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Is Earnings Management Related to Labor Productivity Gap? Evidence from the USA

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Abstract: Using a standard partial adjustment model and US firms, we study the relationship between managers' failure to achieve target labor productivity and their tendency to manage earnings. To overcome the endogeneity problem, we employ an instrumental variable technique based on negative investment growth and find that managers, experiencing a labor productivity gap, tend to manage earnings by manipulating discretionary accruals and real operating activities. Additional analysis suggests that elements of personal value maximization biases drive the estimated effect of the labor productivity gap. Our results are robust considering variation and alternative measures of statistical sensitivity. The positive association between the labor productivity gap and earnings management is also consistent with the opportunistic financial reporting hypothesis and impression management theory.

Keywords: labor productivity gap; accruals; real activities manipulation; earnings management

JEL Classification: J21; J33; M4



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1. Introduction

Although corporate managers foster the organizational goal of maximizing shareholders' wealth, they might not eventually be successful. There are plenty of cases where the manager failed in creating shareholders' value¹. When an innovative venture such as the Lumia phone line failed, Ballmer left Microsoft, which eventually moved toward massive restructuring and lay off with a view to streamline the company². Kaplan and Norton (2001) and Mintzberg (1994) claim that 50% to 90% of all the managers typically fail in their strategic initiatives. Many of these failures are attributed to managers' characteristics such as misjudgment and overconfidence. The phenomenon drawn above calls for a strategic evaluation of workforce performance as well as how and to what extent managers respond in such cases.

Literature suggests three possible channel options through which managers can justify their failure: learning experience (Schuler and Jackson 2001), constraint attribution (Manzoni and Barsoux 1998), and hiding (Caldwell and O'Reilly 1982). Learning experience and constraint attribution channels tend to yield benefits for the shareholders. However, these channels do not work well under the separation of ownership and control features of modern corporations. When monitoring and guidance of corporate boards are effective, exercising the third channel might not be feasible. Other channels, however, appear ill-suited for transforming managers' failures since they are not directly observable. Thus, the necessity of exercising any of the above channels becomes attenuated.

A manager's failure has a bearing upon firms' monetary consequences. Whatever the channel they decide to use to compensate/transform their failures, it should have an impact upon firms' financial performance (e.g., earning quality). It is, however, not clear how shareholders are affected by managers' failures when they are not directly observable.

That is why, several studies identified the importance of financial reporting quality when it is related to investment efficiency (Biddle et al. 2009), stock prices (Healy and Palepu 1993), and lower effective interest cost of issuing debt (Sengupta 1998).

In this paper, we investigate whether managers who fail to achieve target labor productivity are likely to manage earnings. To be specific, we examined managers' preference between complying with any disciplinary action taken by the board and resorting to manipulative behavior with a view to impress the board and the shareholders in such a situation. We further examine whether the managers prefer the latter in order to advance their personal interests. As such, we investigate managers' financial reporting behavior (transparent or opportunistic) when they fail to achieve their implicit target productivity. In doing so, we concentrate on using two different proxies of earnings management: discretionary accruals and real activity manipulation. We also study the sensitivity of the variation of managers' failure to achieve target labor productivity.

One challenge for our analysis is the endogenous co-movement of the labor productivity gap and earnings management. Our estimated results might be affected by omitting an important variable. For example, cutting investments can boost reported earnings in the presence of conservative accounting (Penman and Zhang 2002; Graham et al. 2005). We employ an instrumental variable technique based on negative investment growth in order to disentangle the various explanations of such commonality. We also purge the endogenous part of labor productivity gap-based instrumentation on negative investment growth in relation to a previous year with a view to establish the causal effect of the labor productivity gap on earnings management.

Using a comprehensive sample from Compustat on US firms ranging from 2004 to 2017, we find evidence that managers, who fail to achieve labor productivity target, manage earnings through discretionary accruals and real activity manipulation. We find that if a firm's labor productivity gap increases by one percent, its absolute abnormal discretionary accruals increase by an average 0.022 points, positive abnormal discretionary accruals increase by 0.054 points, and negative abnormal discretionary accruals increase by 0.051 points. We also find a strong positive relationship between the labor productivity gap and real activity manipulation. Our results show that if labor productivity increases by one percent, real activity manipulation in terms of the abnormal cash flow decreases by 0.051 points and the combination of real activity manipulation (calculated by subtracting abnormal production cost from the sum of abnormal cash flows and abnormal discretionary expenses) decreases by 0.051 points. Our further tests show the impact of different levels of the labor productivity gap on earnings management and document that managing earnings is highly driven by commensurate increases in the labor productivity gap. We further investigate managers' motivation for managing earnings. We find strongly negative relations of managers' total compensation, stock compensation, and deferred compensation with their productivity achievement failure. The continuation of such productivity failure has a strongly negative association with the managers' future employment in the firms. The finding is statistically significant and economically meaningful. One percent increase in the labor productivity gap is associated with an approximately 0.525% reduction in employees.

Our model specifications control firm-specific characteristics, i.e., return on assets, size, R&D ratio, market to book, leverage, firm age, year, and industry fixed effects. The results are significant after addressing the endogeneity issues and robustness checks. Thus, the study shows that if a firm fails to meet its expected labor productivity, target management performance becomes poor at the year-end due to lower sales. Eventually, managers become involved in earnings management through manipulating real operating activities with a view to report a positive performance compared to the previous year. Finally, our findings suggest that earnings management is positively associated with the labor productivity gap, which is consistent with the opportunistic financial reporting of earnings under impression management theory.

