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NEW EVIDENCE ON THE SUBSTITUTION BETWEEN ACCRUAL EARNINGS MANAGEMENT AND REAL EARNINGS MANAGEMENT IN UNITED STATES FIRMS

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ABSTRACT

This paper provides new evidence on the relation between accumulated accrual earnings management (AEM) and current real earnings management (REM) using new, more intuitive measures. It also investigates the time-series properties of REM and constructs a meaningful measure of accumulated REM to explore the relation between accumulated REM and current AEM. The results show that REM, like AEM, tends to reverse over time, and that while constraints on the ability to use AEM are associated with a shift toward REM, constraints on the ability to use REM are not associated with a shift toward AEM.

JEL: M40, M41

KEYWORDS: Earnings Management, Discretionary Accruals, Real Earnings Management

INTRODUCTION

In this paper, we examine the time-series properties of real earnings management (REM) and introduce new, more intuitive measures of cumulative accrual earnings management (AEM) and cumulative REM in a sample of United States (US) firms. We then use these measures to examine the bi-directional substitution between these two earnings management methods. We find that REM, like AEM, displays a strong pattern of reversal over subsequent periods, and that managers shift toward REM when accumulated AEM is high, but not vice versa. Walker (2013, 446) defines earnings management (EM) as "the use of managerial discretion over (within GAAP) accounting choices, earnings reporting choices, and real economic decisions to influence how underlying economic events are reflected in one or more measures of earnings." Surveys of Chief Financial Officers (CFOs) indicate that EM is more widespread than previously thought (Graham, Harvey, and Rajgopal, 2005, 2006, Dichev, Graham, Harvey, and Rajgopal, 2013, 2016). While EM can be used to boost earnings in a single period, it is not a sustainable strategy over time. The benefits of prior EM tend to reverse over future periods, and firms' ability to manage earnings using any given tool is limited. Earnings can be managed using (among other strategies) accruals or real activities (Schipper, 1989, Healy and Whalen, 1999, Xu, Taylor, and Dugan, 2007, Dechow, Ge, and Schrand, 2010, Walker, 2013). Under accrual-basis accounting, accruals necessarily reverse in future periods (Baber, Kang, and Li, 2011, Dechow, Hutton, Kim, and Sloan, 2012). The same is not true for REM, but REM may reverse over time as well. The three most commonly studied measures of REM (Roychowdhury, 2006) are excessive production of inventory, abnormal cuts to discretionary spending, and reduced abnormal cash flow from operations. While excessive production in one period does not necessarily mechanically reduce the ability to overproduce in the future, it may very well make excessive production less attractive and harder to justify (to boards, investors, and auditors, etc.) in future periods as inventory accumulates. Similarly, managers cannot make cuts to discretionary spending or allow cash flow from operations to decrease *ad infinitum* without negatively affecting firm performance. On the other hand, negative

implications for future firm performance are inherent in the definition of EM. It is unlikely that managers can continue to use REM costlessly, but it is possible that reporting negative earnings, missing analyst expectations, or other motivations for managing earnings are even more costly than continuing to use REM. Managers may be able to "kick the can down the road" indefinitely, and financial statement users may perceive "abnormal" levels of production, discretionary spending, or cash flow from operations as normal for a firm that consistently relies on REM. Thus, whether REM reverses over time remains an empirical question. Reversals of prior EM choices are important because they can influence EM choices in current and future periods. If prior-period discretionary accruals have accumulated and not yet reversed, managers' ability to use AEM in the current period becomes constrained (Baber, Kang, and Li, 2011, Barton and Simko, 2002). When managers reach a cap at which they can no longer use their preferred method of managing earnings (i.e., when accumulated EM of one type is high), they may shift to another form. Prior literature has found that managers shift toward REM when accumulated AEM is high (Ho, Li, and Ouyang, 2012), but it has not examined whether they shift toward AEM when accumulated REM is high. Without an understanding of whether REM should be expected to reverse over time, it is not clear *ex ante* whether a measure of accumulated REM would be meaningful. Thus, we begin by examining the time-series properties of REM and find that all three REM measures display significant patterns of reversal over time.

