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RESEARCH ANALYST FORECASTING ACCURACY AND EARNINGS MANAGEMENT: EVIDENCE FROM PAKISTAN

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Abstract
This study aims to examine the impact of earnings management on research analysts' forecast accuracy in Pakistan. The current study collected a sample of 37 non-financial firms listed on the Pakistan stock exchange (PSX), containing 407 observations from 2012 to 2022.This study used panel corrected standard error (PCSE) model to get the robust results of the regression model. The results show a significant negative influence of earnings management on research analysts' forecast accuracy in the provided data of Pakistan. These results are in consistent with existing literature of agency theory. This study is the first to research the research analysts' forecast accuracy in Pakistan. Besides, the first study investigates the influence of earnings management on the accuracy of the research analysts' forecasts.

Research Paper

Keywords: Research Analysts forecast accuracy, Agency theory, Earnings management, Developing market, Pakistan

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Introduction

In capital markets research, the role of research analysts is mainly investigated in developed markets like US and UK. However, academic research shows rare evidence of research on research analysts in developing markets (Ahmed & Boutheina, 2017). These developing markets differ from developed markets in terms of weak capital market efficiency, underdeveloped investor protection laws, and weak corporate governance. Pakistan is one of the developing markets, so the findings of prior studies of developed markets fail to reflect true insights into developing capital markets (Salamzadeh & Markovic, 2018). This study uses information asymmetry as the theoretical foundation to understand how firm characteristics such as earnings management influence the research analysts ' earnings forecast accuracy. The research analyst works as the information intermediary between the market participants, such as investors, managers, and creditors. The research analysts issue research-based reports on the firm's expected performance containing information about earnings forecasts, target prices, and stock recommendations (buy, hold, sell). The research analysts' earnings forecasts are used as a superior proxy for market expectations than earnings forecasts based on static time-series models (Fink, 2021; Fried & Givoly, 1982). Research analysts contribute to the capital market's efficiency, such as mitigating information asymmetry and increasing market liquidity (Roulstone, 2003) and stock price discovery (Gleason & Lee, 2003).

Previous literature affirms that the quality of research analysts' earnings forecasts behaves according to the firm's information environment. For instance, Lang and Lundholm (1996) and Yu (2010) investigated that the

earnings forecast accuracy of research analysts positively correlates with the quality of the information environment. Research analysts use the reported earnings in the firm's disclosures as a critical source for generating earnings forecasts (Embong & Hosseini, 2018; Ulijn & Salamzadeh, 2024). That is why research analysts consider the quality of reported earnings as a severe concern for their earnings forecast accuracy (Ilmas et al., 2018). Pakistan is an example of a developing economy, given its underdeveloped investor protection regulations and ineffective capital markets (Saeed & Zamir, 2021). According to previous studies (Ilmas et al., 2018; Tabassum et al., 2015), listed companies in Pakistan use earnings management. Financial distress (Khalid et al., 2020), financial performance (Tabassum et al., 2015), ownership concentration, and client relationships are just a few variables used to study earnings management. However, there are few studies on the relationship between earnings management and research analysts' projection accuracy in Pakistan. In Pakistan's financial markets, research analysts play a crucial role. Ahmad (2018) claims that in Pakistan, research analysts' reports play a role in decision-making for investors to the tune of about 55%. That is why the accuracy of the research analysts is essential to keep the investors' trust in the analysts' reports (Batrancea et al., 2019, 2022).

The current study examines panel data 407 firm-year observations on 37 non-financial enterprises listed on the Pakistan Stock Exchange (PSX) from the fiscal year 2012 to 2022 using a random effect regression model. The IQ database, yearly reports, and PSX database are used to gather data on variables such as earnings management, the number of research analysts following, and the firm's fundamentals. The findings show a negative correlation

between earnings management and analysts' forecast accuracy. These results support previous studies showing that earnings management hampers the ability of research analysts to forecast accurate earnings because of distortions in information on reported earnings by managers (Embong & Hosseini, 2018; Lin et al., 2019). In other words, the results reflect the limited capacity of research analysts to comprehend earnings management. The current study adds to the body of literature by discussing how earnings management affects research analysts' ability to predict earnings in developing nations, particularly Pakistan accurately. The current study confirms previous research on the use of earnings management in Pakistan (Safdar & Yan, 2016; Tabassum et al., 2015), and it adds to the body of knowledge by presenting empirical evidence on the detrimental effects of earnings management on the accuracy of research analysts' earnings forecasts. Therefore, the regulatory body, the Securities and Exchange Commission of Pakistan (SECP), and brokerage houses may benefit from this study as it provides evidence on the use of earnings management and its impact on capital market participants.

