# Investigating the Moderating Role of Board Gender Diversity in the Relationship Between Accounting Conservatism and Real Earnings Management in Companies Listed on the Tehran Stock Exchange

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**Abstract:** The purpose of this study is to examine the relationship between accounting conservatism and real earnings management and to investigate the moderating role of board gender diversity in this relationship. The statistical population of the study includes companies listed on the Tehran Stock Exchange during the period from 2013 to 2022. After applying the required restrictions, 277 companies were selected as the research sample, comprising a total of 2,770 firm-year observations. In this study, panel data and a multivariate regression model were used to test the hypotheses. Moreover, to ensure the validity of the results, econometric diagnostic tests, including multicollinearity, heteroscedasticity, and autocorrelation tests, were conducted. The findings indicate that accounting conservatism has no significant relationship with real earnings management. In contrast, board gender diversity has a negative and significant effect on real earnings management, indicating the effective monitoring role of female board membership in reducing opportunistic managerial behaviors. The results also show that board gender diversity does not play a significant moderating role in the relationship between accounting conservatism and real earnings management. The findings of this study may be useful for investors, managers, and capital market regulatory bodies in evaluating financial reporting quality and strengthening corporate governance mechanisms.

**Keywords:** accounting conservatism, real earnings management, board gender diversity, corporate governance, financial reporting quality

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## 1. Introduction

Financial reporting is one of the central mechanisms through which firms communicate their economic performance, financial position, risk exposure, and managerial stewardship to capital market participants. In modern capital markets, financial statements are not merely technical outputs of accounting systems; rather, they constitute an essential informational infrastructure for contracting, valuation, monitoring, investment decision-making, and regulatory oversight. The usefulness of financial reporting depends largely on the extent to which reported accounting numbers faithfully represent the underlying economic reality of firms and reduce information asymmetry between managers and external stakeholders. Within this framework, earnings occupy a particularly important position because they are widely used by investors, creditors, analysts, regulators, and corporate boards to assess firm performance, predict future cash flows, evaluate managerial efficiency, and determine firm value. However,

because accounting standards often allow managerial discretion in recognition, measurement, classification, and disclosure, reported earnings may become subject to opportunistic manipulation. This issue is especially important in emerging markets, where ownership concentration, weaker external monitoring mechanisms, limited analyst coverage, and developing governance structures may intensify agency conflicts and increase the importance of internal corporate governance mechanisms in safeguarding financial reporting quality [1, 2].

Earnings management refers to managerial intervention in the financial reporting process or in real operational decisions with the intention of achieving specific reporting outcomes. Although some forms of managerial discretion may convey private information and improve the informativeness of earnings, opportunistic earnings management reduces earnings quality, impairs the reliability of financial statements, and can mislead investors regarding the true economic performance of firms. In the accounting literature, earnings management is generally discussed in two broad forms: accrual-based earnings management and real earnings management. Accrual-based earnings management relies mainly on discretionary accounting choices and estimates, whereas real earnings management is conducted through changes in actual business activities, such as accelerating sales, overproducing inventory, reducing discretionary expenditures, or altering the timing of operating decisions. Real earnings management is particularly important because it may be less visible to auditors and regulators than accrual manipulation, but it can impose direct economic costs on the firm by distorting optimal operating, investment, and production decisions [3, 4].

Real earnings management has attracted increasing scholarly attention because it reflects a form of managerial opportunism that moves beyond accounting estimates and affects real corporate activities. Managers may offer abnormal price discounts or lenient credit terms to increase current-period sales, produce more than necessary to reduce the reported cost of goods sold per unit, or cut discretionary expenditures such as advertising, research and development, and administrative costs to improve short-term earnings. These actions may increase reported earnings in the current period, but they can undermine future profitability, weaken competitive capacity, increase inventory-related costs, and reduce long-term firm value. Therefore, real earnings management is not only a financial reporting issue but also a strategic and operational problem that can affect resource allocation and sustainable corporate performance. The connection between earnings management, firm value, investment decisions, and financing policies highlights the broader economic significance of financial reporting quality for shareholders and other stakeholders [5, 6].

