

FROM ACCRUALS TO REAL ACTIVITIES: UNDERSTANDING THE TRADE-OFF IN EARNINGS MANAGEMENT CHOICES AMID XBRL ADOPTION IN ITALY

LÁSZLÓ SZÍVÓS¹, TAMÁS POSZAVECZ²

Abstract

This study examines the factors influencing managerial decisions between accrual-based earnings management (AEM) and real earnings management (REM) following the mandatory adoption of eXtensible Business Reporting Language (XBRL) among firms listed on the Italian stock exchange. By analyzing the shift between AEM and REM, the research provides insights into how enhanced financial reporting transparency affects managerial decision-making. The study employs an empirical analysis of Italian firms to assess the relationship between XBRL adoption and earnings management practices. The research investigates the extent to which firms adjust their earnings management strategies in response to increased transparency, with a specific focus on the trade-off between AEM and REM. The results indicate that mandatory XBRL adoption is associated with a decline in accrual-based earnings management (AEM) and a corresponding increase in real earnings management (REM) among Italian firms. The findings suggest that increased financial reporting transparency prompts firms to rely more on REM while simultaneously reducing their use of AEM. Additionally, the intensity of the trade-off between AEM and REM is found to be positively moderated by firms classified as SUSPECT, which are those reporting only small positive profits or slight increases in profitability. These firms would likely have experienced losses or declining profitability without the use of earnings management tools, with a stronger tendency to rely on AEM over REM. However, this moderating effect was not observed among loss-making (LOSS) firms. This study makes two key contributions. First, it is among the first to examine the impact of XBRL implementation on earnings management practices within a European context, specifically in Italy. Second, it provides novel insights into the factors influencing the trade-off between AEM and REM, addressing an important gap. The findings highlight the unintended consequences of financial reporting standardization, demonstrating that increased transparency may shift earnings management strategies rather than eliminate them. Regulators and policymakers should consider these effects when designing financial disclosure regulations to mitigate potential opportunistic behavior by firms.

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¹ Eötvös Loránd University, Faculty of Economics, Budapest, Hungary, e-mail: szivos.laszlo@gtk.elte.hu, ORCID: <https://orcid.org/0009-0008-2517-9808>.

² Robert Bosch Kft, Budapest, Hungary, e-mail: tamas.poszavec@student.elte.hu, ORCID: <https://orcid.org/0009-0007-0324-6099>.

INTRODUCTION

The quality of financial statements is crucial for investors, lenders, and the public. Any innovation that enhances financial reporting quality deserves attention in both professional and academic spheres. XBRL (eXtensible Business Reporting Language), introduced by XBRL International Inc. in 2003, is a reporting framework designed to improve business communication. Widely adopted by regulators, XBRL facilitates the seamless global exchange of financial data (Apostolou et al., 2009). Effective financial reporting requires not only standardized accounting practices but also automated processes for data management. Based on XML, XBRL employs tags to make financial data machine-readable and easily processable (Valentinetti et al., 2011). Early studies (Chang & Jarvenpaa, 2005; Wagenhofer, 2003) suggest XBRL standardizes financial reporting content and format, enhancing transparency and information quality (Liu et al., 2017; Tawiah & Borghi, 2022). Research also indicates that XBRL improves financial statement comparability, reducing information asymmetry (Hodge et al., 2004; Yoon et al., 2011; Kim et al., 2012; Liu & Yao, 2014; Liu & Wang, 2017).

Innovations that reduce information asymmetry or improve financial statement transparency limit managers' ability to manipulate earnings through biased accounting choices. With XBRL, financial data can be more easily extracted and analyzed, aiding in the detection of manipulations. Since XBRL adoption increases the likelihood that auditors, investors, and regulators will uncover financial misstatements, managers have less flexibility for accruals manipulation to meet earnings targets (Kim et al., 2012; Kim et al., 2019). However, in line with agency theory, when incentives encourage managers to maximize their own benefits (Watts & Zimmerman, 1978; Baker et al., 2019), they may turn to alternative methods, such as real earnings management (Ewert & Wagenhofer, 2005; Gao et al., 2017; Cooper et al., 2018). Prior research suggests real earnings management is preferable to accrual-based methods because it is less likely to result in accounting violations, making it a viable strategy when detection risk increases, as seen with XBRL implementation (Cohen & Zarowin, 2010; Cai et al., 2020; Huan et al., 2020).

Our study makes a twofold contribution to the earnings management literature. First, it examines how XBRL implementation has influenced earnings management practices in Italy, a country not yet studied in this context. Research on the link between XBRL adoption and earnings management remains limited, with most studies focused on China (Peng et al., 2011; Chen et al., 2020), the US (Kim et al., 2019), Indonesia (Mayapada et al., 2020; Frista et al., 2023), and the United Arab Emirates (Sanad, 2024). By extending this research to

Europe, our study assesses the generalizability of previous findings. Italy offers a unique setting, as its XBRL adoption for listed companies occurred in clear stages - optional adoption (2018-2020) and mandatory adoption (2021-2022) - allowing for a precise examination of XBRL's impact on earnings management. In contrast, other European countries have not followed such clearly defined stages, complicating the analysis of its effects.

Second, we contribute to the literature by further examining the trade-off between accrual-based earnings management (AEM) and real earnings management (REM). Prior research has explored this trade-off in various contexts. Some studies (Cohen et al., 2008; Zang, 2012; Ashbaugh-Skaife et al., 2008) analyzed how the Sarbanes-Oxley Act (SOX) in the US and IFRS adoption (Doukakis, 2014; Ho et al., 2015; Ipino et al., 2016) influenced managers' choices between these techniques. Others have investigated factors such as the cost of using different methods (Zang, 2012), investor protection (Enomoto, 2015), compensation clawbacks (Chan et al., 2015), and seasoned equity offerings (Kothari et al., 2016). However, to our knowledge, no prior research has examined how firm-specific characteristics - such as being loss-making or reporting only marginal improvements in earnings and return on assets (ROA) compared to the previous year - affect the intensity of trade-off between AEM and REM.

The paper is structured as follows: the next section covers the Literature review and hypothesis development, followed by the Data and methodology. The Results section presents descriptive statistics and empirical findings, followed by the Discussion, which interprets the results and relates them to existing research. Finally, we conclude with a summary of key findings and their practical implications.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The literature review is structured to effectively support the development of our hypothesis. This section is divided into two main subsections. First, we analyze and discuss prior research on the impact of XBRL adoption on firms' earnings management practices. In the second part, we provide an overview of studies examining the trade-off between accrual-based earnings management (AEM) and real earnings management (REM).