Next, we proxy for limitations on firms' ability to use AEM and REM in the current period by estimating their cumulative levels over prior periods. Using the modified Jones (1991) model, we estimate a measure of accumulated AEM that is more intuitive and direct than those used in prior research by summing discretionary accruals by firm across the time series for which the firm appears in our sample (excluding the current period). We show that this measure outperforms measures of past AEM from prior literature. To measure REM, we follow Roychowdhury (2006) in estimating abnormal production, discretionary expenses, and cash flow from operations. We then measure accumulated REM by summing these values over time for each firm, excluding the current period. Using our novel measures, we confirm the result from prior literature that accumulated AEM is associated with a shift toward REM in the current period. Our measure of accumulated AEM is associated with REM even when the measure from prior literature is included, indicating that it contains additional information.

We then investigate whether accumulated REM is associated with a shift toward AEM in the current period and find that it is not. Taken together, these findings suggest that managers shift toward REM when necessary, but all else being equal, would prefer to use AEM. Our study contributes to the existing literature in several ways. First, by investigating the time-series properties of REM, we provide insight on whether the ability to manage earnings through REM is unlimited, or if REM behaves analogously to AEM (albeit for different reasons). Second, we introduce a direct measure of cumulative discretionary accruals as a proxy for past AEM activity. This measure offers a more direct and intuitive way to estimate prior AEM activity compared to existing measures in the literature. Our measure does not rely on articulation between the income statement and the balance sheet and, by construction, captures the reversals of prior-period accruals, which prior literature has shown to affect the ability to use AEM. Our empirical design offers a more realistic multi-period model and results in inferences that generalize beyond just "suspicious" (potentially managed) firm-years. Our results reveal that existing measures of AEM constraints are not significantly related to REM activity when our more direct measure is included. Third, we also introduce a direct measure of cumulative REM as a proxy for past REM activity. To our knowledge, we are the first to examine cumulative levels of REM. Fourth, these measures allow us to examine not only the relation between accumulated AEM and current REM, but also the relation between accumulated REM and current AEM. From these relations, we provide evidence on managers' preference for AEM vs. REM by showing that there is no shift toward AEM when accumulated REM is high. The remainder of this study is organized as follows. In the next section, we provide a literature review and develop our research questions. The third section provides details on our sample selection procedures and research design. The fourth section reports the results, while in the fifth section we present the results of our robustness tests. We conclude in section six.

LITERATURE REVIEW AND RESEARCH QUESTIONS

Several definitions of EM exist in the prior literature. A recent definition states that EM is "the use of managerial discretion over (within GAAP) accounting choices, earnings reporting choices, and real economic decisions to influence how underlying economic events are reflected in one or more measures of earnings" (Walker, 2013, 446). In contrast to previous definitions, this definition is deliberately broad and does not presume all EM is bad but rather focuses on "legal accounting and economic choices that do not amount to fraudulent violations of generally accepted accounting principles (GAAP)" (Walker, 2013, 446). Arya, Glover, and Sunder (1998, 2003) show that EM can exist in equilibrium. A number of studies examine the decision to use AEM versus REM and the multitude of factors that can influence this decision (see, for example, Barton and Simko, 2002, Cohen, Dey, and Lys, 2008, Cohen and Zarowin, 2010, Badertscher, 2011, Ho et al., 2012, Zang, 2012, Wongsunwai, 2013, Chan, Chen, Chen, and Yu, 2015, Kothari, Mizik, and Roychowdhury, 2016, Ahmed, Duellman, and Grady, 2018, Cassell, Doucet, Johnson, and Myers, 2019, Cunningham, Johnson, Johnson, and Lisic, 2020).