One of the important accounting attributes that may influence earnings management behavior is accounting conservatism. Accounting conservatism is commonly understood as the tendency to recognize losses and bad news more quickly than gains and good news. Under conservative reporting, managers are required to provide stronger verification for the recognition of favorable outcomes than for unfavorable outcomes. Conservatism can therefore function as a contracting and governance mechanism by constraining managerial overstatement of earnings and net assets, limiting opportunistic reporting, and increasing the credibility of accounting information. In agency settings, conservatism may protect investors and creditors by accelerating the recognition of economic losses and reducing managers' ability to delay the reporting of unfavorable information. This asymmetric recognition principle has been widely discussed as a fundamental feature of financial reporting that can influence debt contracting, compensation arrangements, litigation risk, corporate governance, and capital market efficiency [7, 8].

The relationship between accounting conservatism and earnings management, however, is theoretically complex. On the one hand, conservative accounting may reduce earnings management by limiting managerial discretion, increasing the timely recognition of losses, and constraining the inflation of accounting income. From

this perspective, conservatism improves financial reporting discipline and decreases the scope for opportunistic manipulation. On the other hand, conservatism may also create reporting incentives that encourage managers to use real actions to achieve target earnings when accrual-based manipulation becomes more constrained. If conservative accounting restricts accounting-based discretion, managers may shift toward real earnings management because real activities are often more difficult to detect and may be perceived as normal business decisions. Thus, conservatism may not necessarily eliminate earnings management; rather, it may alter the form through which managers pursue desired reporting outcomes. This substitution logic is particularly relevant for real earnings management, because real actions may allow managers to influence earnings while remaining within formal accounting rules [9, 10].

Corporate governance mechanisms are expected to play a critical role in shaping the relationship between financial reporting attributes and earnings management behavior. Among governance mechanisms, the board of directors has a central monitoring responsibility because it oversees managerial decisions, approves major strategic policies, supervises financial reporting processes, and represents shareholders' interests. Board characteristics such as independence, financial expertise, diligence, diversity, and professional competence can influence the quality of board monitoring and the extent to which managers are prevented from engaging in opportunistic reporting practices. In recent accounting and management research, board characteristics have been increasingly analyzed not only as formal governance structures but also as substantive determinants of decision quality, reporting transparency, and firm performance. Evidence from corporate governance studies indicates that stronger board mechanisms can improve financial performance, reduce misreporting incentives, and strengthen the effectiveness of internal control and management accounting systems [11, 12].

Board gender diversity has emerged as one of the most significant dimensions of corporate governance research. Gender diversity refers to the presence and participation of women in the composition of the board of directors. The theoretical relevance of gender diversity is grounded in several perspectives. Agency theory suggests that more diverse boards may enhance monitoring effectiveness by increasing independence of thought and reducing groupthink. Resource dependence theory argues that female directors may contribute distinct experiences, knowledge networks, communication patterns, and stakeholder sensitivities that improve board decision-making. Ethical and behavioral perspectives further suggest that gender-diverse boards may exhibit stronger attention to transparency, accountability, social responsibility, and risk control. Consequently, female board representation may influence not only strategic decisions and firm performance but also the quality of financial reporting and the likelihood of managerial opportunism [13, 14].

Prior research has generally suggested that female board participation can improve earnings quality and reduce earnings management, although the strength and direction of the relationship may vary across institutional contexts. Female directors may strengthen board oversight by asking more critical questions, demanding higher-quality information, and improving the board's sensitivity to reputational and ethical consequences of reporting manipulation. The presence of women on boards may also increase board attendance, monitoring intensity, and stakeholder orientation. As financial reporting quality depends on both technical accounting practices and governance oversight, board gender diversity can operate as a mechanism that constrains opportunistic managerial behavior and enhances the credibility of reported earnings. Empirical studies in different capital markets have linked female directors to higher earnings quality, lower earnings manipulation, and stronger reporting transparency, supporting the argument that gender-diverse boards may contribute to more effective governance [15, 16].

Recent studies have extended this debate by examining the association between board gender diversity and different forms of earnings management, including both accrual-based and real earnings management. This distinction is crucial because governance mechanisms may affect accrual manipulation and real manipulation differently. While accrual-based earnings management can be constrained by auditing, accounting standards, and board financial expertise, real earnings management involves operational decisions that may be more difficult for directors to identify unless the board has sufficient independence, expertise, and diligence. Research in emerging markets has shown that board gender diversity can play a significant role in reducing both accrual and real earnings management practices, suggesting that gender-diverse boards may provide broader monitoring benefits across multiple dimensions of financial reporting behavior. Nevertheless, the governance effect of female directors may depend on their actual influence, critical mass, independence, professional background, and the institutional environment in which firms operate [17, 18].