PHASES OF XBRL IMPLEMENTATION IN ITALY

Valentinetti and Rea (2011) note that XBRL was introduced in Italy as early as 2009, but its initial adoption was limited to non-listed firms and only applied to core financial statements - excluding accompanying

notes. Publicly listed companies and IFRS-reporting firms were exempt from using the XBRL taxonomy, a deviation from the approach taken by several other European countries (Avallone et al., 2016).

In 2018, the European Parliament and Council introduced the European Single Electronic Format (ESEF) to standardize digital reporting for publicly listed companies. Regulation 2018/85/EU mandated that, from January 1, 2020, these companies submit financial reports in XHTML format and tag IFRS consolidated statements with XBRL labels (EC, 2018). Due to the COVID-19 pandemic, an optional one-year deferral delayed mandatory compliance until 2021. From 2021, primary financial statements required XBRL tagging, with accompanying notes added in 2022 (EC, 2021; Miścikowska, 2022). To facilitate adaptation, both the EU and Italian regulators allowed voluntary reporting from 2018 to 2020.

THE IMPACT OF XBRL ADOPTION ON THE FIRMS' EARNINGS MANAGEMENT ACTIVITIES

Prior studies have explored how stricter financial regulations, such as the Sarbanes-Oxley Act (SOX) and International Financial Reporting Standards (IFRS), influence this choice. Cohen et al. (2008) and Zang et al. (2012) found that SOX did not eliminate earnings management but shifted it from AEM to REM, as managers remained motivated to meet earnings targets. Their findings indicate a post-SOX decline in AEM accompanied by an increase in REM, suggesting that stricter regulations make REM a preferred alternative. The impact of IFRS adoption has yielded mixed findings. Doukakis (2014), analyzing European firms between 2000 and 2010, found no significant effect on either AEM or REM. In contrast, Ho et al. (2015) reported that IFRS adoption in China reduced discretionary accruals while increasing REM. Their analysis further revealed that the decline in AEM was less pronounced among firms with government control, those in less developed regions, and firms with weaker financial performance. Ipino et al. (2016) reached a similar conclusion, finding that firms, particularly in countries with strict law enforcement, substituted AEM with REM after IFRS adoption.

While XBRL adoption significantly impacts financial reporting, its effect on earnings management remains underexplored. Research indicates that XBRL reduces accrual-based earnings management (AEM) by enhancing transparency and comparability. Studies across different markets, including China (Peng et al., 2011) and the US (Kim et al., 2019; Hsieh et al., 2019), report a decline in discretionary accruals post-XBRL adoption, reinforcing that XBRL restricts AEM.

Building on the argument that XBRL increases reporting transparency and the cost of AEM, studies sug-

gest firms shift toward real earnings management (REM) as an alternative. Kim et al. (2019) and Hsieh et al. (2019) found a positive association between XBRL adoption and REM, with Hsieh et al. (2019) linking it to abnormal cash flows. Similar trends were observed in Indonesia (Mayapada et al., 2020) and China (Chen et al., 2020), where transparency and comparability improvements led managers to favour REM when AEM was constrained. Since REM involves real business activities rather than accounting estimates, it is less likely to attract regulatory scrutiny, making it a preferred method when transparency measures restrict AEM (Cai et al., 2020).

Following the standard substitution theory in the earnings management literature (e.g., Cohen et al., 2008; Zang, 2012), we posit that the implementation of XBRL adoption in Italy from 2021 enhances financial reporting transparency, thereby increasing the cost and risk of accrual-based earnings management. As a result, managers are more likely to shift toward real earnings management, which is harder to detect and regulate. This theoretical sequence motivates the following two hypotheses.

H_{1a}: The mandatory adoption of XBRL in Italy is associated with a decrease in accrual-based earnings management among firms listed on the Italian stock exchange.

H_{1b}: As a result of the constraints on accrual-based earnings management caused by the mandatory adoption of XBRL implementation, Italian firms increased their use of real earnings management.

CHOICES BETWEEN AEM AND REM

Prior research has explored additional factors influencing the trade-off between accrual-based earnings management (AEM) and real earnings management (REM). Enomoto et al. (2015) examined investor protection, considering factors such as investor rights, legal enforcement, disclosure indices, and analyst followings. Their findings confirmed a substitution effect between AEM and REM, showing that stronger investor protection constrains AEM. However, the impact on REM was mixed - while analyst following and legal enforcement limited REM due to enhanced monitoring, other investor protection measures showed no consistent effect. Chan et al. (2015) investigated the effect of clawback provisions and found that, although total earnings management remained unchanged, firms shifted from AEM to REM, reinforcing the substitution effect. Kothari et al. (2015) analyzed earnings management during seasoned equity offerings (SEOs) and found that firms favored REM over AEM following post-SEO stock underperformance, despite REM's higher long-term costs. They suggested that in periods of heightened scrutiny, managers prefer earnings man-

agement techniques that pose lower reputational risks if detected. Boulhaga et al. (2022) found that stronger internal controls reduce discretionary accruals while increasing REM. Similarly, Owusu et al. (2022), studying UK firms (2009-2016), examined the role of female auditors in earnings management but found no association with REM.

Some other studies (Cohen & Zarowin 2010, Gunny 2010, Vorst 2016; Gao et al. 2017) provide arguments as to why a firm prefers engaging in REM versus AEM. The general finding is that, on the one-hand, AEM is considered to bring higher risk of regulatory scrutiny and litigation. On the other hand, building up discretionary accruals in previous years and specific business operations might restrict the opportunity to further implement accrual-based earnings management. As opposed to this, REM is less subject to auditor scrutiny and may be more suitable in certain situations.

Based on the prior research presented above, it is evident that several factors contribute to the existence of a trade-off between AEM and REM. However, to the best of our knowledge, no previous studies have investigated the factors influencing the intensity of this trade-off between the two methods. Building on the findings of prior research such as Roychowdhury (2006), Zang (2012), Doukakis (2014) and Chen et al. (2020), we propose that firms in a loss-making position (i.e., with a negative return on assets (ROA)) or those that, in the absence of earnings management, would report a steady or declining ROA, zero, or a slightly negative profit, are more likely to prefer AEM techniques as opposed to REM.