This paper contributes to the different streams of literature in several ways. Firstly, the findings provide one labor performance metrics to take disciplinary actions (reward or

punish), which is a contribution to workforce performance evaluation literature. Secondly, a new firm-specific element is identified that causes managers to manage earnings in an impressive way. It enriches the literature on the determinants of earnings management. Finally, the findings complement the investors' and creditors' financing decision-making process, alerting them about misleading financial information on firms. It gives an early indication to the investors and creditors that the firm might engage in earnings management and let them cast doubt on the firms' reporting quality based on the achievability of labor productivity. This is a contribution to investment decision literature. Moreover, this study contributes to the broader business literature by recognizing the importance of optimal production for a firm to grow steadily and to set a realistic production budget in order to prove management efficiency.

The rest of this paper proceeds as follows: Section 2 discusses related hypotheses; Section 3 entails the details on data and sample construction; Section 4 presents the measures of the labor productivity gap and the measures of the earnings management proxies, i.e., discretionary accruals and real operating activities; Section 5 discusses the empirical results and possible endogeneity issues; Section 6 shows the managers' motivation; Section 7 presents the robustness test for empirical results; and Section 8 concludes the paper.

2. Literature Review and Hypothesis Development

Empirical studies on labor productivity (see [Datta et al. 2005](#); [Snell 1992](#); [Koch and McGrath 1996](#)) are enormous as it is related to measure workforce performance. However, failure to achieve target productivity has gained scant attention in academic literature. Literature regarding earnings quality with respect to many firm-specific and other characteristics is, however, well established and well tested. To our knowledge, this is the first ever paper that presents evidence of earnings management with respect to a core operating activity of a firm, i.e., the labor productivity gap. Since investors and creditors make their investment and financing decisions mostly depending on the firms' financial reports, managers' financial reporting has been one of the important areas in accounting for several decades.

Among others, [Biddle et al. \(2009\)](#) find a strong positive association between reporting quality and investment efficiency. Similarly, [Chen et al. \(2011\)](#) also show a positive relationship between financial reporting quality and investment efficiency. [Teoh et al. \(1998\)](#), [Rangan \(1998\)](#), and [Cohen and Zarowin \(2010\)](#) find evidence that earnings management is negatively related to the underperformance of seasoned equity offering. [Chan et al. \(2001\)](#) highlight that accruals, i.e., the difference between the accounting earnings and cash flow, are negatively associated with future stock returns. Furthermore, [Teoh et al. \(1998\)](#) state that "issuers with unusually high accruals in the IPO year experience poor stock return performance in the three years thereafter".

Some other reports in the literature mention the reasons why firms engage in earnings management by manipulating accruals and real operating activities. [Burgstahler and Dichev \(1997\)](#) state that firms manipulate reported earnings to avoid earnings decrease and loss. Similarly, [Roychowdhury \(2006\)](#) mentions that firms manipulate real operating activities to avoid reporting annual losses. [Kanagaretnam et al. \(2004\)](#) state that managers become engaged in earnings management to reduce earnings variability.

Based on this literature, we can explain managers' financial reporting behavior with respect to accountability theory ([Tetlock 1983](#)). Accountability theory implies that "a person has a potential obligation to explain his/her actions to another party who has the right to pass judgment on those actions and to administer potential positive or negative consequences in response to them" ([Vance et al. 2015](#)). When managers act on accountability theory, they acknowledge their responsibilities and disclose the performance outcome in a transparent manner. Although the larger the absolute value of discretionary accruals the lower the quality of earnings ([Dechow et al. 1998](#)), accountable managers will be transparent in their reporting of financial information to investors and other stakeholders. Their responsible behavior will be treated as an opportunity of learning from the failure.

From an accountability point of view, we expect that managers will report reliable financial information to investors and other stakeholders. Thus, our first conjecture is as follows:

Transparent Financial Reporting Hypothesis: Managers who fail to achieve the target labor productivity will report transparent and reliable financial information to investors and other stakeholders and not indulge in the manipulative behavior of financial reporting.

Apart from the accountability perspective, managers also have their own incentives to be engaged in manipulative behavior of financial reporting. Bergstresser and Philippon (2006) highlight that firms manipulate reported earnings when CEOs' potential total compensation is closely tied to the value of stock and option holdings. Park (2017) shows that pay disparities within top management teams also induce earnings management. Correspondingly, Guidry et al. (1999) point out that managers engage themselves in decisions concerning discretionary accruals in order to maximize their short-run bonuses.

To report the consistency in earnings over previous years, firms will look for meeting the expected target productivity. Any shortfall from the target productivity level will increase a firm's fixed cost and affect a firm's sales level. Under impression management theory (Goffman 1949), managers tend to impress others or attempt to influence the perception of others by providing self-assessed beneficial information (Dillard et al. 2000). Our second conjecture comes from this conjecture that managers will manipulate financial reporting with a view to impress shareholders even after failing to achieve target labor productivity. We delineate our second conjecture as follows;

Opportunistic Financial Reporting Hypothesis: Managers who fail to achieve the target labor productivity will not report transparent and reliable financial information to investors and other stakeholders, and indulge in the manipulative behavior of financial reporting.

In general, the more the firms have a productivity gap, the more the managers will be engaged in earnings management through accruals and manipulating real operating activities. Earnings management lets them match their financial performance as it is consistent with prior years.

As an internal factor, the "labor productivity gap" prompts managers to be engaged in earnings management. Hence, we predict a positive association between the labor productivity gap and earnings management.