The moderating role of board gender diversity in the relationship between accounting conservatism and real earnings management is theoretically important because it connects a financial reporting attribute with a board-level governance mechanism. If accounting conservatism constrains opportunistic reporting, the presence of female directors may strengthen this constraining effect by improving monitoring, increasing ethical sensitivity, and reducing managerial discretion in both accounting and operating decisions. Conversely, if conservative accounting encourages managers to substitute real activities for accrual manipulation, a gender-diverse board may reduce this substitution by more closely scrutinizing operational decisions that appear inconsistent with long-term value creation. Therefore, board gender diversity may not only have a direct effect on real earnings management but may also condition the effectiveness of accounting conservatism as a reporting-quality mechanism. Recent research on gender diversity, accounting conservatism, and corporate social responsibility supports the view that board composition can influence conservative reporting behavior and the broader accountability orientation of firms [19, 20].

The Iranian capital market provides a meaningful context for examining these relationships. Companies listed on the Tehran Stock Exchange and Iran Fara Bourse operate in an environment characterized by concentrated ownership structures, regulatory development, evolving corporate governance expectations, and increasing demand for transparency from investors and supervisory institutions. In such a context, earnings quality is particularly important because investors may rely heavily on published financial statements to evaluate corporate performance and make investment decisions. At the same time, the monitoring effectiveness of governance mechanisms may vary across firms depending on board structure, ownership concentration, financial expertise, and the presence or absence of female directors. Recent Iranian studies have emphasized the importance of internal audit, board governance mechanisms, audit committee characteristics, managerial overconfidence, and financial reporting quality in explaining earnings-related outcomes in listed firms [2, 6, 12].

Despite the growing body of research on earnings management and corporate governance, several gaps remain. First, many studies focus primarily on accrual-based earnings management, while real earnings management deserves greater attention because it affects actual operating decisions and may impose long-term economic costs. Second, accounting conservatism has often been studied as an independent determinant of reporting quality, but its association with real earnings management remains theoretically ambiguous and context-dependent. Third, although board gender diversity has been increasingly examined in relation to earnings quality, fewer studies have investigated whether it moderates the relationship between accounting conservatism and real earnings management. Fourth, evidence from emerging markets remains relatively limited, even though institutional

differences can substantially affect the role of conservatism and governance mechanisms. These gaps justify further empirical investigation using firm-year panel data, appropriate econometric procedures, and diagnostic tests to account for heterogeneity, autocorrelation, and other potential estimation issues [21, 22].

The significance of the present study lies in its integration of accounting conservatism, real earnings management, and board gender diversity within a single empirical framework. By examining whether conservatism is associated with real earnings management and whether board gender diversity moderates this relationship, the study contributes to the literature on financial reporting quality, corporate governance, and earnings management in an emerging capital market. The findings can also provide practical implications for investors, corporate boards, auditors, regulators, and policymakers. For investors, the results may clarify whether conservative reporting and female board representation provide useful signals of reporting quality. For boards and managers, the study may highlight the governance value of board diversity and financial reporting discipline. For regulators, the evidence may inform policies aimed at strengthening corporate governance mechanisms and improving the transparency of listed firms. Accordingly, the aim of this study is to investigate the relationship between accounting conservatism and real earnings management and to examine the moderating role of board gender diversity in this relationship among companies listed on the Tehran Stock Exchange and Iran Fara Bourse.

## 2. Methodology

Research methodology can be classified based on various criteria, including purpose, nature of data, method of data collection, mode of inference, and research design. In terms of purpose, the present study is applied, because its findings can be useful for investors, financial analysts, auditors, corporate managers, regulatory institutions, and researchers in the fields of accounting and finance. Moreover, since this study examines the relationship between accounting conservatism, real earnings management, and the moderating role of board gender diversity, it is classified as descriptive-correlational in terms of nature and method. Furthermore, because the data used in this study are extracted from historical information in financial statements and published corporate reports, the present study is also considered an ex post facto study.

In this study, actual data from companies listed on the Tehran Stock Exchange and Iran Fara Bourse are used to test the hypotheses. The required data were extracted from audited financial statements, board reports to the general assembly, explanatory notes accompanying the financial statements, the Rahavard Novin database, and the Comprehensive Database of All Listed Companies, known as CODAL. After data collection, the information was classified and prepared in Excel, and then EViews statistical and econometric software was used to test the hypotheses and estimate the research models. Given the structure of the data, which includes information from multiple companies over consecutive time periods, the appropriate method for data analysis is pooled or panel data analysis. The use of panel data increases the number of observations, reduces collinearity among variables, improves estimation efficiency, and controls for unobserved heterogeneity among firms.