The rationale behind this preference is that the realization of a loss is typically identified in the fourth quarter of the fiscal year, when actual data for the first three quarters is available, along with a relatively accurate forecast for the final quarter. By this stage of the financial year, however, managers have limited time to implement REM strategies effectively to meet their

earnings targets by the end of the year. Given these time constraints, they are more likely to rely on AEM, which can be executed within a shorter time frame and without requiring operational adjustments. As a result, loss-making firms or suspect firms - those reporting zero or minimal increases in ROA compared to the previous year or zero or small positive earnings - are less likely to shift from AEM to REM. All of this alters the well-established trade-off between the two earnings management techniques, leading to a reduced substitution effect. Based on this rationale we propose the following two hypotheses:

- H₂: A company's loss-making status (LOSS) weakens the trade-off between real and accrual-based earnings management, as loss-making firms tend to rely more on accrual-based techniques.
- H₃: A firm's suspect status (SUSPECT) weakens the trade-off between real and accrual-based earnings management, as suspect firms tend to rely more on accrual-based techniques.

DATA AND METHODOLOGY

SAMPLE SELECTION AND SOURCE OF DATA

To test our hypotheses, we analysed firms listed on the Italian stock exchange for the period from 2016 to 2022. This period allows us to examine three distinct phases of XBRL adoption: (i) pre-XBRL years (2016-2017), (ii) an optional adoption phase (2018-2020), and (iii) the mandatory adoption period (2021-2022). Our initial sample consisted of 458 companies with 3,206 firm-year observations. However, after excluding firms in the financial sector and removing observations with insufficient data for calculating earnings management proxies, the final sample comprised 223 firms with 936 firm-year observations (Table 1). As a result of the steps detailed above, we ended up with an unbalanced panel (that is the length of time-series belonging to a given company might vary between 1 and 5) of 936 firm-year observations.

Table 1: Sample selection

Sample selection	Companies	Firm-year observations
Initial sample	458	3,206
Less: firms / observations in the financial industry	(73)	(511)
Less: observations with insufficient data for calculating EM proxies	(162)	(1,759)
Final sample	223	936

Source: Author's own work.

Table 2 presents the distribution of our panel data by year and industry. The largest proportion of observations comes from 2022, with 193 firm-year observations (20.6%). Among industries, the consumer cyclicals sector represents the largest share, accounting for 271

firm-year observations, which constitutes 29% of the total sample. All financial and non-financial data of companies were retrieved from Refinitive Eikon database (now LSEG Workspace).

Table 2: Sample distribution by year and industry

Industry	Observations		Year	Observations	
	No.	%		No.	%
Basic Materials	44	4.70%	2016	93	9.94%
Consumer cyclical	271	28.95%	2017	92	9.83%
Consumer non-cyclical	78	8.33%	2018	104	11.11%
Energy	39	4.17%	2019	141	15.06%
Healthcare	59	6.30%	2020	150	16.03%
Industrials	233	24.89%	2021	163	17.41%
Real Estates	28	2.99%	2022	193	20.62%
Technology	116	12.39%	Total	936	100.00%
Utilities	68	7.26%			
Total	936	100.00%			

Source: Author's own work.

RESEARCH DESIGN AND MODEL SPECIFICATION

To operationalize our hypotheses, we first define the measures we used as proxies for real earnings management (REM) and accrual-based earnings management (AEM).

The most commonly used proxy for REM is the one proposed by Roychowdhury (2006). Roychowdhury (2006) developed a REM proxy to quantify the extent of real earnings manipulation that captures earnings management through three primary channels where firms engage in real activities manipulation to temporarily enhance reported earnings.

Firms may manipulate sales by offering discounts or lenient credit terms to temporarily inflate earnings. Roychowdhury (2006) suggests measuring sales manipulation through cash flows from operations (CFO_{it}), which should follow a linear function of sales (SALES_{it}) and sales changes (ΔSALES_{it}). To quantify this, we estimate the coefficients of Equation (1) annually and use residuals to separate normal and abnormal cash flows. The estimated CFO (CFO_{it}) reflects normal cash flow, while abnormal CFO - the difference between estimated and actual values - serves as an indicator of sales manipulation.

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_0 + \alpha_{1i} \left(\frac{1}{A_{it-1}}\right) + \alpha_{2i} \left(\frac{SALES_{it}}{A_{it-1}}\right) + \alpha_{3i} \left(\frac{\Delta SALES_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (1)$$

Overproduction occurs when firms produce excessively within a period, spreading fixed costs over a larger output to temporarily lower the cost of goods sold (COGS_{it}) and inflate profits. To measure abnormal production costs, we estimate the coefficients of Equation (2) and Equation (3) annually, using residuals to identify discretionary production costs. The total discretionary production cost, as defined in Equation (4), is the sum of discretionary COGS from Equation (2) and the discretionary change in inventory (ΔINV_{it}) from Equation (3).

$$\frac{COGS_{it}}{A_{it-1}} = \alpha_0 + \alpha_{1i} \left(\frac{1}{A_{it-1}}\right) + \alpha_{2i} \left(\frac{SALES_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (2)$$

$$\frac{\Delta INV_{it}}{A_{it-1}} = \alpha_0 + \alpha_{1i} \left(\frac{1}{A_{it-1}}\right) + \alpha_{2i} \left(\frac{\Delta SALES_{it}}{A_{it-1}}\right) + \alpha_{3i} \left(\frac{\Delta SALES_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (3)$$

$$\frac{PROD_{it}}{A_{it-1}} = \alpha_0 + \alpha_{1i} \left(\frac{1}{A_{it-1}}\right) + \alpha_{2i} \left(\frac{SALES_{it}}{A_{it-1}}\right) + \alpha_{3i} \left(\frac{\Delta SALES_{it}}{A_{it-1}}\right) + \alpha_{4i} \left(\frac{\Delta SALES_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (4)$$

Firms may cut discretionary expenditures, such as R&D, advertising, and SG&A costs, to temporarily boost current-period profits, though this may harm long-term performance. Discretionary expenses (DISCEXP_{it}) are calculated as the sum of these components. The normal level of DISCEXP_{it} is estimated annually using Equation (5), with residuals serving as indicators of abnormal discretionary expenses.

$$\frac{DISCEXP_{it}}{A_{it-1}} = \alpha_0 + \alpha_{1i} \left(\frac{1}{A_{it-1}}\right) + \alpha_{2i} \left(\frac{\Delta SALES_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (5)$$

All models defined by equations from (1) to (5) are scaled by lagged Total Assets (A_{it-1}) to mitigate heteroskedasticity.