The structure of the current study is as follows: Section 2 discusses the pertinent literature and formulates a hypothesis. Following a description of the sample, data collection, and variable measurement in Section 3, Section 4 presents the empirical results. Section 5 summarizes the findings, contributions, and directions for further study.

Literature Review

Reported earnings are a component of the company's financial information, and market participants regard reported earnings as an essential

source of firm-related information (Francis et al., 2005). Managers consider earnings as a critical metric that analysts and investors assess (Graham et al., 2006). Similarly, Salerno (2014) affirms that earnings number is more reliable to the investors than any other metric of a firm's performance, such as cash flows, earnings before interest, tax, depreciation, amortization (EBITDA), and dividends. Previous studies have indicated that managers can alter reported earnings to meet or surpass estimates made by research analysts, receive better compensation, or affect stock prices (Embong & Hosseini, 2018).

Earnings Management and Forecast Accuracy

Healy and Wahlen (1999) define "Earnings management as occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported economic numbers" (p. 6). The definition justifies that managers have discretion in accounting methods to manage earnings to serve their interests (Bradshaw et al., 2001; K Schipper, 1991).

Furthermore, managers make opportunistic use of earnings management in firms. As Zahra, Priem, and Rasheed (2005) reported, managers engage in opportunistic behavior due to two significant reasons – pressure and opportunity. First, managers face continued market pressure to meet or exceed research analysts' forecasts and positively influence the stock price

(Caton, Goh & Donaldson, 2001). Secondly, the firm's executive management can leverage its access to its information by manipulating earnings numbers in their interests, such as compensation benefits (Zahra et al., 2005).

There is considerable evidence from past studies of management involvement in earnings management (Debnath et al., 2021; Teoh et al., 1998). The literature has classified the methods of earnings management by accrual earnings management and real earnings management. Accrual earnings management uses discretionary accruals as a proxy for measurement and does not affect the firm's cash flows. Higher discretionary accruals reflect higher earnings management (Debnath et al., 2021). Real earnings management manipulates financial earnings through operating activities such as inventory management, research, and development expense (Kothari et al., 2016). The present study measures earnings management by using the proxy of discretionary accruals.

According to Man and Wong (2013), earnings management refers to earnings issued by leveraging accounting policies through real activity- or accrual-based earnings manipulation. The earlier studies examined the relationship between earnings management and research analysts' forecast properties. Studies are mainly undertaken in developed economies, including the United States, the United Kingdom, and Europe (Blkasem Elhaj, 2019; Iatridis and Kadorinis, 2009). In contrast, few researchers in developing economies, such as Malaysia and China, have attempted to study the impact of earnings management on research analysts' forecasting accuracy. According to M. Lang and Maffett (2011), markets with low transparency levels and incon-

sistent legal regimes are associated with efficiently managing accruals. Therefore, this study aims to empirically study the impact of earnings management on research analysts' forecasting accuracy in developing countries, particularly Pakistan (Yasin et al., 2024; Dana & Salamzadeh, 2022). This study uses the information asymmetry as a theoretical ground to understand how earnings management as a source of information asymmetry impacts analysts' forecast accuracy.

Theory and Hypothesis Development

According to Jensen and Meckling (1976), the firm involves the contractual relationship between shareholders (principals) and managers (agents). This contractual relationship turns in agency costs that occur when agents serve their self-interests rather than meet the contractual obligations, and consequently, a conflict of interest emerges between them (Panda & Leepsa, 2017). The managers act for personal gains and fail to protect shareholders' interests. Because of this, the entity's owners must bear increased agency costs related to contract structuring, behavior monitoring and control, and losses brought on by agents' less-than-optimal decisions. A key manifestation of agency conflicts is earnings management, where managers manipulate reported earnings to serve their self-interests (Kazemian & Sanusi, 2015; Safdar & Yan, 2016; Sarkar et al., 2008; Ebrahimi et al., 2022). According to Cudia et al. (2021), information asymmetry arises when managers have more information than external stakeholders such as owners, creditors, and research analysts. These managers when use earnings management opportunistically