Prior literature has also noted that the ability to manage earnings using accruals depends not only on the level of AEM in prior periods, but also on the reversal of prior accruals. Baber, Kang, and Li (2011, 1190) show that the ability to manage earnings through accruals is related to the speed at which prior accruals reverse, noting "earnings manipulations can accumulate on the balance sheet, creating a bank of cumulative discretionary accruals that carries forward into future periods and constrains the ability to manage future income when prior discretionary accruals eventually reverse back to the income statement." DeFond and Park (2001) suggest that abnormal accruals are particularly unlikely to be sustained. Beneish (1997) provides evidence that managers use EM to avoid the reversal of prior income-increasing accruals. Barton and Simko (2002, 2) note that "managers' generous assumptions about recognition and measurement in one period reduce their ability to make equally generous assumptions in later periods, if managers want to stay within the guidance provided by accounting regulators and professional groups."

Several prior papers have examined the substitution between AEM and REM. Barton and Simko (2002) use the level of net assets as a proxy for previous AEM activity, as the balance sheet accumulates the effects of prior accounting choices. As such, it becomes inflated as firms manage earnings upward and should reflect the cumulative level of prior-period AEM. This phenomenon is referred to as "bloated balance sheet" by Ho et al. (2012). Barton and Simko (2002) posit that higher levels of cumulative AEM in prior periods limit managers' ability to use AEM to inflate earnings in the future and show that this constraint is associated with less positive or more negative earnings surprises. Following Barton and Simko (2002), Ho et al. (2012) use the beginning balance of net operating assets relative to sales as a proxy for past use of AEM and show that this constraint on AEM is associated with greater use of REM in the current period. Cunningham et al. (2020) report that while total EM (defined as the sum of AEM and REM) is unchanged after the receipt of a Securities and Exchange Commission (SEC) comment letter, managers switch to REM upon coming under greater scrutiny by the SEC, indicating that "higher REM acts as a substitute for lower AEM." Other studies have examined the preference for AEM versus REM. Cohen et al. (2008), Ho et al. (2012), and Kothari et al. (2016) suggest that AEM is less costly than and thus preferred over REM, while Graham et al. (2005, 2006) report that managers prefer REM over AEM but caution that managerial opinions and actions may not coincide. Zang (2012) suggests that managers use AEM only to the extent that they have exhausted their ability to use REM, since AEM can be performed at the end of the period, whereas REM typically occurs throughout the period. Cohen and Zarowin (2010) report that performance after seasoned equity offerings suffers more when managers have used REM than when they have used AEM. In this study, we examine the time-series properties of REM to assess whether there is a logical foundation for examining accumulated REM. We then examine the substitution between AEM and REM in new ways. Using novel, more intuitive measures of cumulative AEM and cumulative REM, we examine the following research questions:

RQ1: Does REM reverse in subsequent periods?
RQ2: Is accumulated AEM associated with REM in the current period?
RQ3: Is accumulated REM associated with AEM in the current period?

DATA AND METHODOLOGY

Accrual Earnings Management (AEM)

While prior papers have used measures of the overstatement of net assets to capture accumulated AEM, we estimate a more straightforward and direct measure that we argue outperforms measures of "bloated balance sheet." As noted by Baber et al. (2011) and Dechow, Hutton, Kim, and Sloan (2012), the structure of double-entry accounting necessarily causes accruals to reverse in future periods. Thus, the ability to use AEM in the current period depends on not only the level of AEM in prior periods, but also the extent to which prior accruals have reversed. Accordingly, we directly examine firms' cumulative level of discretionary accruals, which by construction incorporates the reversals of prior accruals. Our proxy for accumulated AEM is the cumulative total of discretionary accruals over the entire time series for which the firm appears in our sample, excluding the current period. Cumulative discretionary accruals for firm *i* in period *t* are measured as the sum of firm *i*'s discretionary accruals from period *1* to period *t-1*:

$$cum\_da_{it} = \sum_{1}^{t-1} da_i \quad (1)$$

Discretionary accruals are measured based on a modified Jones (1991) model (based on DeFond and Park 1997), estimated at the 2-digit Standard Industrial Classification (SIC) code industry-year level:

$$\frac{TA_{it}}{assets_{it-1}} = \propto_0 + \propto_1 \frac{1}{assets_{it-1}} + \propto_2 \frac{\Delta revenue_{it} - \Delta AR_{it}}{assets_{it-1}} + \propto_3 \frac{PPE_{it}}{assets_{it-1}} + \varepsilon \quad (2)$$