**Data Collection Instrument**

The data required for the study are collected from secondary and documentary sources. For this purpose, corporate financial information is extracted from audited financial statements, annual reports, board activity reports, explanatory notes, and valid databases of the Iranian capital market. In cases where the data available in databases are incomplete, the CODAL system and archives published by the Securities and Exchange Organization are used.

Since the research variables are measured based on actual and audited corporate information, the data collection instrument has appropriate validity. In addition, the use of audited financial statements helps increase the reliability of the data. Data related to real earnings management are extracted from items in the income statement, statement of cash flows, and balance sheet. Data related to accounting conservatism are calculated using information on earnings, stock returns, and firms' market value. Furthermore, information related to board gender diversity was extracted from board reports and the composition of firms' board members.

**Statistical Population and Research Sample**

The statistical population of the present study includes all companies listed on the Tehran Stock Exchange and Iran Fara Bourse during the period from 2013 to 2022. A systematic elimination method is used to select the statistical sample. Accordingly, companies are included in the research sample if they meet the following conditions:

They were listed on the Tehran Stock Exchange or Iran Fara Bourse by the beginning of 2013 and remained present in the capital market until the end of 2022.

The required financial information for calculating the research variables during the study period was available.

The companies' fiscal year ended on March 20 in order to maintain the comparability of information.

The companies were not banks, financial institutions, insurance companies, investment companies, or financial intermediaries, because the nature of their activities and the structure of their financial statements differ from those of other companies.

They did not change their fiscal year during the study period.

Their stock trading was not suspended for long periods, so that market-based variables could be calculated.

After applying the above restrictions, the remaining companies were selected as the final research sample. In the initial text, after applying the restrictions, 277 companies were introduced as the statistical sample of the study. Therefore, considering the 10-year period, the number of firm-year observations in the complete case is equal to 2,770 observations.

**Research Variables**

The research variables include the dependent variable, independent variable, moderating variable, and control variables. In this study, real earnings management is considered the dependent variable, accounting conservatism is considered the independent variable, and board gender diversity is considered the moderating variable.

Dependent Variable: Real Earnings Management

The dependent variable of the study is real earnings management. Real earnings management refers to actions taken by managers through changes in a firm's real activities, such as production, sales, and discretionary expenditures, to achieve a desired level of earnings. Unlike accrual-based earnings management, this type of earnings management directly affects a firm's operating decisions and may lead to a reduction in firm value in the long term.

To measure real earnings management, following Roychowdhury (2006) and subsequent studies, three main indicators are used: abnormal operating cash flow, abnormal production costs, and abnormal discretionary expenses. First, the normal values of each of these items are estimated, and then the residuals of the models are considered the abnormal component.

a) Abnormal Operating Cash Flow

The following model is used to estimate normal operating cash flow:

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{S_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}$$

where:

$$CFO_{i,t}$$

is the operating cash flow of firm $i$in year $t$,

$$A_{i,t-1}$$

is the total assets of firm $i$at the beginning of the period,

$$S_{i,t}$$

is the sales of firm $i$in year $t$,

$$\Delta S_{i,t}$$

is the change in sales of firm $i$in year $t$, and

$$\varepsilon_{i,t}$$

is the model residual. The residual of this model is considered abnormal operating cash flow (Roychowdhury, 2006).

b) Abnormal Production Costs

The following model is used to estimate normal production costs:

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{S_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \alpha_4 \frac{\Delta S_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}$$

In this equation:

$$PROD_{i,t}$$

is the production cost of firm $i$in year $t$, which is calculated as the sum of cost of goods sold and changes in inventory. The residual of this model represents abnormal production costs. Overproduction beyond the normal level can reduce the cost per unit of goods and increase reported earnings in the short term, but it may increase inventory holding costs and the risk of inventory write-downs in the long term (Roychowdhury, 2006).

c) Abnormal Discretionary Expenses

The following model is used to estimate normal discretionary expenses:

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{S_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}$$

where:

$$DISEXP_{i,t}$$

is the discretionary expenses of firm $i$in year $t$. Discretionary expenses usually include selling, general and administrative expenses, advertising expenses, and research and development expenses. An abnormal reduction

in these expenses can increase current-period earnings, but it may negatively affect the firm's future performance (Roychowdhury, 2006; Cohen & Zarowin, 2010).