Following the well-established practice of prior research (among others Roychowdhury, 2006; Cohen et al., 2008; Boulhaga et al., 2022; Ricipito, 2024) we calculate our real earnings management proxy (REM_{it}) with the following formula:

$$REM_{it} = CFO_{it} - PROD_{it} + DISCEXP_{it} \quad (6)$$

We use Kothari et al. (2005) extension of the modified Jones model (Dechow & Dichev, 2002, Denich 2021) as a proxy for accrual-based earnings management (AEM). This approach, widely used in prior research (e.g., Cohen et al., 2008; Chan et al., 2015; Gao

et al., 2017; Kim et al., 2019), refines the model by incorporating lagged Return on Assets (ROA). The adjustment accounts for the influence of prior-year performance on managers' earnings management decisions, as firms with varying past performance may exhibit systematic accrual differences. By including lagged ROA, the model improves the accuracy of discretionary accrual estimates.

To calculate Total Accruals (TA_{it}) we use the following formula in line with Dechow and Dichev (2002) and Hribar and Collins (2002):

$$TA_{it} = EBIT_{it} - CFO_{it} \quad (7)$$

Where TA_{it} is the Total Accrual in year t and $EBIT_{it}$ is the Earnings Before Interest and Tax in year t and CFO_{it} is the cash flows from operation in year t.

To compute discretionary accruals, we estimate the coefficients of Equation (8) for each year and use the model residuals as a measure of AEM:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \frac{\Delta SALES_{it} - \Delta REC_{it}}{A_{it-1}} + \alpha_3 \frac{PPE_{it}}{A_{it-1}} + \alpha_3 \frac{ROA_{it-1}}{A_{it-1}} + \varepsilon_{it} \quad (8)$$

Where $\Delta SALES_{it}$ stands for the change in sales from the previous period to the current period, ΔREC_{it} is the change in receivables from the previous period to the current period, PPE_{it} is the gross Property, Plant and Equipment in year t and ROA_{it-1} is the lagged return on asset ratio in year t-1. Equation (8) is also scaled by lagged total assets (A_{it-1}) in order to address heteroskedasticity.

While prior research suggests that the relationship between total accruals and the explanatory variables may be nonlinear (see, e.g., Höglund, 2012; Collins et al., 2017; Klietk et al., 2021), these models remain widely used in the field of earnings management research despite such concerns.

Our main variable of interest is $XBRL_M$, a dummy variable that equals 1 for the years 2021 and 2022, reflecting the mandatory adoption of XBRL for listed Italian firms from 2021 onward and zero otherwise. By introducing $XBRL_O$ as a dummy variable, assigned a value of 1 for the years 2018 to 2020, we aim to assess the impact of the optional adoption of XBRL within our model. During this period, the XBRL taxonomy was already available in Italy; however, its adoption remained voluntary for listed firms. To examine the relationship between mandatory XBRL adoption and the real earnings management activities of Italian listed firms, we specify the regression model in Equation (9). To mitigate the influence of outliers, all continuous variables are winsorized at the 1st and 99th percentiles on both tails of the distribution.

$$REM_{it} = \beta_0 + \beta_1 XBRL_O_{it} + \beta_2 XBRL_M_{it} + \beta_3 DACC_{it} + \beta_4 XBRL_M_{it} * DACC_{it} + \beta_5 SUSPECT_{it} + \beta_6 SUSPECT_{it} * DACC_{it} + \beta_7 LOSS_{it} + \beta_8 LOSS_{it} * DACC_{it} + \beta_9 BIG4_{it} + \beta_{10} AUDITOP_{it} + \beta_{11} SIZE_{it} + \beta_{12} LEV_{it} + \beta_{13} MTB_{it} + \beta_{14} l_ROA_{it} + \beta_{15} GOV_{it} + \beta_{16} \Delta GDP_{it} + \varepsilon_{it} \quad (9)$$

Table 3 contains and summarizes all variables we use in our analysis.

Table 3: Variable definition

Variable name	Definition	Expected sign	Source
Dependent variable			
REM	Our REM proxy calculated by $CFO_{it} - PROD_{it} + DISCEXP_{it}$ based on the Roychowdhury (2006) model		REM proxy calculated by authors
Variable of interest			
XBRL_O	Dummy variable: equals to 1 in years 2019 and 2020, 0 otherwise	+	Defined by the authors
XBRL_M	Dummy variable: equals to 1 in years 2021 and 2022, 0 otherwise	+	Defined by the authors
Controll variables			
DACC	Discretionary accruals calculated by the Kothari model	-	AEM proxy calculated by authors
BIG4	Dummy variable: equals to 1 if the firm is audited by a BIG4 company, 0 otherwise	+	Defined by the authors based on Refinitive Eikon
AUDITOP	Dummy variable: equals to 1 if the company has a clear audit opinion in the given year, 0 otherwise	-	Defined by the authors based on Refinitive Eikon

Variable name	Definition	Expected sign	Source
Control variables			
SIZE	Natural logarithms of total assets	-	Refinitive database
LEV	Ratio of total liabilities and total assets	+/-	Refinitive database
MTB	Market to Book ratio calculated by dividing the book value of equity by book value of shareholder's equity	-	Refinitive database
I_ROA	Previous year net profit after tax divided by the previous year total assets	+	Refinitive database
SUSPECT	Dummy variable: Its value is equal to 1 if the company reported small profit ($0.01 > ROA > 0$) AND / OR reported a small growth in profitability ($0.005 > \Delta ROA > 0$) in the current year	+	Defined by the authors based on Refinitive Eikon
LOSS	Dummy variable: equals to 1 if ROA is negative, 0 otherwise	+	Defined by the authors
GOV	The arithmetic average of three government control variables (Rule of Law, Control of corruption and Regulatory quality)	+	Worldbank
ΔGDP	GDP-growth of the country in a given year	-	Eurostat

Source: Author's own work.

We include discretionary accruals (DACC) as a measure of accrual-based earnings management (AEM) to account for the trade-off between AEM and real earnings management (REM), following Chen et al. (2020). Prior research (DeAngelo, 1981; Becker et al., 1998; Krishnan, 2003; Cohen & Zarowin, 2010; Francis & Wang, 2010; Chi et al., 2011; Alhadab & Clacher, 2018; Denich & Baracsi, 2023) indicates that firms audited by BIG4 auditors produce higher-quality financial reports than those audited by non-BIG4 firms. Therefore, we control for BIG4 and expect a positive coefficient, consistent with Chen et al. (2020) and Hsieh et al. (2018). Stronger audits reduce AEM, leading managers to rely more on REM. We also include audit opinion (AUDITOP), a dummy variable set to 1 for a clean opinion and 0 otherwise (Chen et al., 2020). Firm size (SIZE), measured by lagged total assets, is included as larger firms face greater regulatory scrutiny, limiting earnings management (Lobo & Zhou, 2001; Xie et al., 2003; Swastika, 2013; Trang & Mai, 2021). The effect of leverage (LEV) on earnings management is debated - highly leveraged firms may manipulate earnings to meet debt covenants, but greater creditor scrutiny may also constrain opportunistic decisions (DeFond et al., 2007; Peng et al., 2011; Rahmani & Mir, 2013; Zamri et al., 2013; Hsieh et al., 2019; Chen et al., 2020; Owusu et al., 2020; Prayitno, 2020). The market-to-book ratio (MTB) is included, as firms with lower MTB tend to be more earnings-sensitive, increasing the likelihood of earnings management (Hsieh et al., 2019; Chen et al., 2020; Prayitno, 2020). To control for country-level factors, we follow Chen et al. (2020) by including GDP growth (ΔGDP) and a government control indicator (GOV), comprising rule of law, control of corruption, and regu-