3. Data and Sampling

Information on the corporate financial performance of a sample of 21,987 firm-year observations was obtained from Compustat. We collected a sample of the years ranging from 2004 to 2017. To construct the sample of the study, financial institutions (Standard Industrial Classification (SIC) Codes 6000–6999) and utility suppliers (Standard Industrial Classification (SIC) Codes 4900–4999) were excluded as they are highly regulated. Board-related data were retrieved from the BoardEx database. Several existing reports reveal that poor corporate governance is one of the most important reasons why firms engage in earnings management. Xie et al. (2003) state that corporate governance is related to the firms' involvement in earnings management. Klein (2002) highlights that reduction in board or audit committee independence causes a large increase in abnormal accruals. Therefore, we controlled board independence in our model specification. As our second conjecture is under impression management theory, managers will try to impress the board with their manipulative earnings and extract their benefit. Board independence issue comes with SOXAct-2002. Firms are required to have an independent director on their board. In the years 2003 and 2004, firms complied with the board independence requirement. Hence, the year 2004 perfectly fits to test our opportunistic hypothesis under impression management theory. Thus, we chose 2004 as the beginning year for sample collection. We merged Boardex data with the Compustat dataset with a view to obtain the complete sample for the study. All financial values were winsorized at the top and bottom 1% level for addressing the impact of outliers. The study restricted the sample only to all nonfinancial firms with available data (excludes observations with any missing value). This left 21,987 firm-year

observations. Details of the dataset are in Appendix A; summary statistics are shown in Table 1.

Table 1. Descriptive statistics.

Variable	N	Mean	STD	P25	Median	P75
Abs Abnormal Accruals	21,987	0.069	0.083	0.021	0.044	0.080
Positive Abnormal Accruals	8456	0.095	0.247	0.020	0.048	0.102
Negative Abnormal Accruals	13,531	−0.060	0.074	−0.071	−0.043	−0.023
Abnormal Cash Flows	21,987	−0.004	0.176	−0.069	−0.007	0.061
Abnormal Production Cost	21,987	−0.002	0.282	−0.143	0.006	0.136
Abnormal Disc. Expense	21,987	0.013	0.392	−0.146	−0.011	0.190
Combined RAM	21,987	0.005	0.602	−0.313	−0.048	0.304
LP \$m	21,987	0.43	0.56	0.17	0.27	0.44
Ln (LP)	21,987	12.509	0.998	12.042	12.494	12.997
Employee	21,987	9184	22675	364	1617	6700
LP GAP	21,987	0.173	0.267	0.038	0.087	0.189
High LP Gap	21,987	0.274	0.446	0.000	0.000	1.000
Firm Size	21,987	6.408	1.962	5.080	6.425	7.737
Market to Book	21,987	1.858	1.537	0.910	1.360	2.192
ROA	21,987	−0.025	0.210	−0.038	0.034	0.077
Leverage	21,987	0.175	0.199	0.000	0.118	0.281
R&D	21,987	0.059	0.110	0.000	0.008	0.075
Board Independence	21,987	0.609	0.136	0.500	0.609	0.714
Ln (Firm Age)	21,987	2.894	0.679	2.398	2.890	3.367
Firm Age (In years)	21,987	21.67	15.68	10.0	17.0	28.0

4. Empirical Design: Labor Productivity Gap and Earnings Management Proxies

4.1. Measures of Labor Productivity Gap

We define our key independent variable, labor productivity gap, as the portion of target labor productivity that managers cannot achieve in a given year. Labor productivity is the sales per employee. Datta et al. (2005), Snell (1992), and Koch and McGrath (1996) state that firms set a target labor productivity level at the beginning of the year and try to converge its current labor productivity toward the target labor productivity level. Prior literature confirms that firms do have target labor productivity. For example, Snell (1992) and Koch and McGrath (1996) find that firms want to follow the strategies that require employees to act in a certain way. Following Flannery and Rangan (2006), we model the target labor productivity with a possibility of variation of the target across firms or over time, and specify a target labor productivity in the following form:

$$LP^*_{i,t+1} = \beta X_{i,t} \tag{1}$$

where $LP^*_{i,t+1}$ is the target labor productivity for firm i at the year of $t + 1$, $X_{i,t}$ is a vector of labor productivity-related characteristics, and β is the coefficient of the vector. The expected variation in $LP^*_{i,t+1}$ is nontrivial. $X_{i,t}$ includes a log of employees, sales growth, capital intensity, R&D ratio, relative pay, industry growth, industry differentiation, and relative capital intensity (Koch and McGrath 1996; Huselid 1995; Guthrie 2001; Rajagopalan and Datta 1996; Jackson and Schuler 1995; Datta et al. 2005). We estimate the model that allows incomplete adjustment of the firm’s current labor productivity toward its target within each year of operation. For this specification, we use the following standard partial adjustment model:

$$LPI_{i,t+1} - LPI_{i,t} = \lambda(LP^*_{i,t+1} - \beta X_{i,t}) + \delta_{i,t+1} \tag{2}$$

Here, the difference between initial labor productivity and year-end labor productivity is a portion of the gap between actual and target labor productivity and $(1 - \lambda)$ represents the portion of the labor productivity gap for the firm in a given year. Plugging model (1) into model (2) and subsequent rearrangement leaves the estimable model as follows:

$$LPI_{i,t+1} = (\lambda\beta) X_{i,t} + (1 - \lambda)LPI_{i,t} + \delta_{i,t+1} \tag{3}$$

Thus, managers' driving force for earnings management is $(1 - \lambda)$, which represents how much action or initiative they took for achieving the target labor productivity. In model (3), firm i stands in $(LP_{i,t})$ and it wants to be $(\beta X_{i,t})$ in terms of labor productivity, assuming all firms have the same speed of adjustment. We regress model (3) and obtain the coefficient of 0.503 or 50.3% as the value of $(1 - \lambda)$. Solving it, we find $\lambda = 49.7\%$, which is the portion of the total labor productivity gap that managers achieve in a given year. The remaining portion of the $(1 - \lambda)$ is considered the managers' rate of failure to achieve target labor productivity in a given year, which can also be termed as the labor productivity gap. Thus, it becomes our variable of interest in this study.