Finally, to calculate the overall index of real earnings management, a combination of the three components above is used. Since abnormal operating cash flow and abnormal discretionary expenses are usually interpreted in the opposite direction of real earnings management, these two components are multiplied by negative one and then added to abnormal production costs:

$$REM_{i,t} = (-1 \times AbCFO_{i,t}) + AbPROD_{i,t} + (-1 \times AbDISEXP_{i,t})$$

In this equation, a higher value of $REM$indicates a higher level of real earnings management.

Independent Variable: Accounting Conservatism

The independent variable of the study is accounting conservatism. Accounting conservatism is one of the important attributes of financial reporting, according to which losses and bad news are recognized in financial statements more quickly than gains and good news. In other words, under conservative conditions, a higher degree of verification is required for recognizing gains than for recognizing losses. Conservatism can affect financial reporting quality by reducing managers' opportunistic behaviors, increasing the reliability of accounting information, and reducing information asymmetry (Basu, 1997; Watts, 2003).

One of the most common models for measuring accounting conservatism is the Basu (1997) model. This model is based on the asymmetric timeliness of gain and loss recognition and examines whether accounting earnings respond more quickly to bad market news than to good news. The Basu model is specified as follows:

$$\frac{EARN_{i,t}}{P_{i,t-1}} = \beta_0 + \beta_1 DR_{i,t} + \beta_2 RET_{i,t} + \beta_3 DR_{i,t} \times RET_{i,t} + \varepsilon_{i,t}$$

where:

$$EARN_{i,t}$$

is earnings per share or net income of firm $i$in year $t$,

$$P_{i,t-1}$$

is the market price of the firm's stock at the beginning of the period,

$$RET_{i,t}$$

is the annual stock return of firm $i$in year $t$,

$$DR_{i,t}$$

is a dummy variable for bad news, which takes the value of one if stock return is negative and zero otherwise, and

$$DR_{i,t} \times RET_{i,t}$$

is the interaction variable in the model.

In this model, the coefficient $\beta_3$is the indicator of accounting conservatism. The larger and more significant this coefficient is, the higher the level of accounting conservatism, because it indicates that accounting earnings are more sensitive to bad news (Basu, 1997; LaFond & Watts, 2008).

Since the present study requires a usable firm-year index for the main model, accounting conservatism can be calculated using the Basu model approach through annual/industry estimation or approaches based on conditional conservatism. Moreover, in the case of limitations in stock return data, alternative measures of conservatism, such as the market-to-book ratio or accumulated negative accruals, may be used. Nevertheless, the main proposed measure for this study is the Basu model, because it has been used in the accounting literature as one of the best-known measures of conditional conservatism (Basu, 1997).

Moderating Variable: Board Gender Diversity

The moderating variable of the study is board gender diversity. Board gender diversity refers to the presence of women in the composition of the company's board of directors. The presence of female members on the board can increase diversity of perspectives, improve decision-making quality, strengthen managerial monitoring, and increase sensitivity to ethical issues and reporting transparency (Adams & Ferreira, 2009; Srinidhi et al., 2011).

In this study, board gender diversity is measured as a dummy variable. If at least one female member exists in the composition of the company's board of directors, the variable takes the value of one; otherwise, it takes the value of zero:

$$BGEND_{i,t} = \begin{cases} 1 & \text{if at least one female member is present on the board of directors} \\ 0 & \text{otherwise} \end{cases}$$

This measure has also been used in studies related to corporate governance and financial reporting quality and is recognized as a simple and reliable indicator for measuring the presence of women on the board of directors (Adams & Ferreira, 2009; Srinidhi et al., 2011).

Control Variables

To control for the effects of other factors influencing real earnings management, several control variables are used in the research model. These variables include board characteristics, ownership structure, financial characteristics of the firm, and performance indicators.