where TA_{it} is total accruals, measured as income before extraordinary items minus operating cash flows; $assets_{it-1}$ is lagged total assets; $\Delta revenue_{it}$ is the change in revenue from period *t-1* to *t;* ΔAR_{it} is the change in accounts receivable from period *t-1* to *t;* and PPE_{it} is gross property, plant, and equipment. Discretionary accruals (da_{it}) are calculated as the difference between the reported value for total accruals and the fitted value of total accruals based on the coefficient estimates from equation (2).

Real Earnings Management (REM)

Our measures of real EM are based on Roychowdhury (2006), which focuses on three potential manipulations of real activities:

Firms may increase production, thereby spreading fixed overhead costs over a larger number of units and reducing the per unit cost. This decreases the cost of goods sold and increases earnings.

Firms may decrease discretionary expenditures such as advertising; research and development; and selling, general, and administrative expenses to increase current earnings.

Firms may temporarily increase sales by offering price discounts or relaxing credit terms. Though this will boost earnings in the current period, it will decrease cash flows.

Following Roychowdhury (2006), we estimate normal levels of production, discretionary expenses, and cash flow from operations and interpret any deviation from these normal levels as evidence of REM. We estimate the following regressions at the (2-digit SIC) industry-year level. Our three measures of REM are the residuals from each equation. For the second and third measures, the residuals are multiplied by negative

one so that in each case, a larger value for the measure can be interpreted as a higher level of REM:

$$production_{it} = \propto_0 + \propto_1 \frac{1}{assets_{it-1}} + \propto_2 \frac{sales_{it}}{assets_{it-1}} + \propto_3 \frac{\Delta sales_{it}}{assets_{it-1}} + \varepsilon \quad (3)$$

where $production_{it}$ is defined as the cost of goods sold plus the change in inventory from period *t-1* to *t,* $assets_{it-1}$ is lagged total assets, $sales_{it}$ is sales revenue, and $\Delta sales_{it}$ is the change in sales revenue from period *t-1* to *t*:

$$discretionary\_expenses_{it} = \propto_0 + \propto_1 \frac{1}{assets_{it-1}} + \propto_2 \frac{sales_{it}}{assets_{it-1}} + \varepsilon \quad (4)$$

where discretionary expenses are comprised of research and development; advertising; and selling, general, and administrative expenses and all other variables are defined as before:

$$CFO_{it} = \propto_0 + \propto_1 \frac{1}{assets_{it-1}} + \propto_2 \frac{sales_{it}}{assets_{it-1}} + \propto_3 \frac{\Delta sales_{it}}{assets_{it-1}} + \varepsilon \quad (5)$$

where CFO_{it} is cash flow from operations and all other variables are defined as before.

We measure the cumulative level of real EM for each firm over the entire time series during which it has appeared in our sample, excluding the current period:

$$cum\_REM_{it} = \sum_1^{t-1} REM_i \quad (6)$$

where REM_i is defined in turn as abnormal operating cash flow, abnormal discretionary expenses, or abnormal production, from equations 3 through 5.

Sample Selection

Our sample includes all US firms in the Compustat annual files from fiscal year 1988, the first year that cash flow statement data became available, through 2017. Following Barton and Simko (2002) and Baber et al. (2011), we exclude utilities and financial services firms (2-digit SIC codes 49, 60-67). To avoid bias introduced by sample attrition, we exclude firms that do not appear in our data in either 2016 or 2017. We examine a sample of potentially managed earnings observations, which we define as small positive earnings realizations, those with net income less than 1.5% of beginning-of-year market value, following Burgstahler and Dichev (1997). Data required for our main tests are available for 12,477 observations for 1,764 unique firms. Our tests of the time-series properties of REM include fewer observations, as a five-year time series is not available for all firms in our main sample. Following prior research, all variables are winsorized at the 1% and 99% levels to mitigate the effect of outliers.