to serve their interests, rather than showing true information of the firm. Consequently, the information asymmetry is exacerbated due to manipulated information such as reported earnings in financial disclosures. Further, this information asymmetry reduces the reliability of reported earnings, which is one of the primary sources of information for the research analyst's forecasts. The research analysts use reported earnings along with information to generate their forecasted earnings, stock recommendation (buy, hold, sell), and target prices. Therefore, the accuracy of forecasted earnings by research analysts depends on how much information asymmetry is embedded in reported earnings. If there is high information asymmetry in reported earnings, then the research analyst will find it complex to find true information about firms' performance.

Contrary to the information asymmetry, the signal theory (Spence 1973) and stakeholders' theory (Freeman 1984) emphasize the firm's perspective on the stakeholders. The signal theory suggests that firms convey their performance as a signal to the market and that the firm's performance is accurate. For instance, managers provide private information by manipulating reported earnings, which can also be categorised as the source of information asymmetry. Similarly, the stakeholders theory (Freeman 1984) also suggests that the interests of all stakeholders must be balanced, including investors, creditors, and analysts. Hence, these theories are more related to the firm perspective instead of users of financial information. Therefore, information asymmetry is primarily used as the theoretical basis for analysing the relationship between research analysts' accuracy and earnings management.

Accordingly, Dechow, Ge, and Schrand (2010) assert that earnings management is a critical element influencing the quality of accounting information. Previous research demonstrates that reported earnings are analysts' most important input sources. Therefore, the quality of reported earnings becomes a decisive factor in accurately producing research analysts' earnings forecasts (Dechow & Schrand, 2004). The reported earnings number comprises cash flows (non-discretionary accounts) and accruals (discretionary accounts). The latter allows managerial discretion and potential manipulation according to their interests (Embong & Hosseini, 2018).

Based on prior research, the current study anticipates that the reported earnings manipulation will also have an impact on the accuracy of research analysts' earnings forecasts because reported earnings are one of the most critical sources of firm information used by research analysts (Barker & Imam, 2008; Shukor & Nor, 2011). The accuracy of research analysts' earnings estimates correlates to the high quality of earnings (Schipper & Vincent, 2003). This study looks into how Pakistani research analysts' forecasts are affected by earnings management. Studies by Safdar & Yan (2016), Tabassum et al. (2015), and Zulfiqar et al. (2009) have shown evidence of earnings management by PSX-listed companies. However, the impact of earnings management on research analysts' forecast accuracy in Pakistan has barely ever been investigated. As a result, this study, based on the literature mentioned above, hypothesizes.

H1: The earnings management negatively influences on research analysts' forecast accuracy.

Methodology

Sample Selection and Data Collection

This research concentrates on non-financial companies listed on the Pakistan Stock Exchange (PSX), given the significant disparities in financial reporting frameworks, regulatory obligations, and earnings manipulation techniques between financial and non-financial sectors. Non-financial enterprises typically have more flexibility in accounting choices, enabling greater diversity in earnings management practices, which is essential for evaluating its effect on the precision of analysts' predictions. Furthermore, non-financial firms operate under relatively uniform financial reporting standards as per International Financial Reporting Standards (IFRS), ensuring consistency in financial information across these companies. While Banks, insurance providers, and other financial entities operate under unique regulatory and accounting systems. These organizations must adhere to strict capital requirements, asset risk classifications, and reserve regulations, which limit their ability to employ conventional earnings management strategies. Additionally, the finance industry adheres to specific accounting standards (such as IFRS 9 for financial instruments) that substantially affect reported earnings. Incorporating financial firms in the study sample could skew results due to fundamental differences in how they manage earnings, potentially misrepresenting the research findings on the impact of earnings management on analyst forecast accuracy.

The sample of non-financial companies used in this study was drawn from companies listed on the Pakistan Stock Exchange 100 index between

2012 and 2022. The following criteria were satisfied in order to draw the initial sample from the capital IQ database: A company must meet the following criteria: i) it must be listed on PSX during the study period; ii) it must be in the non-financial sector; and iii) it must have had at least one analyst estimates of earnings per year. Based on the criteria, 64 firms (excluding financial firms) with 704 firm-year observations from 2012 to 2022 made up the initial sample. After applying the sample selection process outlined in Table 1, the final sample consists of 37 firms with a total of 407 firm-year data from 2012 to 2022. The data was collected using Capital IQ, the PSX database, and the firms' annual reports.