4.2. Earnings Management Proxies

4.2.1. Measures of Discretionary Accruals

Following Dechow et al. (2003) and Phillips et al. (2003), we consider the modified Jones model by using the following model for estimates of discretionary accruals as the reliability of the inferences:

$$TACC_{it} = \alpha + \beta_1((1 + k)\delta Sales - \delta Rec) + \beta_2 PPE_{it} + \beta_3 TACC_{it-1} + \beta_4 Sales Growth_{it} + \varepsilon_{it} \quad (4)$$

Here, TACC is the difference between operating cash flows and income before extraordinary items as reported on the statement of cash flows. $\delta Sales$ is the change in sales from the previous year to the current year. δRec is the change in accounts receivable from the beginning to the end of the year. PPE is the end-of-year property, plant, and equipment. All variables are scaled by average total assets. The slope coefficient, k , is from the following regression:

$$\delta Rec = \alpha + \delta Sales + \varepsilon_{it} \quad (5)$$

As per the modified Jones model, discretionary are the results of all credit sales in each period and induced by the positive correlation between discretionary accruals and current sales growth.

4.2.2. Measures of Real Activities Manipulation

Roychowdhury (2006) argue that firms start overproduction for lowering COGS, report better operating margin, and thus leave an ambiguous effect on net abnormal CFO. Following extant research (e.g., Kim et al. 2012; Roychowdhury 2006), we estimate normal cash flow using the following model:

$$CFO_t / AT_{t-1} = \alpha + \beta_1(1 / AT_{t-1}) + \beta_2(Sales_t / AT_{t-1}) + \beta_3(\delta Sales_t / AT_{t-1}) + \varepsilon_{it} \quad (6)$$

Here, CFO_t represents the normal cash flows from the operations as a linear function of sales and changes in sales in the current period. AT_t indicates current year's total asset. $\delta Sales$ is the changes in sales with respect to previous year's sales. The residuals represent abnormal cash flow. Following the same literature, we define production cost as the sum of the cost of goods sold and changes in inventory for a given year, and estimate the normal production cost using the following model:

$$PROD_t / AT_{t-1} = \alpha + \beta_1(1 / AT_{t-1}) + \beta_2(Sales_t / AT_{t-1}) + \beta_3(\delta Sales_t / AT_{t-1}) + \beta_4(\delta Sales_t / AT_{t-1}) + \varepsilon_{it} \quad (7)$$

Consistent with simplified assumptions of Dechow et al. (1998) and Roychowdhury (2006), we estimate normal discretionary expenses using the following simplified model of Kim et al. (2012).

$$DiscExp_t / AT_{t-1} = \alpha + \beta_1(1 / AT_{t-1}) + \beta_2(\delta Sales_{t-1} / AT_{t-1}) + \varepsilon_{it} \quad (8)$$

Here, $DiscExp_t$ is the discretionary expenses in year t that include R&D expenses, advertising expenses, and SG&A expenses. We compute combined real activity manipulations as abnormal cash flow minus production cost and, then, adding the results with discretionary expenses.

5. Empirical Results and Discussion

5.1. Summary Statistics

In Table 1, we present the descriptive statistics. All continuous variables are winsorized at the top and bottom 1% level. The full sample consists of 21,987 firm-year observations. The mean (median) absolute abnormal accruals is 0.069 (0.044) million USD with a standard deviation of 0.083 million USD. In the first quartile, the absolute abnormal accrual is 0.023 million USD and in the third quartile, the absolute abnormal accrual is \$0.080 million. The mean (median) of only positive abnormal accrual is 0.095 (0.048) million USD with a standard deviation of 0.247 million USD. The mean (median) of labor productivity is 0.43 (0.17) million USD with a standard deviation of 0.56 million USD. The firm characteristics and necessary variables for the analysis are detailed in Table 1. The firm characteristics include ROA, Firm Size, R&D Ratio, MTB, Leverage, Firm Age, and Board Independence. All variables are defined in Appendix A.

5.2. Earnings Management Activities of Firms' High LPG vs. Low LPG

Table 2 reports firms' earnings management proxies in relation to the levels of labor productivity gap. All proxies are defined in Appendix A. A firm is defined in terms of labor productivity gap. If the labor productivity gap is above the sample mean, we define the firm as having a high labor productivity gap. Otherwise, if the labor productivity gap is below the sample mean, we define the firm as having a low labor productivity gap. The test statistic is based on the difference in means with *p*-values across samples. Significance of means and median are estimated based on the *t*-test and Wilcoxon test, respectively (*p*-values for the *t*-statistic and *Z*-statistic are two-tailed), and reported in respective columns.

Table 2. Earnings management activities of firms: high LPG vs. low LPG.

