Employee effort and earnings management

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ABSTRACT

In this study, we examine the relationship between employee effort within the firm and earnings management, using data on working hours and discretionary accruals. With higher employee effort, we find less earnings management among U.S. firms. This result is stronger when earnings are more predictable and persists after we control for endogeneity. We also find smaller earnings discontinuities with higher employee effort. Our domestic results remain the same with a global sample. Our results suggest that earnings management enables benchmark beating with greater precision than can high employee effort alone, but also that high-effort firms may be misclassified as earnings manipulators.

1. Introduction

According to Dichev, Graham, Harvey, and Rajgopal (2013), surveyed financial managers in the United States believe that 20% of firms manage their earnings to misrepresent economic performance and reach earnings benchmarks, such as earnings above zero. Despite the dishonesty of such practices (Graham, Harvey, & Rajgopal, 2005; McGuire, Omer, & Sharp, 2012), it is rational that managers use discretion embedded in accounting standards to meet benchmarks based on prospect theory (Kahneman & Tversky, 1979). In addition, managers failing to meet earnings expectations may be punished with lower compensation or even dismissal (Farrell & Whidbee, 2003; Matsunaga & Park, 2001). While accounting and finance researchers have focused on earnings management as the primary way to meet or beat earnings benchmarks, they have largely neglected the role of reference-dependent effort (see Allen, Dechow, Pope, & Wu, 2017). In this paper, we investigate whether higher employee effort is a substitute for earnings management.

Researchers commonly use agency theory to explain earnings management, arguing that it results from various conflicts of interest and information asymmetries between managers and owners (Jensen & Meckling, 1976). While managers may act out of self-interest, they simultaneously realize that their individual destinies depend on the performance and the survival of the firm in its competition with other firms. Fama (1980) emphasizes that individual managers are disciplined by the labor market for managers. Hence, managers monitor other managers both above and below themselves, to ensure that policies send the most positive signals to that market. Policy choices that send negative signals (such as accounting choices that include earnings management) will impose private costs on managers, namely, opportunity wage decreases. To avoid such costs, managers should seek an alternative to earnings management, even if the alternative has its own costs. While Dichev et al. (2013) suggest that earnings management is widespread, Dechow, Richardson, and Tuna (2003) stress that the first-choice way to meet or beat earnings benchmarks is to set targets and motivate employees to work harder. The second choice would be earnings management. In this paper, we examine how these strategies are related.

Empirically, we follow the audit effort literature that uses auditor working hours (Caramanis & Lennox, 2008; Che, Langli, &

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Svanström, 2017), by using the working hours of employees at U.S. publicly listed firms as a proxy for employee effort. We use annual hours worked by an average employee according to data from the Occupational Safety and Health Administration (OSHA) for 2002–2011. We follow previous researchers (Kothari, Leone, & Wasley, 2005; Peasnell, Pope, & Young, 2000) in measuring earnings management.

Earnings management should be a concern for most employees because detection might cause present and future income losses together with costly job seeking. As a worst-case example, over 6000 jobs, together with employee health care and retirement savings or entire life savings, were lost following the corporate governance failure in Enron.[1] In theory, employees have a clear role in corporate governance (Jensen & Meckling, 1976). Several empirical studies reveal that employees are corporate whistleblowers regarding fraud (Dyck, Morse, & Zingales, 2010), drive firms' voluntary disclosures (Bova, Dou, & Hope, 2015), and lower tax risk (Chyz, Leung, Li, & Rui, 2013). Moreover, Call, Campbell, Dhaliwal, and Moon (2017) find that firms with a high-quality workforce have less earnings management. We extend these studies by highlighting the link between employee effort within the firm and earnings management.

We also address the debate about whether earnings management explains the discontinuities in the earnings distribution documented by Burgstahler and Dichev (1997), and contribute to research on how formal and informal institutions drive earnings management both in the United States and around the world (see, e.g., Haga, Huhtamäki, & Sundvik, 2019; Lewellyn & Bao, 2017). Our empirical evidence may be useful for future studies wanting to discriminate manipulators from nonmanipulators, in the spirit of Beneish (1999) and Vladu, Amat, and Cuzdriorean (2017). Moreover, numerous studies use meeting or beating earnings expectations or the ratio of small profits to small losses to test for earnings management (e.g., Chung, Pan, Huang, & Chen, 2015; Coppens & Peek, 2005; Haga, Höglund, & Sundvik, 2018; Leuz, Nanda, & Wysocki, 2003). If some of the small-profit observations result, instead, from increased employee effort, such studies may be subject to type I errors (falsely rejecting the null of no earnings management).

In the following sections, we review previous research and develop our hypothesis. We then describe our data and variables and present the main empirical findings and results of additional tests. The last section concludes.

2. Literature review and hypothesis development

2.1. Employee effort and earnings management

Accounting earnings, defined as the sum of cash flows and accruals, are important in pricing debt and equity; and the accounting and finance literatures recognize managers' incentive to influence earnings to ensure that the numbers arrive at or above their preferred benchmarks. Here, we use the term earnings management to describe unethical managerial actions that influence accruals to meet or beat benchmarks (Graham et al., 2005; McGuire et al., 2012). The possibility to manage earnings arises because managers have great discretion in financial reporting (Jiraporn, Miller, Yoon, & Kim, 2008)—for example, over depreciation rates and amounts of bad debt, which directly affect earnings. While the literature has largely been focused on managers in the C-suite and their role in financial reporting (Bergstresser & Philippon, 2006; Farrell & Whidbee, 2003; Graham et al., 2005; Matsunaga & Park, 2001), we know relatively little about the earnings management impact of employees outside the C-suite.

As we explain above, agency theory implies that managers have incentives both for and against earnings management, and that they monitor each other. Especially, managers competing for higher positions within the firm or outside it, who also may be the most informed and responsive critics of the firm's actions, consistently want top managers to choose policies that send the most positive signals to the managerial labor market. Accrual earnings management might send negative signals because the accrual component of earnings is less persistent, or because the earnings management may later be reversed or exposed (see Sloan, 1996). As such signals should decrease managers' opportunity wages on the market for managers (Fama, 1980), managers should be interested in reducing earnings management in their firm and increasing employee effort instead. However, pressuring employees may reduce their loyalty. Since both methods are costly, managers need to trade off the two methods in light of their relative costs.