latory quality. We expect GDP growth to be positively associated with REM, as higher economic growth increases earnings volatility, while stronger government control (GOV) should reduce earnings manipulation through stricter oversight.

Following prior studies (Roychowdhury, 2006; Zang, 2012; Doukakis, 2014; Pacheco et al., 2017; Cheng et al., 2020), we define SUSPECT firms as those with strong incentives for earnings manipulation based on two standard benchmarks: loss avoidance and slight earnings growth. Due to data limitations, we exclude seasoned equity offerings (SEOs) as a benchmark. A firm-year observation is classified as SUSPECT if it meets either of the following conditions: (1) reporting small positive earnings, with current-year ROA between 0 and 0.01, indicating income-increasing earnings management to avoid losses, or (2) exhibiting slight profitability growth, with ΔROA between 0 and 0.005, suggesting opportunistic earnings management to exceed prior-year performance (DeGeorge et al., 1999).

We include LOSS, a dummy variable equal to 1 if ROA is negative and 0 otherwise, following Chen et al. (2020). This inclusion is based on the assumption that managers of loss-making firms may be inclined to employ the "big bath" technique, deliberately reporting excessive losses in loss-making years to enhance earnings in future periods.

RESULTS

DESCRIPTIVE STATISTICS

Table 4 presents the descriptive statistics for the full sample, which includes 936 firm-year observations. It reports the mean, median, standard deviation, mini-

mum, and maximum values for all variables incorporated in our model. To better examine differences in key variables (REM, DACC, SUSPECT, LOSS, AUDIT_OP,

and BIG4) across different XBRL adoption phases - pre-XBRL, optional-XBRL, and mandatory-XBRL - we further split main descriptive statistics in Table 5.

Table 4: Descriptive statistics for the entire sample (number of observations: 936)

Variable name	Mean	Median	S.D.	Min	Max
REM	0.00251	-0.05209	0.38960	-1.00900	1.36600
XBRL_O	0.31090	0.00000	0.46310	0.00000	1.00000
XBRL_M	0.38030	0.00000	0.48570	0.00000	1.00000
DACC	-0.00123	0.00013	0.07086	-0.24430	0.28240
SUSPECT	0.16350	0.00000	0.37000	0.00000	1.00000
LOSS	0.19340	0.00000	0.39520	0.00000	1.00000
MTB ratio	2.62200	1.71100	3.60400	-4.88900	25.95000
BIG4	0.78100	1.00000	0.41380	0.00000	1.00000
AUDITOP	0.93160	1.00000	0.25250	0.00000	1.00000
GOV	0.42390	0.42830	0.03289	0.38250	0.48340
SIZE	20.16000	20.14000	2.02600	15.79000	26.18000
ΔGDP	0.02988	0.02406	0.05545	-0.07537	0.09673
LEV	0.19330	0.17560	0.13180	0.00000	0.58970
I_ROA	0.03884	0.03392	0.07872	-0.22270	0.29830

Source: Author's own work.

Table 5 presents changes in REM and DACC across the three periods. The mean REM value decreases slightly by 0.00074 from the pre-XBRL to the optional-XBRL period but then rises sharply by 0.00813 in the mandatory-XBRL period, resulting in a net increase of 0.00719. This pattern aligns with our hypothesis that mandatory XBRL adoption contributed to greater real-activities earnings management. For DACC, the mean value declines by 0.00637 from the pre-XBRL to the optional-XBRL period, then increases by 0.00425 in the mandatory-XBRL period, leading to an overall decrease of 0.00211 when comparing pre- and mandatory-XBRL periods. These findings align with expectations: decline in DACC (0.00211) and rise in REM (0.00719) suggest a shift in earnings management practices following mandatory XBRL adoption.

Table 5 also examines REM and DACC trends across the three periods using median values, which are less affected by extreme observations. Unlike the mean, median REM increases consistently, rising by 0.01568 from -0.06885 in the pre-XBRL period to -0.05317 in the optional-XBRL period, followed by a further 0.01635 increase to -0.03682 in the mandatory-XBRL period. This results in a net increase of 0.03203, reinforcing the view that mandatory XBRL adoption might have contributed to greater reliance on real earnings management (REM). This trend aligns with the mean-based analysis, suggesting firms increasingly used real activities manipulation under heightened transparency. Median DACC trends also mirror the mean-based findings, indicating a shift away from accrual-based earnings management (AEM). The median declines by 0.01088

from 0.00539 in the pre-XBRL period to -0.00549 in the optional-XBRL period, followed by a minor recovery of 0.00509 to -0.00440 in the mandatory-XBRL period. This results in an overall decrease of 0.00979, supporting the idea that XBRL adoption constrained discretionary accrual manipulation. While the mean suggests some recovery in DACC during the mandatory-XBRL period, the median remains negative, indicating firms continue to limit aggressive accrual-based strategies. Taken together, both mean and median analyses support the hypothesis that mandatory XBRL adoption influenced earnings management practices, with firms shifting from accrual-based earnings management (DACC) to real activities manipulation (REM) in response to greater transparency and regulatory scrutiny.

The proportion of firms audited by Big 4 continuously declines across the observed periods, from 84.43% in the pre-XBRL period to 80.07% in the optional-XBRL period, and further to 71.35% in the mandatory -XBRL period. Similarly, the proportion of SUSPECT and LOSS firms increases from pre-XBRL to optional-XBRL (by 0.92% and 6.06%, respectively) before declining in the mandatory-XBRL period (by 0.55% and 7.48%, respectively). The percentage of firms receiving a clean audit opinion remains stable in the pre-XBRL (94.12%) and optional-XBRL (94.16%) periods but declines to 91.57% in the mandatory-XBRL period. This trend suggests that XBRL adoption enhanced financial reporting transparency, potentially making misstatements easier to detect and leading to a higher proportion of modified audit opinions.