Variables Earnings Management Proxies	Firms with High LPG		Firms with Low LPG		Difference Test: <i>p</i> -Value	
	Mean	Median	Mean	Median	<i>t</i> -Test	Wilcoxon Test
N	6032		15,955			
ABS_DA	0.093	0.055	0.060	0.041	<0.0001	<0.0001
Positive_DA	0.139	0.065	0.075	0.041	<0.0001	<0.0001
Negative_DA	−0.078	−0.050	−0.054	−0.041	<0.0001	<0.0001
AB_CFO	−0.032	−0.002	0.007	−0.025	<0.0001	<0.0001
AB_PROD	0.081	0.069	−0.033	−0.015	<0.0001	<0.0001
AB_Disc EXP	−0.051	−0.070	0.037	0.006	<0.0001	<0.0001
Combined RAM	−0.175	−0.196	0.073	0.012	<0.0001	<0.0001

In Table 2, the mean (median) of absolute abnormal accrual of firms having a high labor productivity gap is 0.09 (0.06) whereas the mean (median) of absolute abnormal accrual of firms having a low labor productivity gap is 0.06 (0.04). The associated *t*-test and Wilcoxon rank test confirm that the mean and the median of absolute abnormal accrual of firms having a high labor productivity gap are significantly different from that of lower labor productivity gap firms. Similarly, the mean and the median of all other earnings management proxies in firms having high labor productivity are also significantly different from zero.

5.3. Baseline Regression Results: Discretionary Accruals

We consider models 9 and 10 for understanding the relation between the labor productivity gap and earnings management. These two models mostly capture the impact of the labor productivity gap on earnings management by managers. This section entails the

results from those models in different contexts. The basic model we develop in this study for discretionary accruals are as follows:

$$AB_SDA_{it} = \alpha + \beta_1 * LPG_{it} + \beta_2 * Combined_RAM_{it} + \beta_3 * Controls_{it-1} + FE_{sit-1} + \varepsilon_{it}, \quad (9)$$

The baseline regression (model 9) presents the results of the relation between the labor productivity gap and discretionary accruals. The results given in Table 3 do not confirm hypothesis 1, i.e., Transparent Financial Reporting Hypothesis, “ceteris paribus”: Managers, who fail to achieve the target labor productivity gap, will report transparent and reliable financial information to investors and other stakeholders and not indulge in the manipulative behavior of financial reporting. Our first conjecture did not obtain support and the results are consistent with our second conjecture, i.e., Opportunistic Financial Reporting Hypothesis, “ceteris paribus”: Managers, who fail to achieve the target labor productivity gap, will not report transparent and reliable financial information to investors and other stakeholders and indulge in the manipulative behavior of financial reporting.

Table 3. Accrual-based earnings management on labor productivity gap. (** indicates level of significance at 95% level and *** indicates level of significance at 99% level).

Variables	ABS_DA	Positive_DA	Negative_DA
	(1)	(2)	(3)
LP Gap	0.022 *** (5.19)	0.054 ** (2.07)	−0.051 *** (−6.77)
Combined_RAM	0.017 *** (8.11)	0.053 *** (3.33)	0.025 *** (6.77)
Firm Size	−0.006 *** (−12.76)	−0.005 ** (−1.97)	0.009 *** (16.1)
MTB	0.006 *** (7.64)	0.015 *** (2.76)	−0.005 *** (−5.03)
ROA	−0.190 *** (−21.44)	−0.515 *** (−12.02)	−0.173 *** (−9.50)
Leverage	−0.014 *** (−3.44)	−0.012 (−0.44)	−0.005 (−0.87)
R&D	−0.096 *** (−6.4)	−0.358 *** (−4.56)	−0.199 *** (−7.34)
Firm Age	0.002 ** (2.11)	0.019 *** (2.72)	0.001 (0.97)
Board independence	−0.006 (−1.23)	−0.050 *** (−2.89)	−0.002 (−0.39)
Constant	0.094 *** (14.63)	0.026 (0.93)	−0.084 *** (−12.9)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adj. R-sq.	0.25	0.20	0.15
N	21,987	8456	13,531

The absolute discretionary accruals, positive discretionary accruals, and negative accruals will be increased with the increases in the labor productivity gap. The results show that firms, which have a labor productivity gap, do indulge their managers in earnings management through manipulated financial reporting. The regression models include industry and year fixed effects to capture any shock that occurs in the industry in any given year during the sample period of the study. The study also reports the test statistics and significance levels based on the standard errors adjusted by industry clustering based on three-digit SIC codes.

The baseline regressions report the results using the absolute value of discretionary accruals, positive accruals, and negative accruals. Column 1 of Table 3 shows that increasing the labor productivity gap by one percent causes the increase in absolute abnormal accruals by 0.022 points. The result is statistically and economically significant. When the total absolute abnormal accrual is disentangled into two parts, either positive accruals or negative accruals, the analysis also shows the expected finding. In column 2, abnormal positive accrual is positively associated with the labor productivity gap. The coefficient of LPG significantly represents that 0.054 points is to be caused by increasing one percent of the labor productivity gap. Column 3 also shows that the negative abnormal accrual is also increased by the labor productivity gap. Firm-specific controls are consistent with earnings management literature with some exceptions.

5.4. Earnings Management: Real Activities Manipulation

The basic model we develop in this study for recognizing firms' earnings management through real activity manipulation is:

$$RAMproxies_{it} = \alpha + \beta_1 * LPG_{it} + \beta_2 * ABSDA_{it} + \beta_3 * Controls_{it-1} + FEs_{it-1} + \epsilon_{it}, \quad (10)$$

Here, $RAMproxies_{it}$ are cash flow from the operation, production costs, discretionary expenses, and combined RAM. $ABSDA_{it}$ is the absolute value of abnormal discretionary accruals (signed abnormal discretionary accruals). All other variables are the same as those of model 9. In this model, we also include industry fixed effects (based on three-digit SIC codes) and year effects, and ϵ_{it} indicates the error term.