Table 1. Sample Selection Procedure

Sample selection	**Number of firms (from 2012-2022)**	**Total firm-year observation**
Total number of firms listed on the Pakistan Stock Exchange	100	
Firms with missing data on analyst forecasts	25	
Initial sample (64*11)		704
Firms belonging to the financial industry	(11)	
Firms with missing firm's earnings per share (EPS) and other related data	(27)	
Total number of final firms	37	
Final sample (37*11)		407

Regression Model and Measurement of Variables

The following regression model is estimated to measure the influence of earnings management on research analysts' forecasting accuracy.

$$AFA_{it} = B_0 + B_1 EM_{it} + Controls_{it} + \varepsilon_{it} \quad (3.1)$$

This paper uses the panel data regression analysis. In the above regression model (3.1), "i" represents the firm, "t" represents t (in years), EM is earnings management, controls represent control variables, and ε represents the error term. The specific definitions of the variables used in the model (3.1) are shown in Table 3.1.

The dependent variable, AFA, represents the analysts' forecast accuracy. Following Lang and Lundholm (1996), the research analysts' forecasting accuracy is measured by the negative of the absolute value of the difference between consensus value of analysts' forecasted earnings per share and firm's issued earnings per share, scaled by the stock price at the end of period t-1 and multiplied by 100. The accuracy of research analysts' forecast is calculated as under:

$$AFA_{it} = (-1) * \left| \frac{Consensus\ Forecast\ EPS_{it} - Actual\ EPS_{it}}{Stock\ Price_{it-1}} \right| * 100 \quad \text{(3.2)}$$

In formula (3.2), "i" represents the firm, and t represents the time. Consensus EPS is the average of all analysts' earnings per share (EPS) issued for a firm "i" in a time "t"; Actual EPS is the EPS issued by a firm "i" in a time "t." Stock Price represents stock price at the end of t-1.

The independent variable EM represents the earnings management in the model (3.1). Following Dechow, Sloan, and Sweeney (1995), the modified Jones Model measures discretionary accruals as a proxy of earnings management. The model is presented as under :

$$\frac{TAC_{it}}{A_{it-1}} = K_1 \frac{1}{A_{it-1}} + K_2 \frac{(\Delta REVi_{it} - \Delta REC_{it})}{A_{it-1}} + K_3 \frac{PPE_{it}}{A_{it-1}} + \varepsilon_{it} \quad \text{(3.3)}$$

In model (3.3), "i" stands for a company, while "t" stands for time. TACit is the difference between a company's operating profit and net cash flows from operations over a time t. The total assets of a company i at time t-1 are represented by Ai t-1. The difference between a firm's i revenue in time t and in time t-1 is known as REVit. The discrepancy between an organization's accounts receivable in time t and time t-1 is known as ΔRECit. PPEit is the net amount of property, plant, and equipment of a firm i in time t, and εit is the residuals of the model regression. The obtained residuals are called discretionary accruals from this modified Jones model (3.3). We will first get the absolute value of these discretionary accruals to use as the proxy for measuring the earnings management in the model (3.1).

Table 2. Measurement of variables of the regression model

Variable Names	**Abbreviation**	**Variable Definition**
Analyst forecast accuracy	AFA	The negative of the absolute difference between the consensus value of analysts' forecasted earnings per share and the firm's issued earnings per share, scaled by the stock price at the end of period t-1 and multiplied by 100.
Earnings Management	EM	Earnings Management is proxied by Discretionary Accruals (DA), which are calculated using the Modified Jones Model (1991). EM is also proxied through Real earnings management (REM) by using the formula Roychowdhury (2006)
Firm Size	TA	Total assets at the end of the year

Loss	Loss	Firms with negative net income
Surprise	Surprise	Variation of net income between current year and last year
Leverage	Leverage	Total liabilities divided by total assets
Analyst following	Ana_follow	The number of analysts who issue at least one forecast for the fiscal year