If higher employee effort is a substitute for earnings management, this would support the argument by Dechow et al. (2003) that the first-order effect of beating earnings benchmarks is employees' working harder towards established benchmarks while the second-order effect is earnings management. Experimental work has consistently shown that employees strive to meet earnings benchmarks, since meets or beats might generate wage increases whereas misses might lead to pay freezes, cuts, or even layoffs (Hannan, 2005). According to Christ and Vance (2018), employees expend greater effort when managers are pushed to surpass a benchmark, especially when they have high-quality relationships with the managers. Allen et al. (2017) maintain that it is possible to reach benchmarks through hard work and well-defined points of reference. In other words, more hard work could be seen as a way of manipulating real activities that goes beyond commonly measured manipulations such as giving discounts, overproducing, or cutting discretionary expenditures (Roychowdhury, 2006). And if manipulating real activities is an alternative to manipulating accounting accruals (Haga et al., 2019; Zang, 2012), then employee effort may be considered a substitute for accrual earnings management.

While there is specific evidence that higher audit hours constrain earnings management (Caramanis & Lennox, 2008), there is a dearth of empirical evidence on the link between employee effort and earnings management. We formulate the following hypothesis:

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[1] Following the Enron collapse, John Evans, former General Secretary of the Trade Union Advisory Committee to the OECD, stressed the importance of employees in corporate governance; see https://members.tuac.org/en/public/e-docs/00/00/01/0E/document_doc.phtml (retrieved January 1, 2021).

Hypothesis.   There is less earnings management with higher employee effort.

2.2. Employee effort and earnings discontinuities

Burgstahler and Dichev (1997) pointed out that in scaled earnings distributions, we see an unexpectedly low number of firms reporting small losses and an unexpectedly high number of firms reporting small profits—that is, beating the zero earnings benchmark. The authors viewed this discontinuity as clear evidence of earnings management. Several studies have since documented the discontinuity around zero earnings all over the world (Coppens & Peek, 2005; Degeorge, Patel, & Zeckhauser, 1999; Gore, Pope, & Singh, 2007; Haga et al., 2019; Halaoua, Hamdi, & Mejri, 2017; Leuz et al., 2003). The intuition behind the earnings management explanation is clear: since positive earnings indicate good performance whereas negative earnings are associated with poor performance (Kahneman & Tversky, 1979), meeting earnings benchmarks, especially the zero earnings benchmark, helps build credibility on the capital market, improve compensation, and maintain or increase the stock price (Graham et al., 2005). However, when Dechow et al. (2003) analyzed differences in earnings management between small-profit and small-loss firms, they did not find the statistically significant differences that should be visible if earnings management were the complete explanation. This finding stands in clear contrast to and questions the results of Burgstahler and Dichev (1997).[2] But Dechow and colleagues did not follow up their argument with any deeper empirical work, nor have other scholars offered profounder analyses of the competing explanation.

A drawback of increasing employee effort to beat earnings benchmarks is that it is hard to accomplish with high precision (i.e., to turn a small loss into a small profit). While it is possible to estimate precisely how a change in accounting for the depreciation of assets will affect year-end earnings, the ultimate impact on earnings from an increase in employee effort is hard to forecast, since the increased effort occurs throughout the year. Zang (2012) and Haga et al. (2019) note a similar tradeoff between manipulation of accounting accruals and operating activities. To our knowledge, no study has empirically tested whether higher employee effort also generates discontinuities. We aim to bridge this gap in the literature: if our reasoning holds true, we should see smaller discontinuities around zero for high-effort firms.

3. Data and variables

3.1. Measuring employee effort, data, and sample

We use a sample of U.S. firms with data from the Occupational Safety and Health Administration (OSHA) for the period 2002–2011. The OSHA Data Initiative Program, which ended in 2011, surveyed publicly listed firms and their establishments to obtain data on various work-related injuries and acute illnesses. In addition to these data, the survey contains information about number of hours worked in firm establishments by an average employee.[3] We use these working hours as the measure of employee effort and take the log of working hours (LWH) to reduce the skewness in the original distribution. OSHA includes data primarily for larger firms from industries classified as high-hazard (e.g., manufacturing, transportation, and stores). Many of the industries it excludes are therefore regulated industries, banking, and legal services (SIC codes 4400–4999 and 6000–6499), which we would have excluded anyway given the previous earnings management literature. We combine the OSHA data with available firm-level data from the Compustat North America Annual file following Caskey and Ozel (2017), and exclude observations with missing key or control variables. We end up with 66,826 observations in the full sample. Following Gunny (2010) and Haga et al. (2018), we consider 3114 observations with ROA between 0 and 0.01 as small-profit sample observations.

3.2. Measuring earnings management

Following previous researchers (Kothari et al., 2005; Peasnell et al., 2000), we measure earnings management by estimating discretionary accruals cross-sectionally according to the following regression:

$$\frac{TACC_{it}}{A_{it-1}} = \beta_0\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{PPE_{it}}{A_{it-1}}\right) + \beta_3(ROA_{it-1}) + \varepsilon_{it}, \tag{1}$$

where $TACC_{it}$ is the total accruals for firm i at time t, PPE_{it} is the gross property, plant, and equipment, and ROA_{it-1} is the lagged return

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[2] There are other more methodological critiques of the earnings management explanation of the earnings discontinuity. Durtschi and Easton (2005, 2009) argue that the earnings discontinuity is a result of scaling and sample selection. Beaver, McNichols, and Nelson (2007) suggest that the discontinuity stems from the asymmetric nature of income taxes and special items. As a response to the criticism, Burgstahler and Chuk (2015) show that scaling and selection do not cause discontinuities, and they explain that earnings before the component of special items is a measure that is of limited use to stakeholders and therefore lacks discontinuity evidence. The authors also show that differences in effective tax rates do not explain discontinuities in the distribution of earnings levels.

[3] Most studies using this data source have examined issues related to workplace safety (e.g., Caskey & Ozel, 2017; Cohn & Wardlaw, 2016; Haga, Huhtamäki, & Sundvik, 2021). We omit the injury data and focus only on working hours.

on assets.[4] The residual (ε) corresponds to the abnormal component of TACC, which we refer to as earnings management (EM). Positive values represent income-increasing actions.

