td>
</tr>
<tr>
<td>Mean ΔPM</td>
<td>-0.0192***</td>
<td>0.0094***</td>
</tr>
<tr>
<td>Median ΔPM</td>
<td>-0.0060***</td>
<td>0.0010***</td>
</tr>
<tr>
<td>Mean ABNAC</td>
<td>-0.0147***</td>
<td>0.0107***</td>
</tr>
<tr>
<td>Median ABNAC</td>
<td>-0.0093***</td>
<td>0.0047***</td>
</tr>
<tr>
<td>Mean NOA</td>
<td>0.8454***</td>
<td>0.7170***</td>
</tr>
<tr>
<td>Median NOA</td>
<td>0.4957***</td>
<td>0.4790***</td>
</tr>
<tr>
<td>Mean ΔNOA</td>
<td>0.0910***</td>
<td>0.2004***</td>
</tr>
<tr>
<td>Median ΔNOA</td>
<td>0.0251***</td>
<td>0.1058***</td>
</tr>
<tr>
<td>Mean EM_UP</td>
<td>0.1437***</td>
<td>0.2118***</td>
</tr>
<tr>
<td>Mean EM_DN</td>
<td>0.2574***</td>
<td>0.1183***</td>
</tr>
</tbody>
</table>

***, ** ,and * - significantly different from zero at the 1%, 5% and 10% level, respectively (two-tailed).
SURP is defined as actual earnings less the median analyst forecast of earnings closest to the earnings announcement date.
See Table 1 for definitions of the other variables.
Table 8
The relation between extreme earnings surprises and the interaction between the sign of the change in profit margin and asset turnover.

This table reports the estimation results from the following models:

\[
\text{EXTR}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \xi_{t+1},
\]  

(9)

\[
\text{EXTR}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \text{EM} \_ \text{UP}_t + \gamma_6 \text{EM} \_ \text{DN}_t + \xi_{t+1},
\]  

(10)

\[
\text{EXTR}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \text{ABNAC}_t + \gamma_6 \text{EM} \_ \text{UP}_t + \gamma_7 \text{EM} \_ \text{DN}_t + \xi_{t+1},
\]  

(11)

\[
\text{EXTR}_t = \gamma_0 + \gamma_1 \text{RNOA}_t + \gamma_2 \text{NOA}_t + \gamma_3 \Delta \text{RNOA}_t + \gamma_4 \Delta \text{NOA}_t + \gamma_5 \Delta \text{ATO}_t + \gamma_6 \Delta \text{PM}_t + \gamma_7 \text{ABNAC}_t + \gamma_8 \text{EM} \_ \text{UP}_t + \gamma_9 \text{EM} \_ \text{DN}_t + \xi_{t+1}.
\]  

(12)

where the dummy variable (EXTR) equals one when a firm-year observation is in the extreme top or bottom decile of earnings surprise, and zero otherwise. The model provides insight into whether contemporaneous increases (decreases) in profit margin and decreases (increases) in asset turnover provide incremental information for identifying firm-year observations where the firms manage upward (downward). We expect that firms manage downward when they miss or beat analyst forecasts by a large amount; therefore, we expect a negative (positive) coefficient on EM_UP (EM_DN). We estimate the models using logistic regression. Chi-square statistics are in parentheses. (n=13,333)

<table>
<thead>
<tr>
<th>Model</th>
<th>Intercept</th>
<th>RNOA</th>
<th>NOA</th>
<th>ΔRNOA</th>
<th>ΔNOA</th>
<th>ΔATO</th>
<th>ΔPM</th>
<th>ABNAC</th>
<th>EM_UP</th>
<th>EM_DN</th>
<th>Pseudo R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>-1.3092***</td>
<td>-0.6961***</td>
<td>0.0836***</td>
<td>-0.2326**</td>
<td>-0.967***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.01%</td>
</tr>
<tr>
<td></td>
<td>(-2644.97)</td>
<td>(258.87)</td>
<td>(21.98)</td>
<td>(10.75)</td>
<td>(119.66)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>-1.3364***</td>
<td>-0.6818***</td>
<td>0.0845***</td>
<td>-0.1758**</td>
<td>-0.5107***</td>
<td></td>
<td></td>
<td></td>
<td>-0.1450**</td>
<td>0.1761***</td>
<td>5.22%</td>
</tr>
<tr>
<td></td>
<td>(-1894.59)</td>
<td>(251.14)</td>
<td>(22.47)</td>
<td>(6.05)**</td>
<td>(81.41)</td>
<td></td>
<td></td>
<td></td>
<td>(6.19)</td>
<td>(12.69)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>-1.3392***</td>
<td>-0.6799***</td>
<td>0.0843***</td>
<td>-0.1735**</td>
<td>-0.4856***</td>
<td></td>
<td></td>
<td>-0.2254***</td>
<td>-0.1421**</td>
<td>0.1700***</td>
<td>5.27%</td>
</tr>
<tr>
<td></td>
<td>(-1899.70)</td>
<td>(249.69)</td>
<td>(22.34)</td>
<td>(5.90)**</td>
<td>(71.97)</td>
<td></td>
<td></td>
<td>(5.58)</td>
<td>(5.94)</td>
<td>(11.79)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-1.2947***</td>
<td>-0.7359***</td>
<td>0.0747***</td>
<td>-0.0019</td>
<td>-0.6467***</td>
<td>-0.1124***</td>
<td>-0.1999**</td>
<td>-0.2507***</td>
<td>-0.1636***</td>
<td>0.1874***</td>
<td>5.57%</td>
</tr>
<tr>
<td></td>
<td>(-1654.89)</td>
<td>(273.57)</td>
<td>(16.81)</td>
<td>(0.01)</td>
<td>(90.24)</td>
<td>(-23.33)</td>
<td>(-4.92)</td>
<td>(-6.77)</td>
<td>(7.79)</td>
<td>(14.04)</td>
<td></td>
</tr>
</tbody>
</table>

***, **, and * - significantly different from zero at the 1%, 5% and 10% level, respectively (two-tailed). See Table 1 for variable definitions.