This study selects the control variables (controls) in model 3.1, as prior literature suggests. These control variables include firm size (TA), loss (LOSS), surprise (SURPRISE), leverage (LEVERAGE), and analyst following (ANA_FOLLOW). Firm size is calculated as the total assets of a firm i in a time t. According to a past study by Watts and Zimmerman (1990), large firms are expected to be more transparent and disclose more information to the stakeholders. Hence, we expect more accuracy in the analysts' earnings forecasts. Loss is a dummy variable set as 1 for a firm with negative earnings and 0 otherwise. Surprise is the difference in net income between the current year and last year. Both control variables, loss (type of earnings like profit or loss) and surprise (variation of earnings like growth or fall), are reported in previous literature as one of the main factors influencing the accuracy of analyst forecasts in emerging and developed economies (Coën et al., 2009). Leverage is the ratio of total liabilities over total assets as a proxy is given in prior studies' findings (Ahsan et al., 2016; Qureshi, 2009). Campa (2019) reported that listed firms with high leverage are more inclined toward using earnings management (as cited in Dokas et al., 2021). Analyst following is the number of analysts who issue at least one earnings forecast for a firm i in

time t. The prior literature suggests that a firm followed by many analysts leads to more accurate earnings forecasts because of the competition among the following analysts (Embong & Hosseini, 2018; Hope, 2003; Lang et al., 2003; Lang & Lundholm, 1996). Firms followed by more analysts have lower earnings management (Degeorge et al., 2013; F. Yu, 2008). Moreover, analyst following interacts with earnings management by moderating its impact—greater analyst coverage may restrict aggressive earnings management practices, thus improving forecast accuracy. In contrast, companies with fewer analysts following them may have more freedom to manipulate earnings, potentially resulting in larger forecast errors (less forecast accuracy). These studies show a positive relationship between analyst following and analysts' forecast accuracy.

Findings

Descriptive Analysis

Table 3 details the descriptive statistics for all the variables employed in the primary model. The measurement of analyst forecast accuracy (AFA) is negative by formula (multiplying the absolute forecast error by a negative one) to make interpretation easier for regression correlation and coefficients. Therefore, correlated variables will show a positive coefficient with variable AFA. The mean and median values of accuracy are negative -3.327 and -0.985. An individual analysts forecast error is nearly 3.327% of the stock price for the mean and 0.985% for the median value.

This study uses the winsorization to replace the outlier values. Black and Carnes (2006), Embong and Hosseini (2018), and Lin et al. (2019) reported that the mean value of accuracy of analysts' forecasts is -0.095, -0.051 in Malaysia from 1989-2002, 2007-2012, and -0.03684 in China from 2001-2012 respectively. Earnings Management has a mean of .069 with a minimum of 0 and a maximum of .348, which is of similar magnitude as reported by studies (Embong & Hosseini, 2018) for Malaysia (Lin et al., 2019) for China and (Bagntasarian, 2018) for the UK, (0.077, 0.09921, -0.001) respectively. Findings indicate that research analysts' forecasting accuracy in Pakistan is comparatively the lowest.

In addition, the mean value of firm size (total assets) is 97709.976, with a minimum of 3831.206 and a maximum of 1129983. The average value of earnings variations (surprise) is 732.518 with a minimum of -17447.895 and a maximum of 18634.094. The loss variable shows that firms with negative earnings are in large numbers (94.84 percent) than those with positive earnings (5.16 percent). The mean leverage value for firms is 1.443, with a minimum of 0.106 and a maximum of 11.492. Moreover, the mean value of analysts following a firm is 3.727, with a minimum of 0 analysts following and a maximum of 15.

Table 3. Descriptive Statistics

Panel A: Continuous Variables

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
AFA	407	-3.327	-.985	5.992	-41.122	.025
EM	407	.069	.0521	.066	0	.348
SIZE	407	97709.976	42861.2	145539.47	3831.206	1129983

SURPRISE	407	732.518	465.194	3975.838	-17447.895	18634.094
LEVERAGE	407	1.443	1.147	1.249	.106	11.492
ANA FOLLOW	407	3.727	3	3.283	0	15

Sources(s): Authors

Panel B: Dichotomous Variables

	Category	Frequency	Percentage
LOSS	1	21	5.16
	0	386	94.84

Sources(s): Authors

Table 4 provides a summary of the findings of the Pearson correlation analysis. This study shows evidence of bivariate correlation between variables, and the correlation matrix is also used as an early indicator of the multicollinearity problem. Table 4 shows no multicollinearity problems between variables because no correlation value between variables exceeds 0.8 (Gujarati & Porter, 2009). The correlation coefficient between earnings management (EM) and forecast accuracy (AFA) is negative, with a value of -0.068. The negative relationship suggests that analysts' forecast accuracy is higher for firms with low earnings management.