Table 4 presents the results of real activity manipulation regression on the labor productivity gap. It shows the expected relation between the labor productivity gap and real activity manipulation through earnings management proxies. The results given in Table 3 also show no support for hypothesis 1: Transparent Financial Reporting Hypothesis. It, in fact, received no support from the results shown in Tables 3 and 4, while these results provide support for our second hypothesis: Opportunistic Financial Reporting Hypothesis i.e., "ceteris paribus", managers who fail to achieve target labor productivity tend to manage earnings through real activity manipulation. Kim et al. (2012) document that higher (lower) levels of abnormal operating cash flows, abnormal expenses, and overall real activities manipulation (abnormal production) indicate more (less) conservative operating decisions. The other way around will be conducive to indulge managers' earnings management activities. Thus, with a view to report positive earnings, the firm will try to reduce its total cost, increase its sales volume, and manipulate its abnormal cash flows, abnormal production expenditures, and abnormal expenditure. Hence, we expect a positive effect of the labor productivity gap on abnormal production costs and a negative effect on all other proxies of real activities. Consistent with the finding of Kim et al. (2012), the results show that firms that have a labor productivity gap exhibit more abnormal production cost, less abnormal discretionary expenses, abnormal expenses, and combined real activity manipulation. The results are statistically and economically significant.

Table 4. Real activities manipulation on labor productivity gap. (** indicates level of significance at 95% level and *** indicates level of significance at 99% level).

Variables	ABS_CFO	AB_PROD	AB_D.EXP	Combined_RAM
	(1)	(2)	(3)	(4)
LP Gap	−0.030 *** (−4.0)	0.148 *** (12.16)	−0.119 *** (−6.7)	−0.287 *** (−11.1)
ABS_DA	0.239 *** (7.7)	−0.308 *** (−8.4)	0.131 ** (2.3)	0.660 *** (7.9)
Firm Size	−0.029 *** (−17.1)	0.023 *** (10.8)	0.084 *** (17.8)	0.035 *** (7.01)
MTB	0.031 *** (13.9)	−0.044 *** (−14.6)	−0.015 *** (−2.6)	0.053 *** (7.53)
ROA	0.455 *** (22.5)	−0.529 *** (−22.3)	0.204 *** (4.7)	1.252 *** (24.1)
Leverage	−0.035 *** (−3.4)	−0.026 (−1.54)	0.039 (1.46)	0.020 (0.52)
R&D	−0.202 *** (−5.7)	0.017 (0.23)	1.176 *** (11.8)	1.020 *** (6.8)
Firm Age	0.020 *** (5.9)	0.003 (0.59)	−0.089 *** (−9.9)	−0.075 *** (−6.2)
Board Independence	−0.060 *** (−4.1)	0.013 (0.58)	0.141 *** (3.66)	0.108 ** (2.08)
Constant	0.099 ** (2.57)	0.046 (0.73)	−0.550 *** (−7.4)	−0.525 *** (−6.9)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adj. R-sq.	0.403	0.434	0.346	0.437
N	21,987	21,987	21,987	21,987

The baseline regressions report the results using the absolute abnormal cash flow, abnormal production costs, abnormal discretionary expenses, and their combined costs. Consistent with hypothesis 2, the results show the expected relation between the labor productivity gap and real activity manipulation proxies and their magnitude.

5.5. Earnings Management: Different Level of Labor Productivity Gap

The regression results in Table 5 show the impact of different levels of labor productivity gap on different earnings management proxies. The labor productivity gap is divided into two groups (high labor productivity gap and low labor productivity gap) based on its magnitude. Only absolute abnormal accrual is considered from total accruals and only combined real activity manipulation is considered from all other real activity manipulation proxies in order to see their impact on earnings management. Columns 1 and 2 represent the impact of the high labor productivity gap on absolute abnormal accrual. Models 3 and 4 represent the impact of the low labor productivity gap on combined real activity manipulation proxies. Columns 1 and 2 show that firms having a higher labor productivity gap make managers engage in earnings management more (0.0001 million USD without industry and year fixed effects and 0.00007 million USD with industry and year fixed effects) compared to when the labor productivity gap is low. The coefficients of 0.011 and 0.007 are statistically significant at the 0.1% level. Columns 3 and 4 confirm the same result on the combined real activities manipulation proxy. There is a significant difference in earnings management between high labor productivity gap firms and low labor productivity gap firms. The r-squared (0.22, 0.25, 0.24, and 0.43) of all the models, respectively, shows that the models are good fits in explaining the variation of proxies of accruals and real activity manipulation with the labor productivity gap.

Table 5. Earnings management and level of labor productivity gap. (***) indicates level of significance at 99% level).

Variables	ABS_DA	ABS_DA	Combined RAM	Combined RAM
	(1)	(2)	(3)	(4)
High LP Gap	0.011 *** (7.28)	0.007 *** (4.68)	−0.169 *** (−13.40)	−0.077 *** (−7.41)
ABS_DA			0.614 *** (6.55)	0.623 *** (7.42)
Combined_RAM	0.012 *** (6.63)	0.016 *** (7.56)		
Controls	Yes	Yes	Yes	Yes
Constant	0.096 *** (21.68)	0.096 *** (14.57)	−0.010 (−0.19)	−0.570 *** (−7.32)
Year FE	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes
Adj. R-sq.	0.224	0.245	0.239	0.428
N	21,987	21,987	21,987	21,987

5.6. Earnings Management and Labor Productivity Gap with Endogeneity

Table 6 presents the results from the instrumental variables. One challenge for this analysis is the endogenous nature of firms’ target labor productivity and their earnings management proxies. It is plausible to assume that a firm’s target labor productivity is determined by firm characteristics that also drive changes in managers’ actions toward earnings management. In other words, the labor productivity gap and earnings management are simultaneously positively responding to a common shock or due to an important omitted variable(s). The important omitted variable(s) rather than the labor productivity gap may be the cause of influencing managers to engage in earnings management. The standard ordinary least squares (OLS) approach cannot disentangle the impact of endogenously determined firm characteristics. This study contributes to this issue by bringing omitted variables into the analysis.