Methodology

Our first test examines whether REM, like AEM, displays a pattern of reversing over subsequent periods (RQ1). We regress each measure of current-period REM in our sample of potentially managed firm-years on its four most recent lags, (indicated by F1. through F4. before the variable name). Our next set of tests examines the relation between accumulated AEM and current REM (RQ2). Following prior literature, we suggest that prior AEM activity reduces a firm's ability to use AEM in the current period. Using our novel measure of accumulated AEM, we investigate whether this reduced ability to use AEM is associated with greater use of REM in the current period. We estimate the following equation in our sample of potentially managed firm-years:

$$REM_{it} = \propto_0 + \propto_1 cum\_da_{it} + \propto_2 controls + \varepsilon \quad (7)$$

where REM_{it} represents, in turn, each of the three Roychowdhury (2006) measures of real EM and cum_da_{it} represents cumulative discretionary accruals (excluding the current period). Controls are adapted from Ho et al. (2012) and include the lagged value of the dependent variable ($L.abn\_prod, L.abn\_disx, or\ L.abn\_cfo$); noa_{it}, the observation's industry-adjusted scaled net operating assets; $bign$, an indicator equal to one if the observation has a Big-N auditor and zero otherwise; $loss$, an indicator equal to one if the firm had negative net income before extraordinary items in each of the past two years and zero otherwise; mkt_share, sales divided by total sales for the firm's 2-digit SIC code industry; $lnassets$, the natural log of lagged total assets; and firm fixed effects. Next, we examine the relation between accumulated REM and current AEM (RQ3). We estimate the following equation in our sample of potentially managed firm-years:

$$AEM_{it} = \propto_0 + \propto_1 cum\_REM_{it} + \propto_2 controls + \varepsilon \quad (8)$$

where AEM_{it} represents accrual EM in period *t*, measured using modified Jones (1991) discretionary accruals; cum_REM_{it} represents the cumulative level of real EM over the time series for which the firm appears in our sample (excluding the current period), measured in turn using each of the three REM measures; and controls are the same as those in equation (7). Taken together, these tests shed light on whether managers shift to REM only when their ability to use AEM is limited (or vice versa) or if the substitution between AEM and REM is bidirectional. If it is bidirectional, this may indicate that managers target a certain level of total EM and choose whichever method is less constrained, with no preference for one method over the other.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 presents descriptive statistics. Current-period EM measures are calculated based on residuals and thus are mean-zero at the industry level. As expected, they all have means and medians near zero. Net operating assets (i.e., "bloated balance sheet") are slightly negative on average. About 84 percent of our sample has Big-N auditors, and about 7 percent is made up of consecutive loss firm-years. The average market share is 7.5%. Our sample includes some very large firms, which results in the mean natural log of assets being positive while the median is negative.

Table 1: Descriptive Statistics

Variables	Mean	Std Dev	Median	Minimum	Maximum	Observations
da	0.4444	4.1583	-0.0132	-14.2903	32.8269	12,477
abn_prod	-0.1491	1.6701	-0.0670	-14.5385	4.7419	12,477
abn_disx	0.3772	3.5499	0.1044	-18.2293	15.7431	12,477
abn_cfo	-0.2498	1.4271	-0.0828	-11.1042	7.1735	12,477
cum_da	2.7278	12.1897	-0.2473	-43.4895	52.7634	12,477
cum_ap	-2.1308	9.8761	-1.1683	-26.7161	25.4759	12,477
cum_ds	4.4082	20.6176	0.8609	-43.7514	64.0955	12,477
cum_cfo	-2.5800	-7.1721	-1.1584	-28.1160	24.7441	12,477
noa	-1.5990	-12.7144	-0.1026	-98.5899	48.2311	12,477
bign	0.836	0.370	1.000	0.000	1.000	12,477
loss	0.073	0.261	0.000	0.000	1.000	12,477
mkt_share	0.075	0.133	0.014	0.000	0.591	12,477
da	6.604	2.131	-6.653	1.000	10.407	12,477

Table 1 presents descriptive statistics. See Appendix A for variable definitions.