Table 5: Mean and median differences of key variables

Variable	Pre-XBRL period 2016-2018 (n=289)		Optional-XBRL period (n=291) 2019-2020		Difference in means and median from pre-XBRL to optional-XBRL	
	Mean	Median	Mean	Median	Mean	Median
REM	-0.00007	-0.06885	-0.00082	-0.05317	-0.00074*	0.01568*
DACC	0.00155	0.00539	-0.00482	-0.00549	-0.00637*	-0.01088*
SUSPECT	0.15920	0.00000	0.16840	0.00000	0.00920	0.00000
LOSS	0.17990	0.00000	0.24050	0.00000	0.06060	0.00000
BIG4	0.84430	1.00000	0.80070	1.00000	-0.04360	0.00000
AUDITOP	0.94120	1.00000	0.94160	1.00000	0.00040	0.00000
Variable	Optional-XBRL period 2019-2020 (n=291)		Mandatory-XBRL period (n=356) 2021-2022		Difference in means and median from optional-XBRL to mandatory-XBRL	
	Mean	Median	Mean	Median	Mean	Median
REM	-0.00082	-0.05317	0.00732	-0.03682	0.00813***	0.01635***
DACC	-0.00482	-0.00549	-0.00056	-0.00040	0.00425**	0.00509**
SUSPECT	0.16840	0.00000	0.16290	0.00000	-0.00550	0.00000
LOSS	0.24050	0.00000	0.16570	0.00000	-0.07480	0.00000
Big4	0.80070	1.00000	0.71350	1.00000	-0.08720	0.00000
AUDITOP	0.94160	1.00000	0.91570	1.00000	-0.02590	0.00000
Variable	Pre-XBRL period 2016-2018 (n=289)		Mandatory-XBRL period (n=356) 2021-2022		Difference in means and median from pre-XBRL to mandatory-XBRL	
	Mean	Median	Mean	Median	Mean	Median
REM	-0.00007	-0.06885	0.00732	-0.03682	0.00739***	0.03203***
DACC	0.00155	0.00539	-0.00056	-0.00040	-0.00211***	-0.00579***
SUSPECT	0.15920	0.00000	0.16290	0.00000	0.00370	0.00000
LOSS	0.17990	0.00000	0.16570	0.00000	-0.01420	0.00000
BIG4	0.84430	1.00000	0.71350	1.00000	-0.13080	0.00000
AUDITOP	0.94120	1.00000	0.91570	1.00000	-0.02550	0.00000

Note: ***: p < 0.01; **: p < 0.05; *: p < 0.1

Source: Author's own work.

RESULTS OF MULTIVARIATE ANALYSIS

To test our hypothesis, we estimate Equation (9) using panel data. The Welch F-test ruled out pooled OLS, confirming cross-sectional fixed effects. A Hausman test indicated that the fixed effects model was preferable to the random effects model. Robust standard errors were employed to address heteroskedasticity and ensure reliable estimates. We also tested for

multicollinearity, finding that all variables except interaction terms had variance inflation factor (VIF) values below 10, suggesting no significant concern. While, as expected (Brambor et al., 2005; Adersson et al., 2014), interaction terms exceeded this threshold, but this does not affect the unbiasedness of the estimates, and standard errors correctly capture estimation uncertainty.

Table 7: Results of fixed effect regression analysis on the relationship between XBRL implementation on the real-activities earnings management (REM) - REM being the dependent variable as measure of real earnings management

Variable	Model (1)		Model (2)	
	Estimate	Std. error	Estimate	Std. error
const	0.84060	0.7036	0.8708	0.6978
XBRL_O	0.01392	0.0536	0.0200	0.0539
XBRL_M	0.05600***	0.0215	0.0543***	0.0201
DACC	-1.076000***	0.1583	-1.2720***	0.1526
DACC * XBRL_M			0.0988	0.2699

Variable	Model (1)		Model (2)	
	Estimate	Std. error	Estimate	Std. error
SUSPECT	-0.03280**	0.0146	-0.0310***	0.0116
DACC * SUSPECT			0.5581***	0.2011
LOSS	-0.13250***	0.0207	-0.1296***	0.0215
DACC * LOSS			0.3740	0.2990
MTB	0.00080	0.0030	0.0010	0.0030
BIG4	-0.06360**	0.0272	-0.0609**	0.0275
AUDITOP	-0.03610	0.0317	-0.0396	0.0315
GOV	-0.02100	0.5288	-0.0882	0.5304
SIZE	-0.03430	0.0341	-0.0344	0.0335
ΔGPD	-0.33290	0.4782	-0.2550	0.4799
LEV	-0.26830***	0.0981	-0.2881***	0.0967
I_ROA	0.22110**	0.1104	0.2508**	0.1312
N	936		936	
Adjusted R ²	0.2279		0.2363	
lnL	591.8000		597.0000	

Note: *, **, and ***Denote significance at 10%, 5%, and 1%, respectively

Source: Author's own work.

Table 7 presents our multivariate regression results. In Model (1), estimated without interaction terms, XBRL_M is positively significant at the 1% level, supporting Hypothesis 1b. This suggests that mandatory XBRL adoption might have increased financial transparency, leading to greater scrutiny and incentivizing managers to rely more on REM to meet profit targets or avoid losses. In contrast, we find no significant association between optional XBRL adoption and REM. The coefficient of DACC is negative and significant at the 1% level, indicating a trade-off between AEM and REM, consistent with Chen et al. (2020) and Cohen et al. (2020). Since Model (1) confirms this trade-off, the increase in REM following mandatory XBRL adoption likely contributed to a reduction in AEM, supporting Hypothesis 1a. However, Model (1) does not directly establish a link between mandatory XBRL adoption and AEM.

Both SUSPECT and LOSS coefficients are negative and significant (at the 5% and 1% levels, respectively), suggesting that firms near zero earnings (SUSPECT) and those reporting losses (LOSS) reduced their reliance on REM. Instead, managers in these firms may have favored AEM over REM to achieve financial targets. This interpretation aligns with the negative association between SUSPECT, LOSS, and REM, alongside the negative DACC-REM relationship, indicating a potential substitution effect. Additionally, BIG4 and LEV are negatively associated with REM, significant at the 5% and 1% lev-

els, respectively, suggesting that firms audited by Big 4 auditors and those with high leverage - both under greater scrutiny - are less likely to engage in REM. This may be due to the long-term risks of excessive REM and increased transparency from auditors and creditors. Finally, I_ROA is positively associated with REM at the 1% level, while other variables show no significant associations.