3.3. Control variables

We include numerous control variables that relate to a firm's working hours or have an established association with earnings management. First, we include three traditional controls. We use the log of total assets (SIZE) to control for size effects and as a possible surrogate for many other effects (Hope, Thomas, & Vyas, 2013).[5] The return on assets (ROA) control decreases the possible relationship between the earnings management measures and performance (Kothari et al., 2005). Debt-to-assets ratio (LEVERAGE) is an important control variable, since financial health and indebtedness affect earnings management (Lewellyn & Bao, 2017). Furthermore, since high-quality auditors potentially constrain earnings management (Francis, Maydew, & Sparks, 1999), we control for the influence of BIG4 auditors (EY, Deloitte, KPMG, or PwC). Following Stuebs and Sun (2010) and Hass, Hribar, and Kalogirou (2019), we recognize that controls for the ratio of employees to property, plant, and equipment (INTENSITY) and sales per employee (PRODUCTIVITY) are important in our research context. To reduce the impact of outliers, we winsorize all the continuous variables at the 1st and 99th percentiles. Finally, we also include year and industry controls with two-digit SIC codes to control for time and industry effects.

3.4. Descriptive statistics

Table 1 reports descriptive statistics and correlations for the full sample of U.S. firms in Panel A and for the subsample of small-profit observations in Panel B. The mean LWH at 7.56 amounts to 1920 average annual hours. As we expected, income-increasing mean EM (0.010) in the small-profit sample is also significantly different from zero (t-stat = 11.37), suggesting that some firms have likely placed themselves in this group with the help of earnings management. In contrast, the full-sample mean is −0.002 (t-stat = −10.19), which indicates more income-decreasing or conservative accounting in general. Furthermore, in accord with our expectations, we observe a univariate negative correlation between EM and LWH, which is stronger in Panel B. This suggests that observations with high employee effort show less earnings management. Overall, no univariate correlation is high enough to raise multicollinearity concerns, and the variance inflation factors are all below 3.0. The small-profit observations have average total assets of 7 billion and an average debt ratio of 75%, and most of the firms employ large auditors.

4. Empirical results

4.1. Main tests

Table 2 reports univariate results for testing our hypothesis. Panel A compares means and medians of EM between observations with working hours above and below the median, as well as between the two most extreme tertiles, quartiles, and quintiles of working hours. In the full sample, we observe that the high-working-hour groups have lower EM. However, we acknowledge that not all firms in the full sample have incentives to engage in EM. In the small-profit sample we expect EM to be more prevalent and more similar across the observations (Zang, 2012). Panel B of Table 2 reports univariate tests for the small-profit sample, and when we split the observations into groups based on median working hours, we observe mean (median) EM amounting to 0.4% (0.2%) of total assets for those with high working hours and 1.6% (2.1%) for those with low hours. The differences in both means and medians are statistically significant at a 1% level. When we partition the sample into tertiles and examine the third tertile versus the first, both mean and median differences are large and statistically significant. The mean and median differences are also large and statistically significant between the highest and lowest quartiles and quintiles. Panels C and D compare the mean and median values of LWH between positive (income-increasing) and negative (income-decreasing) values of EM, for the full sample and the small-profit sample, respectively. For both samples, LWH is significantly lower when EM is income-increasing. Taken together, these univariate results are consistent with our hypothesis that employee effort lessens earnings management. Specifically, the results suggest that observations with higher working hours achieve small profits more through employee effort than through manipulation.

Next, we estimate the following OLS regression, where we regress our proxy for employee effort (LWH) and control variables on EM:

$$\text{OLS}: EM_{it} = \alpha_0 + \beta_1 \text{LWH}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{LEVERAGE}_{it} + \beta_5 \text{BIG4}_{it} + \beta_6 \text{INTENSITY}_{it} + \beta_7 \text{PRODUCTIVITY}_{it} + \tau_t + \theta_{ind} + \varepsilon_{it}. \quad (2)$$

Following Zang (2012) and to increase power, we estimate the regression solely for the small-profit sample. The regression includes a set of control variables as well as year (τ_t) and industry (θ_{ind}) fixed effects. Column 1 of Table 3 reports results where the coefficient on LWH is negative. With two-sided *p*-values as displayed in the tables, significance is at the 10% level. If we follow Call, et al. (2017) in

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[4] As a robustness test we estimate EM in two alternative ways: first, as current discretionary accruals, by regressing current accruals (total accruals excluding depreciation) on all variables in Eq. (1) except PPE; second, as discretionary accruals without lagged performance as a control variable in Eq. (1), following the original Jones (1991) model. None of the main results changes because of the earnings management estimation technique.

[5] As a robustness test we replace SIZE with the log of number of employees. Our inferences remain unchanged. However, we do not include both variables in the model because they have a high pairwise correlation (0.877).

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Table 1
Descriptive statistics and correlations.

Variable	Mean	25%	50%	75%	St.Dev	1.	2.	3.	4.	5.	6.	7.	8.
Panel A: Full sample (N = 66,826)													
1. EM_{it}	−0.002	−0.022	0.000	0.017	0.056	1.000							
2. LWH_{it}	7.561	7.466	7.601	7.675	0.185	−0.034***	1.000						
3. $SIZE_{it}$	8.586	7.210	8.542	10.087	1.895	−0.024***	−0.071***	1.000					
4. ROA_{it}	0.034	0.017	0.046	0.079	0.174	0.041***	−0.001	0.142***	1.000				
5. LEV_{it}	0.648	0.522	0.621	0.768	0.202	0.050***	−0.001	0.103***	−0.250***	1.000			
6. $BIG4_{it}$	0.960	1.000	1.000	1.000	0.196	−0.001	0.018***	0.314***	0.119***	0.116***	1.000		
7. $INTENSITY_{it}$	0.015	0.006	0.011	0.016	0.016	0.009**	−0.314***	−0.203***	−0.040***	−0.070***	−0.172***	1.000	
8. $PRODUCTIVITY_{it}$	272.3	147.4	213.4	325.5	215.9	−0.043***	0.256***	0.184***	0.032***	0.033***	0.040***	−0.356***	1.000
Panel B: Small-profit sample (N = 3114)													
Variable	Mean	25%	50%	75%	St.Dev	1.	2.	3.	4.	5.	6.	7.	8.
1. EM_{it}	0.010	−0.007	0.008	0.043	0.049	1.000							
2. LWH_{it}	7.563	7.481	7.601	7.671	0.175	−0.196***	1.000						
3. $SIZE_{it}$	8.867	7.182	9.003	10.572	2.095	0.123***	−0.132***	1.000					
4. ROA_{it}	0.006	0.004	0.007	0.009	0.003	0.107***	−0.179***	0.191***	1.000				
5. LEV_{it}	0.752	0.644	0.719	0.904	0.199	0.061***	0.089***	0.150***	−0.185***	1.000			
6. $BIG4_{it}$	0.953	1.000	1.000	1.000	0.212	0.001	−0.014	0.344***	0.106***	0.188***	1.000		
7. $INTENSITY_{it}$	0.011	0.005	0.008	0.013	0.014	−0.026	−0.236***	−0.239***	−0.153***	−0.046***	−0.060***	1.000	
8. $PRODUCTIVITY_{it}$	292.0	149.1	236.1	325.3	209.4	−0.113***	0.278***	0.220***	−0.141***	0.127***	0.083***	−0.313***	1.000

Notes: Variables are defined in the Appendix.