Table 6. Results from the instrumental variable analysis. (** indicates level of significance at 95% level and *** indicates level of significance at 99% level).

Variable	ABS_DA	ABS_DA	Combined_RAM	Combined_RAM
	(1)	(2)	(3)	(4)
LP Gap	0.217 **	0.187 **	−0.897 **	−1.063 ***
Test–Statistic	(2.89)	(2.42)	(−2.70)	(−2.99)
ABS_DA			−0.124	0.795 ***
			(−0.65)	(7.50)
Combined_RAM	0.007	0.028 ***		
	(0.87)	(4.85)		
First-Stage F-stat	19.27	14.77	18.31	15.90
T-sat on Instrument	(4.39) ***	(3.84) ***	(4.28) ***	(3.99) ***
Firm-SpecificControls	No	Yes	No	Yes
Constant	0.022	0.037	−0.136	−0.264
	(1.49)	(1.43)	(−0.98)	(−1.94)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-Sq.	0.05	0.05	0.26	0.35
N	21,987	21,987	21,987	21,987

McNichols and Stubben (2008) find that by manipulating financial reporting, firms make suboptimal investment decisions that give an advantage to the external parties at the expense of the shareholders of the firms. Similarly, Tang (2007) states that firms’ investment level is higher with the most aggressive accounting practices. However, Julio and Yook (2016) make similar but a little different conclusion between the firms’ earnings management and subsequent investment decision. They argue that a moderate level of earnings management improves firms’ corporate investment decisions while an excessive amount unwraps the benefit of earnings management. Investment literature confirms these conditions. Penman and Zhang (2002) and Graham et al. (2005) find that cutting investments can boost reported earnings in the presence of conservative accounting productivity growth as a function of investment. Considering this literature, we use negative investment as an instrumental variable for predicting the labor productivity gap and earnings management proxies. The negative investment satisfies the condition of the relevance criterion, e.g., it is highly correlated with the labor productivity gap (first stage t statistic is 4.39 and 4.28) and earnings management proxies, and exclusion restriction, e.g., it should not have a direct effect on earnings management proxies.

Negative investment growth is a good instrument (first stage F test 19.27 and 18.31) because the first stage F statistic passes the minimum F value criteria (10). These findings confirm the true relation between the labor productivity gap and earnings management proxies, which is not determined endogenously or by an important omitted variable.

6. Labor Productivity Gap and Managerial Incentives

Earnings management literature aligns the managers’ earnings management motive with their desire to maximize personal interests, e.g., total compensation (Bergstresser and Philippon 2006), pay disparities (Park 2017), and short-run bonuses (Guidry et al. 1999). In this section, we test whether the labor productivity gap threatens managers’ personal benefit.

The results show that a 0.395% decrease in managers’ total compensation in year t + 1 is associated with a one percent increase in the labor productivity gap in year t. Similarly, a 0.088% decrease in managers’ stock compensation in year t + 1 is associated with a one percent increase in the labor productivity gap in year t. A 0.011% decrease in managers’ deferred compensation in year t+1 is associated with a one percent increase in the labor productivity gap in year t. We find a potential threat to their employment in the following year of experiencing the labor productivity gap. One percent increase in the labor

productivity gap causes a layoff of about 50 employees in the following year. All estimated results are highly statistically and economically significant.

7. Robustness Checks

In this section, the sensitivity of OLS regression using firm fixed effect, subsample periods, and industry clustering is evaluated. Table 7 presents the results of the sensitivity of OLS regressions. The results still hold for each cluster, which shows the increasing earnings management with an increase in the labor productivity gap (LPG). Table 8, Panel A, shows the estimates from the regressions with firm fixed effects. All specifications control for the same set of independent variables belonging to Equations (9) and (10) under research design. All regressions include firm and year fixed effects but are not reported for brevity. Standard errors are corrected for clustering at the industry (based on three-digit SIC code) level and t statistics are reported in parentheses below the estimates. The table shows that absolute abnormal accrual and combined real activities are positively and negatively associated with labor productivity, respectively. The true impact of labor productivity is there even with firm fixed effect, which holds the second hypothesis of our study.

Table 7. Labor productivity gap and employee motivation. (** indicates level of significance at 95% level and *** indicates level of significance at 99% level).

Variables	Future Compensation	Future Stock Compensation	Future Def. Compensation	Future Employee Lay Off
	(1)	(2)	(3)	(4)
LP Gap	−0.395 *** (−3.4)	−0.088 ** (−2.1)	−0.011 ** (−2.2)	−0.525 *** (−10.9)
Controls	Yes	Yes	Yes	Yes
Constant	12.349 *** (36.2)	8.908 *** (84.7)	0.445 *** (15.3)	1.802 *** (2.97)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adj. R-sq.	0.920	0.783	0.247	0.851
N	1091	17,805	17,836	17,998

Table 8. A. Robustness checks for Firm and year fixed effects. **B.** Robustness checks for Industry clustering. **C.** Robustness Check for Subsample period analysis. (** indicates level of significance at 95% level and *** indicates level of significance at 99% level).