To better address Hypotheses 2 and 3, we incorporate the following interaction terms into our model: DACC * SUSPECT, and DACC * LOSS. Model (2) presents the coefficients and significance levels after including these interactions. Our objective is to examine how specific factors, such as a company's SUSPECT or LOSS status, influence (moderate) the established trade-off between AEM and REM practices. Additionally, we introduce the interaction term DACC * XBRL_M to assess whether the mandatory adoption of XBRL affects managers' choice between AEM and REM. The results of Model (2) indicate that only the interaction term DACC * SUSPECT is statistically significant at the 1% level, with a coefficient of 0.5581. This suggests that a firm's SUSPECT status positively moderates the rare of trade-off between AEM and REM. The conditional AEM versus REM trade-off effect is formally described by Equation (10) and is presented in Table 8.

$$\hat{\beta}_1 + \hat{\beta}_2 * SUSPECT = -1.273 + 0.5581 * SUSPECT \quad (10)$$

Table 8: Total (conditional) effect of DACC depending on SUSPECT

SUSPECT	Conditional effect of DACC	Upper CI at 95 %	Lower CI at 95 %
0	-1.273	-1.524	-1.020
1	-0.715	-1.266	-0.434

Source: Author's own work.

This finding supports Hypothesis 3, suggesting that a firm's SUSPECT status might slow the substitution of AEM for REM. This may be because year-to-date earnings and accurate forecasts become fully known only in the fourth quarter, revealing whether a firm will incur a small loss or a slight profitability decline. At this stage, effective cost-reduction strategies may be impractical, prompting managers to rely more on AEM, which offers a quicker means to achieve financial targets. Additionally, increasing REM at this point may be less favorable, as it is more visible to shareholders and analysts. These stakeholders could interpret heightened REM as a short-term tactic at the expense of long-term value, perceiving it as an imprudent cost-cutting strategy rather than a sustainable financial decision.

Since the interaction term between LOSS and DACC ($DACC * LOSS$) in Model (2) is not statistically significant, we conclude that a firm's loss-making status does not affect the nature of trade-off between AEM and REM. This finding suggests that Hypothesis 2 is not supported.

Regarding our other explanatory variables, Model (2) yields results that are largely consistent with those of Model (1), with similar coefficients and p-values.

To assess robustness, we conducted a placebo test by generating fake XBRL_M dummy variables and incorporating them into our regression models. We created two alternatives: XBRL_M_FAKE1 (equal to 1 for 2016–2017, 0 otherwise) and XBRL_M_FAKE2 (equal to 1 for 2017–2018, 0 otherwise). During 2016–2018, XBRL was not available for listed firms in Italy, making optional adoption impossible. Any significant effect from these fake treatments would suggest spurious relationships. We incorporated each placebo variable separately into our regressions, generating Model (3) and Model (4) (Appendix 1), to test whether our findings were sensitive to arbitrary treatment timing. Both placebo variables were insignificant, confirming that REM was unaffected during periods when XBRL adoption was not possible. This reinforces the validity of our main results, demonstrating that the observed XBRL_M effects were not driven by spurious trends.

DISCUSSION

Our findings reveal a significant positive relationship between mandatory XBRL adoption (2021–2022) and real earnings management (REM) among firms listed on the Italian Stock Exchange. However, this effect is absent during 2019–2020, when XBRL adoption was optional. This suggests that increased reporting transparency and regulatory oversight, resulting from the mandatory phase, influenced firms' earnings management choices. These findings align with prior research conducted by Peng et al., 2011, Kim et al., 2019, Hsieh et al., 2019 and Chen et al., 2020.

An important contribution of this study is the confirmation of a negative association between AEM and REM, reinforcing the earnings management trade-off documented in previous literature (Cohen et al., 2008; Zang, 2012; Doukakis, 2014; Ho et al., 2015; Gao & Wang, 2017; Chan et al., 2020). These findings indicate that firms, when constrained by stricter financial reporting standards, shift away from AEM and toward REM to manage earnings. Prior studies (Roychowdhury, 2006; Zang, 2012) suggest that REM is preferred when the cost of accrual manipulation rises, a pattern that appears to be reinforced by XBRL's transparency-enhancing effects. However, while REM provides an alternative to AEM, it may come at a higher operational cost, as it involves actions such as overproduction, discretionary expense reductions, and sales manipulation (Roychowdhury, 2006; Vorst, 2016). Such decisions could distort firms' operational efficiency and ultimately affect long-term financial performance, a concern raised by prior studies on REM's long-term consequences (Gunny, 2010; Gao et al., 2017).

The observed substitution between AEM and REM can be explained by several mechanisms associated with XBRL implementation. First, XBRL improves the machine-readability and standardization of financial reports, facilitating the automated detection of irregularities and enhancing regulatory surveillance. As a result, accrual-based manipulations - which rely on accounting estimates and are more traceable in structured data - become more easily identifiable by both regulators and analysts. Second, financial analysts and data vendors can more easily track firm performance over time using tagged XBRL data, increasing reputational pressure and reducing the attractiveness of AEM. Third, because XBRL primarily increases the visibility of reported financial numbers rather than underlying operational activities, managers may shift toward REM, which manipulates cash flows and operations in ways less directly observable in financial reports. This mechanism aligns with prior findings from Cohen et al. (2008) and Zang (2012), who suggest regulatory tightening indirectly raises the marginal cost of AEM, prompting a strategic shift to REM.

While our results suggest that the mandatory XBRL implementation played a significant role in shaping earnings management practices, we acknowledge potential alternative explanations. First, the post-2020 period overlaps with the economic aftermath of the COVID-19 pandemic, which may have prompted firms to alter earnings management behaviour due to operational disruptions, investor uncertainty, or financial distress. However, our inclusion of macroeconomic controls such as GDP growth, and the stability of our placebo tests (which show no effect during pre-XBRL periods), mitigate this concern. Second, changes in audit enforcement or corporate governance reforms

could have occurred simultaneously. Yet we control for audit quality (BIG4), audit opinion, and industry effects. Third, strategic changes in managerial incentives unrelated to disclosure regulation (e.g., changes in executive compensation or market pressure) may also have played a role. While these cannot be entirely ruled out, the consistency of our results across different models, and their alignment with prior literature on post-regulation shifts from AEM to REM, suggest that the XBRL reform remains the most plausible explanatory factor.