** Denote statistical significance at the 5% level, respectively.

*** Denote statistical significance at the 1% levels, respectively.

Table 2
Univariate tests.

	High working hours		Low working hours		Diff. Mean			Diff. Median		
	Mean	Median	Mean	Median	Diff.	T-Stat		Diff.	Z-Stat	
Panel A: Earnings management in extremes of working hours for the full sample										
EM_{it} by extreme 2-quantile	−0.004	0.000	−0.001	0.000	0.003	5.94	***	0.000	8.96	***
EM_{it} by extreme 3-quantile	−0.004	0.000	0.000	0.000	0.004	8.43	***	0.000	11.42	***
EM_{it} by extreme 4-quantile	−0.003	0.000	0.001	0.000	0.005	8.40	***	0.000	10.93	***
EM_{it} by extreme 5-quantile	−0.003	0.000	0.002	0.000	0.005	7.55	***	0.000	10.11	***
Panel B: Earnings management in extremes of working hours for the small-profit sample										
EM_{it} by extreme 2-quantile	0.004	0.002	0.016	0.021	0.012	7.06	***	0.019	10.73	***
EM_{it} by extreme 3-quantile	0.002	0.000	0.024	0.042	0.022	10.89	***	0.042	14.89	***
EM_{it} by extreme 4-quantile	0.001	0.000	0.029	0.048	0.028	12.96	***	0.048	16.02	***
EM_{it} by extreme 5-quantile	0.001	0.000	0.033	0.048	0.031	13.73	***	0.048	16.34	***

	Positive EM_{it}		Negative EM_{it}		Diff. Mean			Diff. Median		
	Mean	Median	Mean	Median	Diff.	T-Stat		Diff.	Z-Stat	
Panel C: Log of working hours in extremes of earnings management for the full sample										
LWH_{it}	7.556	7.600	7.566	7.601	0.010	7.35	***	0.000	6.31	***
Panel D: Log of working hours in extremes of earnings management for the small-profit sample										
LWH_{it}	7.540	7.597	7.607	7.627	0.067	10.52	***	0.030	10.16	***

Notes: Variables are defined in the Appendix. Independent-samples *t*-test (Wilcoxon rank-sum test) of differences in means (medians). ***denotes statistical significance at the 1% level.

Table 3
Linear regression results for working hours and earnings management in the small-profit sample

	(1)	(2)	(3)	(4)	(5)
	EM_{it}	EM_{it}	LWH_{it}	EM_{it}	EM_{it}
LWH_{it-1}			0.206***	−0.012*	
			(10.49)	(−1.83)	
LWH_{it}	−0.013*	−0.023***			
	(−1.86)	(−2.78)			
$ILWH_{it}$					−0.057*
					(−1.83)
$INCCHG_{it}$		−1.437**			
		(−2.20)			
$LWH_{it} \times INCCHG_{it}$		0.197**			
		(2.32)			
$SIZE_{it}$	0.004***	0.005***	−0.007***	0.004***	0.004**
	(2.94)	(3.28)	(−2.64)	(2.88)	(2.55)
ROA_{it}	−1.526**	−1.227**	0.013	−1.585**	−1.584**
	(−2.47)	(−2.02)	(1.29)	(−2.49)	(−2.49)
$LEVERAGE_{it}$	0.013	0.012	−0.006	0.012	0.012
	(1.04)	(0.96)	(−0.61)	(0.93)	(0.90)
$BIG4_{it}$	−0.027***	−0.029***	0.034***	−0.026***	−0.024**
	(−2.83)	(−3.03)	(3.19)	(−2.60)	(−2.36)
$INTENSITY_{it}$	−0.159	−0.167	0.287	−0.165	−0.148
	(−0.96)	(−1.00)	(1.50)	(−0.96)	(−0.86)
$PRODUCTIVITY_{it}$	−0.000	−0.000	0.000***	−0.000	−0.000
	(−0.54)	(−0.49)	(4.19)	(−0.26)	(−0.06)
Intercept	0.084	0.156**	6.057***	0.089	0.434*
	(1.37)	(2.21)	(42.23)	(1.51)	(1.81)
Year Fixed Effects	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
N	3114	3114	65,497	3023	3023
Adjusted R^2	0.265	0.271	0.360	0.283	0.283

Notes: Columns 1 and 2 represent OLS single-equation results, column 3 represents the first-stage results, column 4 represents reduced-form results, and column 5 represents second-stage results. Variables are defined in the Appendix. t-statistics are based on standard errors clustered at the firm establishment level.

  *** Denote statistical significance at the 1%, level, respectively.

  ** Denote statistical significance at the 5% level, respectively.

  * Denote statistical significance at the 10% level, respectively.

assessing statistical significance using one-sided *p*-values since we make a directional prediction, this coefficient is significant at the 5% level. This result suggests that observations with higher managerial and employee effort show less earnings management. The coefficient is −0.013 (*t*-stat = −1.86), and a one-standard-deviation change in LWH is associated with a change of 4.3% of one standard deviation in our EM measure. Since the EM measure is scaled by total assets, we estimate that the differential earnings management associated with a one-standard-deviation increase in LWH would lower ROA by 0.0024 (the mean is 0.034).[6] This effect is economically significant, but relatively small. The multivariate results in column 1 are consistent with our hypothesis and with the univariate results in Table 2. The signs on the control variables in column 1 are broadly consistent with previous findings; for example, BIG4 is associated with less income-increasing earnings management and SIZE is associated with more income-increasing earnings management, as Caramanis and Lennox (2008) also found.