Time-Series Properties of Real Earnings Management (REM)

The results of regressing each REM measure on its four most recent lags (RQ1) are presented in Table 2. In each specification, current-period REM is significantly negatively correlated with subsequent values of REM. This indicates that, although REM cannot be expected to mechanically reverse the way AEM does, it does in fact seem to reverse over subsequent periods for operational or other reasons. Thus, we answer our first research question (RQ1) in the affirmative. It is possible that persistently high levels of abnormal production or low levels of abnormal discretionary spending and cash flow from operations are unattractive to managers, boards of directors, investors, auditors, etc. and/or negatively impact firm performance. Consistent with the observation from DeFond and Park (2001) that high levels of AEM are unlikely to be sustained over time, we suggest that high levels of REM are also not likely sustainable. As such, this allows us to meaningfully measure limits on the ability to use REM in the current period using accumulated REM.

Table 2: Time-Series Properties of Real Earnings Management

	(1)	(2)	(3)
Variables	***abn_prod***	***abn_disx***	***abn_cfo***
f.abn_prod	-0.0844***		
	(-4.71)		
f2.abn_prod	-0.1207***		
	(-8.67)		
f3.abn_prod	-0.0300**		
	(-2.03)		
f4.abn_prod	-0.0847***		
	(-7.12)		
f.abn_disx		-0.0090	
		(-0.36)	
f2.abn_disx		-0.0836***	
		(-4.93)	
f3.abn_disx		-0.0492***	
		(-3.71)	
f4.abn_disx		-0.1173***	
		(-9.70)	
f.abn_cfo			-0.0878***
			(-4.67)
f2.abn_cfo			-0.0740***
			(-3.89)
f3.abn_cfo			-0.0771***
			(-5.30)
f4.abn_cfo			0.0322
			(1.38)
Constant	-0.2466***	0.4378***	-0.2392***
	(-9.42)	(9.13)	(-13.43)
Observations	6,848	6,848	6,848
Adjusted R-squared	0.2278	0.2732	0.2250
Firm Fixed Effects	Yes	Yes	Yes

*Table 2 examines the relation between current and future values of Real Earnings Management (REM) variables. REM refers to abnormal production in Column (1), abnormal discretionary expenses in Column (2), and abnormal cash flow from operations in Column (3). Robust t-statistics are presented in parentheses. ***, **, and * indicate significance at the one, five, and 10 percent levels, respectively. See Appendix A for variable definitions.*

Accumulated Accrual Earnings Management (AEM)

The results of estimating equation (7) are presented in Table 3. By two of the three measures of REM, current-period REM activity is significantly increasing in accumulated AEM. The coefficients on cumulative discretionary accruals are positive and significant in regressions of abnormal production (0.0098, p<0.01) and abnormal discretionary spending (0.0271, p<0.01), indicating that when the ability to use AEM is limited, managers shift toward REM. Thus, we answer our second research question (RQ2) in the affirmative – accumulated AEM over prior periods is associated with REM in the current period. The coefficient on noa, which measures "bloated balance sheet," is positive and significant, consistent with Ho et al. (2012). This indicates that our measure of accumulated AEM contains additional information beyond "bloated balance sheet." Interestingly, the coefficient on abnormal cash flow from operations is significantly negative. Ho et al. (2012) who show that "bloated balance sheet" (noa) is associated with greater use of REM, do not examine this third REM measure from Roychowdhury (2006). It is not clear why this measure is left out of prior literature or why it behaves differently from the other two REM measures here, but it is possible that accumulated abnormal cash flow from operations is related to accumulated AEM in a different manner than the other REM measures. Big-N auditors are not significantly associated with lesser REM by any of the three measures.