Panel A: Firm and year fixed effect						
Variables	ABS_DA (1)		Positive_DA (2)		Negative_DA (3)	
LP Gap	0.022 *** (5.19)		0.054 ** (2.07)		−0.051 *** (−6.77)	
Controls	Yes		Yes		Yes	
Adj. R-sq.	0.25		0.20		0.15	
N	21,987		8456		13,531	
Panel B: Industry clustering						
Variables	ABS_DA (1)		Positive_DA (2)		Negative_DA (3)	
LP Gap	0.022 *** (8.9)		0.054 *** (2.9)		−0.051 *** (−7.4)	
Controls	Yes		Yes		Yes	
Adj. R-sq.	0.25		0.20		0.15	
N	21,987		8456		13,531	
Panel C: Subsample period analysis						
Variables	ABS_DA (1)	Combined RAM (2)	ABS_DA (3)	Combined RAM (4)	ABS_DA (5)	Combined RAM (6)
LP Gap	0.02 *** (3.16)	(−6.68)	(5.19)	Combined RAM (4)	ABS_DA (5)	(−8.72)
ABS_DA		0.61 *** (3.75)		(−11.09)	(2.95)	0.77 *** (3.2)
Combined RAM	0.02 *** (3.83)		Yes	0.66 *** (8.1)		Yes
Controls	Yes	Yes	Yes			Yes
Adj. R-sq.	0.218	0.435	0.247			0.434
N	5197	5197	21,987	Yes	Yes	12,070
				0.437	0.239	

Table 8 (A) presents the results of the firm and year fixed effects. LP gap is significant at alpha of 0.01. Table 8 (B) shows the sensitivity of OLS regressions using industry clustering, which shows the increasing earnings management when firms experience an increase in the labor productivity gap (LPG). The table shows that absolute abnormal accrual and combined real activities are positively and negatively associated with labor productivity, respectively. The estimated results are in the same magnitude and significant as the baseline regression results given in Table 3. We test our hypothesis on different subsample periods with a view to address the skeptics of potential data snooping. Table 8 (C) presents the results of the sensitivity of OLS regressions using different sample periods, which shows the increasing earnings management with an increase in the labor productivity gap (LPG). All specifications control for the same set of independent variables belonging to Equations (9) and (10) under research design. All regressions include industry and year fixed effects but are not reported for brevity. All the coefficients in Table 8, Panel C, are statistically and economically significant, suggesting that firms having a labor productivity gap tend to engage more in expense-increasing earnings management, regardless of sample periods.

8. Conclusions

This study attempts to examine the impact of the labor productivity gap on firms' earnings management. It tests different hypotheses on different earnings management proxies: accrual based earnings and real activity manipulation. The results of the study show that earnings management is positively associated with the labor productivity gap. The results hold after controlling for a set of firm characteristics, alternative statistical measurements, and potential substitution between accrual-based earnings management and real activity manipulation proxies. This study addresses the endogenous problem by bringing an important omitted variable into the context. The results are robust to firm fixed effects and different sample periods. The findings are consistent with the opportunistic financial reporting of the earnings hypothesis. The labor productivity gap is directly related to setting the targeted labor productivity and actual labor productivity with respect to the time period. The labor productivity gap can be addressed if time and realistic targets are taken into consideration. The inertia of addressing these issues can be significantly attributed to the failure to carefully examine the earnings management motivation of managers, which causes earnings management. This speculation could be tested in future research.

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Appendix A. Variable Definitions

Variables	Definitions
ABS_DA	Absolute value of abnormal discretionary accruals calculated using the modified Jones model.
Positive_DA	Positive abnormal discretionary accruals computed using the modified Jones model.
Negative_DA	Negative abnormal discretionary accruals computed using the modified Jones model.
AB_CFO	Operating cash flow Compustat item OANCF.
AB_PROD	Residual from the normal production cost model, where production cost represents the sum of the cost of goods sold and the changes in inventories.
AB_DISEXP	Residual from the discretionary expense model, where discretionary expense represents the sum of R&D expenses, advertising expenses, and SG&A expenses whose missing values replaced by zero.
Combined RAM	Combination of real activities manipulation proxies computed as abnormal cash flows - abnormal production cost + abnormal disc. Expense. The final figure represents their absolute values.
LPG	Log of the portion of target labor productivity that a firm does not achieve in a given year. The labor productivity gap (LPG) is computed using the standard partial adjustment model. For more details, see Section 4.1.
High LPG	A dummy variable indicating 1 if firms experience labor productivity above sample average and 0, otherwise.
Sales Growth	Change in sales scaled by lagged sales for a given year.
ROA	Income before extraordinary items (IB) scaled by total asset (AT).
Firm Size	Natural logarithm of the market capitalization.
Market to Book	Market capitalization (PRCC_C*CSHO) scaled by total asset (AT).
R&D Ratio	Research and development (R&D) expense scaled by total asset (AT).
Firm Age	Natural logarithm of the number of years since the firm first appears in the Compustat database +1.
Leverage	Long-term liability scaled by the total asset. (DLTT)/AT.
Board Independence	Average percentage of independent directors in the board computed by adding all independent director from the sample period and scaled by the number of total board members for the period.
Negative Investment	Percentage of only negative investment computed by (CAPX _T -CAPXT-1)/CAPXT-1

Notes

- ¹ See at https://www.rug.nl/news/2011/05/066_mccarthy?lang=en and a list of failed mergers and acquisitions at <https://www.investopedia.com/articles/financial-theory/08/merger-acquisition-disasters.asp>. accessed on 6 November 2018.
- ² <https://www.cbinsights.com/research/merger-acquisition-corporate-fails/>. accessed on 6 November 2018.

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