Regression Results

Table 6 shows the results of the given regression model in research methodology. Table 6 presents the regression estimates of forecast accuracy on earnings management and control variables. Initially, the results of Breusch-Pagan Lagrange Multiplier tests and Hausman tests suggest that the random effects model is preferred over the fixed effects model (refer table 5). Besides, the mean value of variance inflation factor (VIF) (1.10) suggests no evidence of multicollinearity because the mean vif is less than 10. Further,

the validity and robustness of findings are ensured by performing post-estimation tests such as, Wooldridge test for serial correlation in panel data, and modified Wald test for group-wise heteroskedasticity in regression model. Both tests confirm presence of serial correlation and heteroskedasticity (refer table 5). Therefore, the results are corrected by using the panel corrected standard error (PCSE) model for serial correlation and heteroskedasticity.

In addition, the coefficient of earnings management negatively influences the accuracy of the analysts' earnings forecasts. The negative coefficient suggests that one unit increase in earnings management will decrease the analyst forecast accuracy by 6.97 percent. The negative coefficient value of earnings management shows significance at a 1% level. These results suggest that firms are using earnings management techniques to manipulate the reported earnings, implying the difficulty for the analysts to comprehend the actual information of the firm, thus reducing the accuracy of analyst forecasts. The significant negative influence of earnings management on the accuracy of research analysts also confirms the existing evidence of the practice of earnings manipulation techniques in Pakistan (Safdar & Yan, 2016; Tabassum et al., 2015; Zulfiqar et al., 2009). Coën and Desfleurs (2004), Wei and Xue (2015), and Zulfiqar et al. (2009) studies suggest that the opportunistic behaviour of the managers causes the increase in the agency costs for the firm and decreases the quality of earnings disclosures. The results of this study support existing literature findings (Bagntasarian, 2018; Embong & Hosseini, 2018; Porter & Kraut, 2013) that an increase in the discretionary accruals leads to a decrease in the analysts' forecast accuracy.

Table 4. Pearson's Correlation Matrix for Variables

	AFA	EM	SIZE	LOSS	SUR-PRISE	LEV-ER-AGE	ANA_FOLLOW
(1) AFA	1.000						
(2) EM	-0.068	1.000					
(3) SIZE	0.070	-0.074	1.000				
(4) LOSS	0.136***	0.010	0.078	1.000			
(5) SUR-PRISE	-0.085*	-0.067	0.082*	0.190***	1.000		
(6) LEV-ERAGE	-0.147***	0.128***	-0.075	-0.247***	-0.052	1.000	
(7) ANA_FOLLOW	0.228***	0.035	0.323***	0.167***	0.144***	-0.154***	1.000

Note(s): significance level *** p<0.01, ** p<0.05, * p<0.1
Sources(s): Authors

Table 5. Effect model testing and diagnostic tests

	tests	Chi-square	F-test	Prob.	
Effect Model testing	Breusch-Pagan LM test	47.52		0.0000***	
	Hausmann test	8.49		0.0751**	
Diagnostic tests	Multicollinearity (mean vif)				1.10
	Heteroskedasticity ($\chi 2$ – stat)	8636.57		0.0000***	
	Serial Correlation (F-stat)	7.65	0.0089*		

Source(s): Authors

Table 6. Regression of forecast accuracy on earnings management and control variables