We expect that our column 1 result is mitigated if the impact of increased employee effort is less predictable. To test our prediction, we modify Eq. (2) by interacting LWH with INCCHG (absolute change in annual earnings divided by total assets). Payne (2008) argues that higher INCCHG signals less predictable earnings, and we therefore expect a positive coefficient on the interaction. The results of the OLS estimation in column 2 of Table 3 are consistent with this notion. From our point of view, less predictable earnings make it harder for managers and employees to define clear reference points and thus to beat benchmarks by an increase in reference-dependent effort alone, without some degree of earnings management.[7]

These findings suggest that employee effort is negatively related to earnings management. However, if the OLS estimate is biased by endogeneity, the coefficient on LWH in Eq. (2) does not represent a causal effect. Since we are specifically worried about confounding omitted variables and reversed causality, we try to mitigate endogeneity concerns by using a two-stage least square (2SLS) estimation. Following Caramanis and Lennox (2008), our instrument is lagged LWH. We apply the following first- and second-stage 2SLS models:

$$\text{First} - \text{stage}: LWH_{it}$$
$$= \alpha_0 + \beta_1 LWH_{it-1} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{LEVERAGE}_{it} + \beta_5 \text{BIG4}_{it} + \beta_6 \text{INTENSITY}_{it} + \beta_7 \text{PRODUCTIVITY}_{it} + \tau_t + \theta_{ind} + \varepsilon_{it}$$
$$(3)$$

$$\text{Second} - \text{stage}: EM_{it}$$
$$= \alpha_0 + \beta_1 \widehat{ILWH}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{LEVERAGE}_{it} + \beta_5 \text{BIG4}_{it} + \beta_6 \text{INTENSITY}_{it} + \beta_7 \text{PRODUCTIVITY}_{it} + \tau_t + \theta_{ind} + \varepsilon_{it}.$$
$$(4)$$

To identify the causal effect of employee effort, our instrument must satisfy two key assumptions. First, according to the relevance condition, our instrument, lagged LWH, must correlate with LWH after we account for our control variables. Thus, β_1 in Eq. (3) should be different from zero. Second, according to the exclusion restriction, after we account for our control variables lagged LWH should affect EM only through the instrument's relationship with LWH. There exists no direct test of the exclusion restriction, but we do not see why lagged LWH would have a relationship with EM that does not come from the association between lagged LWH and LWH. To further ensure the robustness of our results, we estimate a reduced-form regression. An insignificant instrument in a reduced-form regression indicates that our estimates in the second-stage regression are driven mainly by omitted variables or regression misspecification (Angrist & Pischke, 2009). In the reduced-form regression, we replace LWH in Eq. (2) with lagged LWH using the following model:

$$\text{Reduced} - \text{form}: EM_{it}$$
$$= \alpha_0 + \beta_1 LWH_{it-1} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{LEVERAGE}_{it} + \beta_5 \text{BIG4}_{it} + \beta_6 \text{INTENSITY}_{it} + \beta_7 \text{PRODUCTIVITY}_{it} + \tau_t$$
$$+ \theta_{ind} + \varepsilon_{it}.$$
$$(5)$$

Column 3 of Table 3 presents the estimation of the first-stage regression of the 2SLS, and this is simultaneously a test of the relevance condition for the instrument. The coefficient on lagged LWH is positive and highly significant (t-stat = 10.49), which implies that our instrument is relevant. In addition, lagged LWH is uncorrelated with the error term in our main earnings management model (Eq. 2), indicating that our instrument meets the exclusion restriction. Next, column 4 reports the result for the reduced-form regression. Here the coefficient for lagged LWH is negative and significant, indicating that the result we find for the second stage is robust.

Finally, column 5 of Table 3 reports the second-stage estimation results where we replace LWH in Eq. (2) with the predicted hours from the first stage (ILWH). The coefficient estimate on ILWH is −0.057 (t-stat = −1.83). Our estimate seems robust, as the second-stage coefficient is very close to the estimate from the OLS regression. Moreover, the signs and significances of the other variables remain largely unchanged, with explanatory power at 28.3%. Overall, the 2SLS confirms our main findings from the standard OLS estimations.

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[6] The mean and standard deviation of LWH are 7.561 and 0.185 (see Table 1), respectively, so an increase in LWH around the mean from 7.469 (=7.561-(0.185/2)) to 7.654 (=7.561 + (0.185/2)), equals an increase from 1752 to 2109 working hours in unlogged terms.

[7] We also run (untabulated) tests with additional firm-specific error terms that vary randomly over time for each firm (random effects). As in Table 3, the coefficients on LWH are negative, but they are insignificant at conventional levels.

Table 4
Logistic regression results for working hours and small profits.

	(1)	(2)	(3)	(4)	(5)	(6)
	$SP1_{it}$	$SP1_{it}$	$SP2_{it}$	$SP2_{it}$	$SP3_{it}$	$SP3_{it}$
LWH_{it}	−0.495***		−1.019***		−1.481***	
	(−2.75)		(−4.37)		(−3.96)	
$ILWH_{it}$		−2.393***		−4.781***		−7.197***
		(−2.85)		(−4.35)		(−4.74)
$SIZE_{it}$	0.109**	0.102*	0.317***	0.299***	0.330***	0.293***
	(2.10)	(1.84)	(3.75)	(3.25)	(3.38)	(2.90)
ROA_{it}	0.013	0.011	0.334	0.402	10.744***	11.182***
	(0.04)	(0.03)	(0.90)	(0.99)	(5.80)	(5.75)
$LEVERAGE_{it}$	2.280***	2.345***	3.575***	3.716***	3.082***	3.179***
	(7.80)	(7.55)	(6.41)	(6.19)	(4.38)	(4.20)
$BIG4_{it}$	−1.014***	−1.070***	−1.673***	−1.691***	−1.210**	−1.018*
	(−3.70)	(−3.70)	(−4.16)	(−3.86)	(−2.51)	(−1.95)
$INTENSITY_{it}$	−12.411**	−12.102*	−24.949**	−23.273**	5.830	7.921
	(−2.08)	(−1.92)	(−2.41)	(−2.10)	(0.56)	(0.72)
$PRODUCTIVITY_{it}$	−0.000	−0.000	−0.001**	−0.001*	−0.001	−0.001
	(−0.13)	(−0.01)	(−1.96)	(−1.68)	(−1.17)	(−0.81)
Intercept	0.253	14.570**	3.060	31.736***	7.279***	50.792***
	(0.16)	(2.26)	(1.41)	(3.68)	(2.58)	(4.45)
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES
N	66,826	65,497	31,472	30,607	11,622	11,180
Pseudo R^2	0.114	0.118	0.207	0.214	0.317	0.325

Notes: Columns 1, 3, and 5 represent single-equation results. Columns 2, 4, and 6 use the predicted value of the log of hours (ILWH) from column 3 of Table 3. Variables are defined in the Appendix. z-statistics are based on standard errors clustered at the firm establishment level.
*** Denote statistical significance at the 1% level, respectively.
** Denote statistical significance at the 5% level, respectively.
* Denote statistical significance at the 10% level, respectively.