Our extended analysis highlights that SUSPECT firms - those reporting small profits or marginal increases in earnings - are more likely to rely on AEM rather than REM when under earnings pressure. This suggests that profitability constraints and timing limitations play a crucial role in managers' earnings management choices. In particular, earnings shortfalls often become apparent in the third or fourth quarter, leaving little time for firms to adjust operational strategies through REM (Zang, 2012; Cohen & Zarowin, 2010). Instead, AEM provides a faster and more flexible means of managing earnings. This finding aligns with prior research suggesting that the trade-off between AEM and REM is conditional on firm characteristics, particularly when firms have limited flexibility in real activities adjustments (Enomoto et al., 2015; Kothari et al., 2016; Boulhaga et al., 2022). However, we do not observe a similar moderating effect for LOSS firms. This aligns with findings by Ipino & Parbonetti (2016), who note that firms in financial difficulty face greater external monitoring and fewer opportunities for earnings manipulation.

CONCLUSIONS

This study provides new insights into how mandatory XBRL adoption influences earnings management strategies. The findings indicate that while XBRL enhances financial statement transparency and reduces information asymmetry, it does not restrict earnings management but rather restructures it – reducing accrual-based earnings management (AEM) while increasing real earnings management (REM).

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For policymakers and auditors, these results highlight that greater reporting transparency does not eliminate earnings management but shifts it toward REM, which, while easier to detect, can still be used opportunistically. Efforts, both regulatory and corporate governance, should go beyond transparency initiatives and focus on mechanisms that limit both AEM and REM, ensuring that financial reporting reflects firms' true economic performance. For investors and analysts, the rise in REM is particularly relevant, as it can jeopardize the long-term success of the firm through cost-cutting and operational distortions. However, REM is more observable than AEM, making it crucial for analysts to scrutinize firms' operating decisions, cash flows, and discretionary expenses to assess earnings quality.

Additionally, this study highlights that in SUSPECT firms - those reporting small profits or marginal earnings growth - the trade-off between AEM and REM is reduced in favor of AEM, as managers prefer the flexibility of accrual adjustments over real activity changes under time constraints. This has important implications for auditors, who must pay close attention to discretionary accruals in such firms, as well as for investors and analysts, who should look beyond reported earnings to understand how firms manage their financial results.

While causality cannot be definitively established, our robustness checks and theoretical grounding support the view that the observed earnings management shift is plausibly attributable to the increased transparency and enforcement enabled by mandatory XBRL adoption.

There are multiple ways of extending this research. Future studies could expand the analysis to a broader set of European countries, allowing for cross-country comparisons and deeper insights into regulatory differences. Further research could also explore additional factors that may influence the trade-off between AEM and REM, providing a more comprehensive understanding of how firms adapt their earnings management strategies in response to regulatory and market conditions.

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Appendix 1: Correlation matrix

	I_ROA	LOSS	SUSPECT	MTB	LEV	BIG4	AUDITOP
I_ROA	1.0000						
LOSS	-0.4490***	1.0000					
SUSPECT	-0.0886**	0.1652***	1.0000				
MTB	0.2477***	-0.0546	-0.0806*	1.0000			
LEV	-0.0797*	-0.0078	0.0547	0.1338***	1.0000		
BIG4	-0.1013**	0.0042	0.0175	0.0121	0.0547	1.0000	
AUDITOP	0.0224	-0.0496	-0.0176	-0.0840*	-0.0673*	0.0408	1.0000
XBRL_O	0.0546	0.0802*	0.0089	0.0033	0.0842**	0.0320	0.0265
XBRL_M	-0.0066	-0.0548	-0.0011	0.0140	0.0469	0.1279***	-0.0493
ΔGDP	-0.0169	0.1145***	-0.0252	0.0078	-0.0322	-0.0732*	-0.0033
GOV	0.0717*	-0.0586	-0.0054	-0.0096	0.0430	-0.0699*	0.0391
SIZE	-0.0205	0.1676***	0.0864**	0.0069	0.2972***	0.3445***	0.0247
DACC	0.0732*	-0.0038	-0.0102	-0.0284	-0.0123	-0.0758*	-0.0178
REM	0.2141***	0.1291***	-0.0930**	0.2008***	-0.0795*	0.0061	-0.0116
	XBRL_O	XBRL_M	GDP	GOV	SIZE	DACC	REM
I_ROA							
LOSS							
SUSPECT							
MTB							
LEV							
BIG4							
AUDITOP							
XBRL_O	1.0000						
XBRL_M	0.5262***	1.0000					
ΔGDP	0.7492***	0.7964***	1.0000				
GOV	0.3562***	0.3236***	0.3117***	1.0000			
SIZE	-0.0300	0.1096***	-0.0351	-0.0991**	1.0000		
DACC	-0.0340	0.0074	0.0342	0.0146	0.0027	1.0000	
REM	-0.0057	0.0097	0.0073	0.0050	-0.0783*	-0.2705***	1.0000

Note: ***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$; : $p < 0.1$

Source: Author's own work.

Appendix 2: Placebo test with fake variables being REM the dependent variable

Variable	Model (3)		Model (4)	
	Estimate	Std. error	Estimate	Std. error
const	0.5385	0.7082	0.5124	0.6792
XBRL_O	0.0337	0.0515	-0.0408	0.0685
XBRL_M_FAKE1	-0.0039	0.0180		
XBRL_M_FAKE2			-0.0461	0.0195
DACC	-1.2280***	0.2090	-1.2290***	0.1962
DACC * XBRL_M_FAKE1	-0.0375	0.3178		
DACC * XBRL_M_FAKE2			-0.0951	0.2599
SUSPECT	-0.0297**	0.0150	-0.0326**	0.0148
SUSPECT * DACC	0.5829**	0.2363	0.5906**	0.2565
LOSS	-0.1258***	0.0219	-0.1298***	0.0213
LOSS * DACC	0.3772	0.3088	0.3796	0.3039
MTB	0.0009	0.0030	0.0014	0.0030
BIG4	-0.0622**	0.0280	-0.0539*	0.0284
AUDITOP	-0.0439	0.0304	-0.0414	0.0321
GOV	-0.2281	0.5053	0.2062	0.5903
SIZE	-0.0148	0.0332	-0.0205	0.0319
GDP	0.1957	0.3984	-0.3567	0.5084
LEV	-0.2584**	0.1051	-0.2842***	0.1006
I_ROA	0.2111	0.1388	0.2476*	0.1334
N	936		936	
Adjusted R ²	0.2111		0.1922	
InL	592.3000		597.000	

Note: *, **, and ***Denote significance at 10%, 5%, and 1%, respectively

Source: Author's own work.