	Pooled OLS	RE Model	FE Model	FE Robust	PCSE Model
EM	(6.97)	-8.504*	-9.013*	(9.01)	-11.137**
	(4.38)	(4.25)	(4.35)	(6.11)	(4.05)
Size	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
LOSS	2.912*	3.347*	3.508**	3.51	2.858*
	(1.36)	(1.31)	(1.35)	(1.77)	(1.29)
SURPRISE	-0.000**	-0.000***	-0.000***	-0.000**	-0.000***
	0.00	0.00	0.00	0.00	0.00
LEVERAGE	(0.41)	(0.08)	0.32	0.32	(0.15)
	(0.24)	(0.27)	(0.32)	(0.33)	(0.34)
ana_follow	0.409***	0.559***	0.883***	0.883**	0.544***
	(0.09)	(0.13)	(0.19)	(0.30)	(0.11)
Constant	-6.343***	-7.509***	-8.962***	-8.962***	-6.943***
	(1.45)	(1.53)	(1.62)	(1.94)	(1.64)
Observation	407	407	407	407	407
R-square	0.109	0.109	0.109	0.109	0.11

Note(s): The standard error (SE)-values in parentheses, *,**, *** represent significance at 5%, 1%, and 0.1%, respectively; **Source(s)**: Authors

EM is earnings management that is calculated as per the Modified Jones model (1995). Total assets determine the firm size; loss is coded as 1 for companies with negative net income, otherwise 0; the surprise is the difference between a company's net income this year and last year; and ana_follow is the number of analysts following a company.

Additionally, this study uses size, loss, surprise, leverage, and analyst following as firm-specific control variables in the regression model. Size has a positively insignificant relationship with the analyst's forecast accuracy. Loss is a binary variable. The loss coefficient significantly influences the analyst forecast accuracy at the 5% level. The loss coefficient indicates that analysts' forecast earnings are more accurate for firms with negative earnings. These results are consistent with the findings of (Bagntasarian, 2018), which show a negative (positive) influence of loss on the analyst's forecast error (analyst forecast accuracy) for current year earnings forecasts. Surprise shows a significantly negative impact on the analyst forecast accuracy. The coefficient value of surprise shows against the finding (Embong & Hosseini, 2018). The negatively insignificant coefficient of leverage shows that the firm's leverage ratio does not affect analysts' forecast accuracy. The coefficient of analyst following shows a significantly positive influence on forecast accuracy. It indicates that many research analysts following a firm are impacting their earnings forecast accuracy positively. This positive influence may result from competition among the research analysts following a firm (Bagntasarian, 2018; Sinha et al., 1997).

Robustness Checks

To assess the robustness of our findings, we compare the results using accrual-based earnings management (AEM) with real earnings management (REM). Real earnings management (REM) refers to the strategic manipulation of operational activities to achieve financial reporting objectives, often at the expense of a firm's long-term economic value (Roychowdhury, 2006). Unlike accrual-based earnings management, which involves accounting discretion, REM influences actual business operations, including sales manipulation, overproduction, and discretionary expense reductions. The abnormal cash flow from operations (CFO) is commonly used as a proxy for REM, measuring deviations from expected cash flows given firm fundamentals (Cohen & Zarowin, 2010). By utilizing REM proxies, researchers can assess the extent to which firms engage in real activity manipulation to manage earnings.

Following Roychowdhury (2006), we use abnormal cash flow from operations (CFO) as a proxy for REM. Table 7 presents the comparison of results as under.

Table 7. Comparison of Existing Results with Real Earnings Management (REM)

Variable	Existing Results (AEM)	Alternative Results (REM - CFO)
EM	-9.013*	-9.213**
	(4.25)	(4.18)
SIZE	0.00	0.012
	(0.00)	(0.02)
LOSS	3.508**	3.124**
	(1.35)	(1.45)
SURPRISE	-0.000***	-0.0002**
	(0.00)	(0.0001)
LEVERAGE	0.32	0.267

	(0.32)	(0.12)
ANA_FOLLOW	0.883***	0.689***
	(0.19)	(0.11)
CONSTANT	-8.962***	-7.312***
	(1.62)	(2.01)
Observations	407	407
R-Square	0.109	0.112

Note(s): The standard error (SE)-values in parentheses, *,**, *** represent significance at 5%, 1%, and 0.1%, respectively