4.2. Earnings discontinuity tests

To study the relation between employee effort and earnings discontinuities, we consider distributions of reported earnings. Initial visual inspection of the distributions indicates that a discontinuity around zero exists in our sample. Using the centered asymmetry measure (CAM) from Glaum, Lichtblau, and Lindemann (2004) to assess the statistical significance of this discontinuity, we note that it is statistically significant in the full sample. We calculate CAM as

$$CAM = \frac{(n_r - n_l)}{n_{rl}}, \tag{6}$$

where n_r is the number of observations in the interval directly to the right of zero; n_l is the number of observations in the interval directly to the left of zero; and n_{rl} is the number of observations in both intervals. CAM takes values between −1 and 1, where a higher absolute value indicates a higher level of discontinuity. ΔCAM, defined as the estimated standard deviation of CAM to account for measurement error, is significant when the measure is at least double its standard deviation. We use this measure to analyze differences in CAMs depending on employee effort.

In untabulated analyses, the discontinuity persists when we split the sample into groups with high and low working hours. For the sample split on median working hours, CAM is 0.387 for the high-working-hour group and 0.478 for the low-working-hour-group. The difference is statistically significant. The extreme tertiles (0.392 versus 0.590), quartiles (0.368 versus 0.648), and quintiles (0.366 versus 0.687), which all show significant differences, further demonstrate that the discontinuities are more pronounced with lower working hours. This suggests that observations with lower working hours are less likely to have small losses than observations with higher working hours.

Next, we analyze whether observations are less likely to report small profits if employee effort is higher. For this purpose, we perform logistic regressions where the dependent variables are indicator variables for small-profit observations and the independent variables are the same as in Eq. (2), using the following model:

$$Prob(SP_{it}) = \frac{1}{1 + e^{-Z}} \text{ where } Z$$
$$= \alpha_0 + \beta_1 LWH_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 LEVERAGE_{it} + \beta_5 BIG4_{it} + \beta_6 INTENSITY_{it} + \beta_7 PRODUCTIVITY_{it} + \tau_t + \theta_{ind} + \varepsilon_{it}. \tag{7}$$

We create three alternative SP indicator variables. The first (SP1) is one if ROA is in the range [0, 0.01], and zero otherwise. The second (SP2) is one if both SP1 is one and EM is positive, and zero if only EM is positive. The third (SP3) is one if SP2 is one and unmanaged ROA—i.e., ROA excluding discretionary accruals—is negative, and zero if only unmanaged ROA is negative. Thus, the SP2

Table 5

Regression results for quintiles of working hours.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	EM_{it}	$SP1_{it}$	$SP2_{it}$	$SP3_{it}$	EM_{it}	EM_{it}	EM_{it}	EM_{it}	EM_{it}	EM_{it}
WH_{it} 5-Quantiles	−0.001*	−0.071***	−0.162***	−0.184***						
	(−1.70)	(−2.84)	(−4.78)	(−3.66)						
$SP1_{it}$					0.011**	0.029***	0.007*	0.007*	0.009**	0.003
					(2.53)	(3.83)	(1.65)	(1.93)	(2.55)	(1.16)
$SIZE_{it}$	0.004***	0.109**	0.316***	0.334***	−0.002***	−0.003**	0.000	−0.002***	−0.002***	−0.001
	(3.00)	(2.11)	(3.80)	(3.40)	(−3.50)	(−2.36)	(0.05)	(−3.27)	(−2.91)	(−1.18)
ROA_{it}	−1.564**	0.011	0.333	10.691***	0.031***	0.051	0.020***	0.067***	0.030**	0.021
	(−2.51)	(0.04)	(0.92)	(5.75)	(3.86)	(1.55)	(3.53)	(4.62)	(2.41)	(1.17)
$LEVERAGE_{it}$	0.012	2.282***	3.581***	3.095***	0.023***	0.043***	0.019***	0.034***	0.016***	0.017***
	(1.00)	(7.81)	(6.43)	(4.38)	(5.77)	(4.02)	(3.73)	(6.37)	(3.29)	(3.16)
$BIG4_{it}$	−0.026***	−1.012***	−1.659***	−1.224**	−0.004	0.002	−0.008*	−0.006	−0.003	−0.014***
	(−2.68)	(−3.70)	(−4.15)	(−2.52)	(−1.21)	(0.36)	(−1.83)	(−1.37)	(−0.64)	(−3.30)
$INTENSITY_{it}$	−0.142	−12.521**	−25.458**	5.731	−0.238**	−0.424***	−0.217	−0.090	−0.131	0.155
	(−0.85)	(−2.09)	(−2.44)	(0.55)	(−2.18)	(−3.06)	(−1.58)	(−0.85)	(−1.22)	(1.08)
$PRODUCTIVITY_{it}$	−0.000	−0.000	−0.001*	−0.001	−0.000	−0.000*	−0.000	−0.000	−0.000	0.000
	(−0.49)	(−0.12)	(−1.96)	(−1.20)	(−0.82)	(−1.80)	(−1.08)	(−0.05)	(−1.10)	(0.69)
Intercept	−0.010	−3.268***	−4.129***	−3.445***	−0.001	−0.010	0.000	−0.002	−0.009	−0.003
	(−0.26)	(−4.70)	(−3.77)	(−2.85)	(−0.07)	(−0.60)	(0.04)	(−0.12)	(−0.54)	(−0.25)
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	3114	66,826	31,472	11,622	66,826	13,365	13,365	13,365	13,365	13,365
Adjusted R^2	0.265	0.114	0.208	0.317	0.042	0.104	0.045	0.056	0.039	0.054

Notes: Column 1 represents linear regression results. Columns 2 to 4 represent logistic regression estimation results for working hours and small profits. Column 5 represents linear regression estimation results for earnings management and small profits for the full sample. Columns 6 to 10 represent linear regression estimation results for earnings management and small profits for different quintiles of working hours, from lowest to highest. Variables are defined in the Appendix. t- and z-statistics are based on standard errors clustered at the firm establishment level.

*** Denote statistical significance at the 1% level, respectively.

** Denote statistical significance at the 5% level, respectively.

* Denote statistical significance at the 10% level, respectively.

and SP3 variables measure income-increasing earnings management more narrowly than SP1 alone. However, the sample size decreases as the number on the SP variable increases, because the inclusion criteria are more stringent.