Table 3: Accumulated Accrual Earnings Management and Current Real Earnings Management

	(1)	(2)	(3)
Variables	**abn_prod**	**abn_disx**	**abn_cfo**
cum_da	0.0098***	0.0271***	-0.0129***
	(4.76)	(4.10)	(-4.43)
L.abn_prod	-0.0508***		
	(-4.91)		
L.abn_disx		0.0136	
		(0.74)	
L.abn_cfo			-0.0728***
			(-5.29)
noa	0.0059***	0.0174***	-0.0116***
	(5.76)	(5.31)	(-7.02)
bign	-0.0560	-0.1220	-0.0063
	(-0.68)	(-0.80)	(-0.09)
loss	0.0275	0.0065	0.1712***
	(0.35)	(0.05)	(3.14)
mkt_share	0.6012**	-0.8813	0.9240**
	(1.97)	(-1.04)	(2.30)
lnassets	-0.1541***	0.2743***	-0.1076***
	(-6.58)	(5.60)	(-5.38)
Constant	0.8447***	-1.3171***	0.3839***
	(5.36)	(-3.81)	(2.74)
Observations	12,477	12,477	12,477
Adjusted R-squared	0.1971	0.2873	0.2187
Firm Fixed Effects	Yes	Yes	Yes

*Table 3 presents the results of estimating equation (7), $REM_{it} = \propto_0 + \propto_1 cum\_da_{it} + \propto_2 controls + \varepsilon$. REM_{it} refers to abnormal production in Column (1), abnormal discretionary expenses in Column (2), and abnormal cash flow from operations in Column (3). Robust t-statistics are presented in parentheses. ***, **, and * indicate significance at the one, five, and 10 percent levels, respectively. See Appendix A for variable definitions.*

Accumulated Real Earnings Management (REM)

The results for estimating equation (8) are presented in Table 4. While the results reported in Table 3 provide evidence that limitations on the ability to use AEM are associated with a shift toward REM, the results reported in Table 4 provide only weak evidence that the reverse is true. Coefficients on accumulated REM are negative in two out of three cases and only significantly positive for accumulated discretionary spending. Thus, we answer our third research question (RQ3) in the negative – accumulated REM over prior periods is not associated with AEM in the current period. Consistent with prior literature, discretionary accruals are negatively associated with both their lagged values and "bloated balance sheet."

Table 4: Accumulated Real Earnings Management and Current Accrual Earnings Management

	(1)	(2)	(3)
Variables	***da***	***da***	***da***
cum_ap	-0.0023		
	(-0.32)		
cum_ds		0.0693***	
		(11.43)	
cum_cfo			-0.1022***
			(-8.06)
L.da	-0.0652***	-0.1082***	-0.0688***
	(-7.02)	(-9.78)	(-7.51)
noa	-0.0067*	-0.0061*	-0.0055
	(-1.79)	(-1.74)	(-1.50)
bign	-0.1760	0.1000	-0.0693
	(-0.84)	(0.49)	(-0.33)
loss	0.3320*	0.3615**	0.3352*
	(1.79)	(2.05)	(1.81)
mkt_share	2.5976*	3.6815**	2.6216*
	(1.73)	(2.57)	(1.78)
lnassets	0.4028***	0.0168	0.1935***
	(6.60)	(0.28)	(2.92)
Constant	-2.2756***	-0.3214	-1.2396***
	(-5.37)	(-0.77)	(-2.81)
Observations	12,477	12,477	12,477
Adjusted R-squared	0.1702	0.2088	0.1776
Firm Fixed Effects	Yes	Yes	Yes

Table 4 presents the results of estimating equation (8), $AEM_{it} = \propto_0 + \propto_1 cum\_REM_{it} + \propto_2 controls + \varepsilon$. *Robust t-statistics are presented in parentheses. ***, **, and * indicate significance at the one, five, and 10 percent levels, respectively. See Appendix A for variable definitions.*

Taken together, the results of Tables 3 and 4 indicate that a constrained ability to use AEM is associated with increased REM activity, but a constrained ability to use REM is *not* strongly associated with increased AEM activity. This suggests that all else being equal, managers prefer AEM, since their EM choices appear unchanged when the ability to use REM is limited.