Table 7 compares accrual-based and real earnings management models, highlighting the robustness of the findings. The coefficient for earnings management (EM) remains negative and statistically significant across both models, reaffirming its adverse impact on analysts' forecast accuracy. The slightly stronger significance in the REM model (-9.213**) compared to AEM (-9.013*) suggests that real earnings management also contributes to forecast inaccuracy. The control variables largely maintain their expected effects. Firm size (SIZE) remains insignificant in both models, indicating that firm size does not strongly influence forecast accuracy. The coefficient for LOSS remains positive and significant, supporting the notion that loss-making firms experience lower forecast accuracy. SURPRISE continues to have a significant negative impact, reinforcing that unexpected earnings deviations contribute to inaccuracies. While the coefficient for analyst following (ANA_FOLLOW) remains positive and significant across both models, it is slightly lower in the REM model (0.689***) than in AEM (0.883***), indicating that accrual-based earnings management might be more susceptible to analyst scrutiny. The overall R-squared values remain consistent across models, confirming that the explanatory power of the models is comparable.In

conclusion, these results validate the robustness of our primary findings, demonstrating that earnings management's negative impact on analysts' forecast accuracy persists regardless of the measurement approach. The similarity in findings suggests that both accrual-based and real earnings management strategies distort financial reporting, ultimately leading to less reliable analyst forecasts.

Conclusion

The managers use earnings management to serve their vested interests or maintain the firm's good reputation among the market participants. In either case, the firm's disclosures report the compromised earnings quality. Consequently, this low earnings quality will serve as a misleading source of information for other market participants. The existing literature reveals that research analysts consider reported earnings as crucial sources of information for their earnings forecasts. If the reported earnings are manipulated, then research analysts' earnings forecasts are also expected to be low accurate. This study investigates the influence of earnings management on the research analysts' earnings forecast accuracy.

This study collects data samples from Pakistan. The sample consists of listed non-financial firms on the Pakistan stock exchange from 2012 to 2022. The results are obtained using the panel data-based regression model of panel corrected standard error (PCSE). The PCSE fixes the serial correlation and heteroskedasticity issues in the regression model. At a 5% significance level, the results reveal a significant negative relationship between EM and AFA. The findings align with earlier research from Malaysia, China, and

the United States. The findings also support the view that firms use manipulated earnings as an input source of information in their forecast earnings. It also illustrates how research analysts' ability to spot earnings management is restricted. As a result, the accuracy of forecasts is decreased when altered reported earnings are used.

This paper contributes to the existing literature on analysts' forecast accuracy determinants in developing countries. The existing literature largely covers the developed markets, which differ from developing countries characteristically, such as highly efficient capital markets, improved legal system for investors, and improved regulatory framework. Compared to this, developing countries like Pakistan are more prone to weak efficiency of capital markets, less regulatory framework, and fewer investor protection laws. This study extends the empirical literature by providing more evidence by exploring the association of earnings management and research analysts' forecast accuracy from Pakistan. The negative influence of earnings management on analysts' forecast accuracy empirically supports that the developing markets show that information asymmetry exists, eventually leading to lower accuracy in the analysts' forecasts.

Moreover, investors, particularly institutional investors, highly weight the earnings forecasts of research analysts when making investment decisions. Therefore, the findings suggest that research analysts should be careful and capable of mitigating the effects of earnings management when generating their earnings forecasts for firms. At large, the regulatory body (SECP) and brokerage houses, which hire research analysts, can take this challenge in

two ways. The SECP can ensure strict compliance of its corporate governance, which restricts the use of earnings management techniques so that more transparent financial disclosures can be disseminated to the investors. The brokerage houses can impart required training to build the capacity of research analysts to analyse financial disclosures appropriately and exclude earnings management effects from their earnings forecasts. The investors are suggested that they always investigate and confirm the research analysts earnings forecasts before making investment decisions based on their forecasts. They also need to consider the impact of earnings management on earnings forecasts.

Additionally, the current study meets the following limitations. Firstly, this study uses a proxy of discretionary accruals for measuring earnings management. However, the literature also suggests other methods of measuring earnings management, such as real earnings management and classification shifting. Secondly, Jian et al. (2023) reported that non-listed firms use earnings management more than listed firms. However, this study is limited to listed firms because of the non-availability of data related to non-listed firms in Pakistan. Thirdly, this study limits itself to earnings management variables while other variables, such as corporate governance structure and implementation of accounting standards, either GAPP or IFRS in developing countries.

After addressing the shortcomings of this study, future research can study the interaction effect of these variables, such as implemented accounting standards, corporate governance structure, ownership structure, and earnings management. Because these variables can possibly weaken or strengthen

relationship of earnings management and research analysts' forecast accuracy. Secondly, given data availability, earnings management may be studied among non-listed firms in developing countries.

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