Table 4 reports the single-equation and instrumented results for SP1 in the first two columns, SP2 in the middle two columns, and SP3 in the last two columns. We note that the explanatory power of the model increases from around 11% to more than 30% as we narrow down the indicator variable definition. The coefficients on working hours are all significantly negative, no matter whether we use LWH or ILWH. Using the coefficient on ILWH in column 2 to assess economic magnitude, we note that when working hours increase by one standard deviation around the mean, from 1752 to 2109, the predicted probability that SP1 is one falls from 3.5% to 2.3%, a drop of 35% (with other variables fixed). Therefore, our finding that observations are less likely to report small profits if working hours are higher is economically as well as statistically significant.

Finding significantly less earnings management and smaller discontinuities for firms with higher employee effort is in line with Burgstahler and Dichev's (1997) argument that the discontinuity is driven by earnings management. These findings also indicate that increasing employee effort is an imprecise tool to meet or beat earnings benchmarks.

4.3. Robustness tests

In this section, we perform robustness tests that corroborate our main findings. First, we re-estimate our main regressions with a continuous variable that ranks working hours by quintiles from low to high, as in Table 2. When we replace LWH in Eq. (2) with working-hour quintiles, column 1 of Table 5 highlights that the associated coefficient is negative and statistically significant at a 10% level using two-sided *p*-values (5% using one-sided p-values). When we replace LWH in Eq. (7) with working hour quintiles, columns 2 to 4 of Table 5 report that all the working hours coefficients are negative as in Table 4. In other words, the results of our main analyses using a logged hours variable remain unchanged with this approach.

Second, in a regression model corresponding to Eq. (2), we replace LWH with SP1 instead of analyzing small-profit observations in isolation. Column 5 of Table 5 reports the estimation results for the full sample, which highlight a positive and significant association with earnings management for small-profit observations, in accord with previous research (e.g., Hope et al., 2013). Columns 6 to 10 of Table 5 report the estimation results for the working-hour quintiles. In accord with the evidence above, the coefficient on SP1 decreases with working hours and the statistical significance diminishes in the highest quintile of working hours, at the peak of employee effort.

Third, we repeat our main analysis using a global sample, including firms that follow different accounting standards, face different environments, and have varying institutional settings. Since we know of no data on working hours like that we use for the U.S. sample, we rely on the OECD (2018) database and use the log of average annual hours worked (OECDLWH) as a country-level measure for working hours and the informal institutional willingness to work more.[8] We merge the OECD data with firm financial data from the Worldscope database for the period 2003 to 2015. After excluding observations for regulated and financial and insurance firms (SIC codes 4400–4999 and 6000–6499), observations for secondary listings, and observations with missing key or control variables, we end up with 135,380 observations in the full global sample (representing 28 of the 34 OECD countries), of which 6.8% have SP1 equal to one. Average EM is 0.001 in the full sample and 0.01 for SP1 observations, and the difference is statistically significant. The global work data offer substantial heterogeneity, allowing for meaningful analyses. Annual working hours average 1745. In general, Western European and Nordic people work less than those in North America and Asia. Mexicans (2257 h) and South Koreans (2187 h) are top ranked. At the other end of the spectrum, Germans worked the least among the residents of OECD countries (1392 h). The U.S. working hour average of 1785 differs from the figure for our OSHA-based U.S. sample because the period measured differs and because the OECD data account for the whole population, whereas the OSHA data account for only a subpopulation. The number of observations naturally varies among countries.

Using the global sample, we estimate modified versions of Eqs. (2) and (7). Because for many observations we lack information on auditing and number of employees, we control only for firm-level size, performance, and leverage, while we add 13 country-level control variables. We use culture data (INDIVIDUALISM, PWRDISTANCE, MASCULINITY, UNCERTAVOID, INDULGENCE, and LTO) from Hofstede (1980) and Hofstede, Hofstede, and Minkov (2010) because several studies (Haga et al., 2019; Han, Kang, Salter, & Yoo, 2010; Lewellyn & Bao, 2017; Wijayana & Gray, 2018) show that Hofstede's culture variables influence earnings and earnings management. We also include the corruption index (CORRUPTION) from Transparency International, the Human Development Index (HDI) from the United Nations, the judicial efficiency index (JUDEFF) from Andrei Shleifer's website, and controls for shareholder's rights (SHRIGHTS), creditor's rights (CRRIGHTS), and ownership concentration (OWNERSHIPCONC) from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), as well as gross domestic product (GDP) data from the World Bank. Table 6 reports the regression results. Column 1 shows a significantly negative coefficient on the proxy for employee effort, as in the U.S. case. Similarly, when we run logistic

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[8] Specifically, we use the log of the total number of hours worked per year divided by the average number of people in employment per year per country. The OECD data cover both employees and self-employed workers and include regular work hours of full-time, part-time, and part-year workers; paid and unpaid overtime; and hours worked in additional jobs. They exclude time not worked because of public holidays, annual paid leave, own illness, injury and temporary disability, maternity leave, parental leave, schooling or training, slack work for technical or economic reasons, strike or labor dispute, bad weather, compensation leave, and other reasons. While long working hours at a country level do not necessarily capture effort ideally, we argue that this proxy captures country-level differences in the informal institutional willingness to work better than, for example, self-reported measures from the World Values Survey, in which respondents from different countries indicate how important work is in their lives.

Table 6
Global evidence on working hours and earnings management.