Robustness Tests

Our results are robust to several different ways of specifying our tests and constructing our sample. We examine a sample of potentially managed earnings observations, which we define as small positive earnings realizations, those with net income less than 1.5% of beginning-of-year market value, following Burgstahler and Dichev (1997). Our results are qualitatively unchanged if we define these potentially managed earnings observations using other intervals or scaling variables. Our results are also robust to expanding our sample beyond potentially managed earnings observations – we remove the sample selection requirement that earnings scaled by beginning-of-year market value equal less than 1.5% of beginning-of-year market value and reexamine our main tests using this expanded sample for the period 1988-2017. Untabulated results indicate that interestingly, the relation between accumulated AEM and current-period REM persists even in observations that are not suspected of having been managed. Chen, Hribar, and Melessa (2018) point out that using residuals as dependent variables can lead to incorrect inferences. Following one of their suggested solutions, we include all first stage regressors in the second-stage regressions and reexamine our main tests. Untabulated results show that our inferences remain qualitatively unchanged. Lastly, in additional untabulated results, we find that our inferences are qualitatively unchanged when we accumulate our EM variables over only the past five or 10 years rather than the entire time series of the firm. This provides some assurance that firm age does not influence our inferences.

CONCLUSION

EM in any form cannot be used to inflate earnings in perpetuity. This paper investigates the substitution between EM methods using a data set of United States firms from 1988 to 2017. Using novel measures of EM constraints, we show that limitations on firms' ability to use AEM are associated with a shift toward REM, but limitations on firms' ability to use REM are *not* associated with a shift toward AEM. Together, these findings suggest that although managers will shift toward REM when necessary, they would prefer to use AEM. Our results contribute to the existing literature by providing evidence on managers' preference across types of EM and highlight the need for investors to monitor for evidence of AEM. While AEM and REM are the most well-studied EM methods, other methods exist. In addition, it is not clear whether our results generalize to international settings, where different regulatory environments may shape the preference for various EM methods. Future research could examine the substitution between EM methods beyond AEM and REM and in various geographical and regulatory settings.

APPENDIX A

Appendix A: Variable Definitions

Variable	Definition
da	discretionary accruals, estimated from a modified Jones (1991) model
abn_prod	abnormal production, estimated following Roychowdhury (2006)
abn_disx	abnormal discretionary expenses, estimated following Roychowdhury (2006)
abn_cfo	abnormal cash flow from operations, estimated following Roychowdhury (2006)
$l.abn\_prod$	the lagged value of abn_prod
$l.abn\_disx$	the lagged value of abn_disx
$l.abn\_cfo$	the lagged value of abn_cfo
$f.abn\_prod$	the leading value of abn_prod. $F2.abn\_prod$ represents the second leading value of abn_prod, $f3.abn\_prod$ represents the third leading value of abn_prod, and so on.
$f.abn\_disx$	the leading value of abn_disx. $F2.abn\_disx$ represents the second leading value of abn_prod, $f3.abn\_disx$ represents the third leading value of abn_disx, and so on.
$f.abn\_cfo$	the leading value of abn_cfo. $F2.abn\_cfo$ represents the second leading value of abn_cfo, $f3.abn\_cfo$ represents the third leading value of abn_cfo, and so on.
cum_da	modified Jones-model discretionary accruals, summed over the time-series for each firm, excluding the current period
cum_ap	abnormal production, summed over the time-series for each firm excluding the current period
cum_ds	abnormal discretionary expenses, summed over the time-series for each firm excluding the current period
cum_cfo	abnormal cash flow from operations, summed over the time-series for each firm excluding the current period
noa	industry-adjusted scaled net operating assets
$bign$	an indicator equal to one if the observation has a Big-N auditor and zero otherwise
$loss$	an indicator equal to one if the firm had negative net income before extraordinary items in each of the past two years and zero otherwise
mkt_share	sales divided by total sales for the firm's 2-digit SIC industry
$lnassets$	the natural log of lagged total assets
asset	lagged total assets
sale	sales revenue scaled by lagged total assets
dsale	change in sales revenue from year *t-1* to year *t* scaled by assets in year *t-1*
drev_dar	change in sales revenue from year *t-1* to year t minus the change in accounts receivable from year *t-1* to year *t*, scaled by assets in year *t-1*
ppe	gross property, plant, and equipment scaled by lagged total assets

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