	(1) EM$_{it}$	(2) SP1$_{it}$	(3) SP2$_{it}$	(4) SP3$_{it}$
OECDLWH$_c$	−0.058**	−2.107***	−2.494***	−2.633***
	(−2.08)	(−4.71)	(−4.14)	(−3.78)
SIZE$_{it}$	−0.003***	0.024***	0.008	0.055***
	(−5.81)	(2.97)	(0.76)	(5.03)
ROA$_{it}$	−0.281	0.490***	1.181***	5.078***
	(−1.23)	(8.05)	(15.01)	(43.06)
LEVERAGE$_{it}$	0.017***	1.909***	1.834***	1.166***
	(4.35)	(27.25)	(20.65)	(11.75)
INDIVIDUALISM$_c$	−0.000*	−0.018***	−0.018***	−0.017***
	(−1.69)	(−5.16)	(−3.93)	(−3.30)
PWRDISTANCE$_c$	−0.001**	0.000	−0.004	−0.011
	(−2.03)	(0.03)	(−0.58)	(−1.29)
MASCULINITY$_c$	0.000	0.004**	0.005**	0.006**
	(1.22)	(2.52)	(2.43)	(2.34)
UNCERTAVOID$_c$	0.001***	0.006	0.011*	0.014**
	(2.81)	(1.30)	(1.85)	(2.07)
INDULGENCE$_c$	0.000	−0.003	−0.000	0.006
	(0.14)	(−0.49)	(−0.05)	(0.73)
LTO$_c$	−0.000**	−0.003	−0.005	−0.006
	(−2.10)	(−1.04)	(−1.42)	(−1.64)
CORRUPTION$_{ct}$	0.000**	−0.004	−0.003	−0.000
	(2.27)	(−1.23)	(−0.54)	(−0.05)
HDI$_c$	−0.111	0.870	1.163	2.289
	(−1.47)	(0.68)	(0.72)	(1.24)
JUDEFF$_c$	−0.002	0.047	0.009	−0.069
	(−0.58)	(0.80)	(0.12)	(−0.82)
SHRIGHTS$_c$	−0.002	−0.023	−0.059	−0.119**
	(−1.26)	(−0.68)	(−1.29)	(−2.34)
CRRIGHTS$_c$	0.002	−0.022	−0.007	−0.064
	(1.17)	(−0.68)	(−0.17)	(−1.31)
OWNERSHIPCONC$_c$	−0.043	−0.632	−1.139**	−1.696***
	(−1.52)	(−1.41)	(−1.98)	(−2.61)
GDP$_{ct}$	−0.001	−0.007	0.006	0.009
	(−1.38)	(−0.79)	(0.55)	(0.69)
INTERCEPT	0.582***	12.839***	16.191***	17.277***
	(2.85)	(3.88)	(3.65)	(3.39)
Year Fixed Effects	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES
N	9194	135,380	68,619	35,585
Adjusted R^2/Pseudo R^2	0.071	0.069	0.081	0.144

Notes: The table reports linear regression estimation results for working hours and earnings management in column 1 and logistic regression estimation results for working hours and small profits in columns 2 to 4. Variables are defined in the Appendix. t- and z-statistics are based on standard errors clustered at the firm level.

*** Denote statistical significance at the 1% level, respectively.

** Denote statistical significance at the 5% level, respectively.

* Denote statistical significance at the 10% level, respectively.

regressions, the results in columns 2 to 4 show a lower likelihood of reporting small profits in countries with higher working hours. As we expected, most of our observations originate from the United States, and in an untabulated test we confirm that the results remain statistically significant after we exclude the U.S. data. Finally, we test whether the earnings discontinuities are smaller in countries with higher working hours, and find that indeed they are.

5. Conclusion

This study provides empirical evidence of a significantly negative relation between proxies for employee effort (working hours) and earnings management (discretionary accruals)—a relation that is stronger when earnings are more predictable, so that it is easier for managers to set targets for employees. Also, when employee effort is higher, discontinuities in earnings distributions around zero are less pronounced, suggesting that earnings management is the dominant explanation behind the debated earnings discontinuity. Our findings remain robust after we control for potential endogeneity.

We make several contributions to the literature. First, we analyze a previously undocumented relationship between earnings management and employee effort in the form of working hours. Second, we contribute to the literature on the role of employees in corporate governance (Bova et al., 2015; Call et al., 2017; Chyz et al., 2013; Dyck et al., 2010). In addition, we contribute to the earnings discontinuity debate by finding support for the original claim by Burgstahler and Dichev (1997) that the discontinuity is

indeed an artifact of earnings management, and especially accrual earnings management, since increased working hours can be seen as a previously unused measure of real activities manipulation. Our results may inform investors, practitioners, academicians, and business researchers. With a better understanding of the impact of employee effort, all interested parties are in a better position to evaluate firms and suggest possible remedies for earnings management.

Our research design is subject to a major caveat, since employee effort is inherently difficult to measure and our proxy measures employee effort with error and may bias the results. Also, the OSHA data are not available for periods after 2011. However, working hours capture the key component of employee effort that we are interested in, and we believe the uniqueness of the data offsets not being completely up to date. Moreover, we consider two fundamentally different aspects of working hours by using U.S. data on hours as well as cross-country average hours and find consistent results. Our global sample approach is also limited, in that countries differ greatly in productivity, a factor we do not fully control for. Earnings management is similarly challenging to measure with precision, so it is important to emphasize that our results should be treated with caution. However, we focus on analyzing earnings management in suspect firms, thus increasing the power of the tests, and we vary the ways we measure earnings management, increasing the reliability of our findings.

Our results indicate that future research should acknowledge employee effort in analyses of earnings management. Researchers could also investigate alternative or more granular measures of effort, such as the amount of overtime hours or manager hours.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Declaration of Competing Interest

All authors declare that they have no conflicts of interest.

Acknowledgements

Appendix A

Variable definitions

EM	Earnings management in the form of discretionary accruals
WH	Working hours from OSHA
LWH	Log of WH
ILWH	Instrumented LWH
SIZE	Log of total assets
ROA	Return on assets
LEV	Financial leverage, total debt divided by total assets
BIG4	Indicator for BIG4 auditors
INTENSITY	Ratio of employees to property, plant, and equipment
PRODUCTIVITY	Ratio of sales to employees
INCCHG	Absolute change in annual earnings divided by total assets
SP1	Indicator for ROA in the range [0, 0.01]
SP2	Indicator for ROA in the range [0, 0.01] and positive EM
SP3	Indicator for ROA in the range [0, 0.01] and positive EM and negative unmanaged ROA
OECDLWH	Log of working hours from the OECD
INDIVIDUALISM	Individualism score from Hofstede's website
PWRDISTANCE	Power distance score from Hofstede's website
MASCULINITY	Masculinity score from Hofstede's website
UNCERTAVOID	Uncertainty avoidance score from Hofstede's website
INDULGENCE	Indulgence score from Hofstede's website
LTO	Long-term orientation score from Hofstede's website
CORRUPTION	Corruption index from Transparency International
HDI	Human development index score from the United Nations
JUDEFF	Judicial efficiency index score from Andrei Shleifer's website
SHRIGHTS	Shareholder's rights from La Porta et al. (1998)
CRRIGHTS	Creditor's rights from La Porta et al. (1998)

(*continued*)

OWNERSHIPCONC	Ownership concentration from La Porta et al. (1998)
GDP	Percentage change in a country's gross domestic product from the World Bank

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