Board independence is calculated as the ratio of non-executive board members to total board members. A more independent board of directors can monitor managers more effectively and reduce the likelihood of opportunistic behaviors in financial reporting (Fama & Jensen, 1993).

$$BIND_{i,t} = \frac{\text{Number of non-executive board members}}{\text{Total number of board members}}$$

Board financial expertise is calculated as the ratio of members with financial expertise to total board members. The presence of members with financial expertise can improve monitoring of the financial reporting process and reduce earnings management (Xie et al., 2003).

$$BEXP_{i,t} = \frac{\text{Number of board members with financial expertise}}{\text{Total number of board members}}$$

Ownership concentration is calculated as the percentage of shares held by the largest shareholder. Ownership concentration can affect managers' reporting behavior by increasing the monitoring of management by major shareholders (Shleifer & Vishny, 1997).

$$OWNC_{i,t} = \text{Percentage ownership of the largest shareholder}$$

Financial leverage is obtained from the ratio of total liabilities to total assets. Firms with high financial leverage may have a stronger motivation to manage earnings because of contractual pressures and debt obligations (Dechow et al., 1996).

$$LEV_{i,t} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

Firm size is calculated as the natural logarithm of total assets. Firm size can influence the level of disclosure, financial reporting quality, monitoring structure, and the possibility of earnings management (Watts & Zimmerman, 1986).

$$SIZE_{i,t} = Ln(\text{Total assets})$$

Return on assets is calculated as the ratio of net income or operating income to total assets and reflects the firm's economic performance. Firm performance can affect managers' incentives to engage in earnings management (Roychowdhury, 2006).

$$ROA_{i,t} = \frac{\text{Net income}}{\text{Total assets}}$$

Growth opportunity is calculated as the ratio of the market value of equity to the book value of equity. Firms with high growth opportunities may have greater motivation to manage earnings because of market pressure and investor expectations (Cohen & Zarowin, 2010).

$$MTB_{i,t} = \frac{\text{Market value of equity}}{\text{Book value of equity}}$$

Firm age is calculated as the natural logarithm of the number of years elapsed since the firm's establishment. Older firms usually have more established control and reporting structures.

$$AGE_{i,t} = Ln(\text{Number of years of firm activity})$$

**Research Models**

To test the research hypotheses, multivariate regression models with panel data are used. The first model is designed to examine the effect of accounting conservatism on real earnings management as well as the direct effect of board gender diversity on real earnings management:

$$REM_{i,t} = \beta_0 + \beta_1 CONACC_{i,t} + \beta_2 BGEND_{i,t} + \beta_3 BIND_{i,t} + \beta_4 BEXP_{i,t} + \beta_5 OWNC_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 ROA_{i,t} + \beta_9 MTB_{i,t} + \beta_{10} AGE_{i,t} + \varepsilon_{i,t}$$

The second model is used to examine the moderating role of board gender diversity in the relationship between accounting conservatism and real earnings management:

$$REM_{i,t} = \beta_0 + \beta_1 CONACC_{i,t} + \beta_2 BGEND_{i,t} + \beta_3 (CONACC_{i,t} \times BGEND_{i,t}) + \beta_4 BIND_{i,t} + \beta_5 BEXP_{i,t} + \beta_6 OWNC_{i,t} + \beta_7 LEV_{i,t} + \beta_8 SIZE_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} MTB_{i,t} + \beta_{11} AGE_{i,t} + \varepsilon_{i,t}$$

In the second model, the coefficient $\beta_3$indicates the moderating role of board gender diversity. If this coefficient is statistically significant, it can be concluded that board gender diversity moderates the relationship between accounting conservatism and real earnings management. The sign of the coefficient also indicates the direction of

moderation; for example, a negative coefficient may indicate that board gender diversity strengthens the reducing effect of conservatism on real earnings management.

**Data Analysis Method**

After data collection and preparation, descriptive statistics of the research variables, including mean, median, minimum, maximum, standard deviation, skewness, and kurtosis, are first calculated. Descriptive statistics provide an overall picture of the characteristics of the data and help the researcher evaluate the dispersion and distribution of the variables.

In the next stage, to examine the preliminary relationships among variables, the Pearson correlation matrix is calculated. This test indicates the magnitude and direction of the linear relationship among the research variables. In addition, the variance inflation factor is used to examine the problem of multicollinearity among independent variables. If the value of the variance inflation factor is less than 10, there is usually no serious multicollinearity problem.

Given the nature of the data, the Limer F test is first conducted to select the appropriate estimation method. This test determines whether the pooled data model is appropriate or whether the panel data model should be used. In the Limer F test, the null hypothesis indicates the appropriateness of the pooled model, and the alternative hypothesis indicates the appropriateness of the panel model. If the significance level of the test is less than 0.05, the null hypothesis is rejected, and the use of the panel data method will be appropriate.

After confirming the panel model, the Hausman test is used to choose between the fixed-effects and random-effects models. In the Hausman test, the null hypothesis indicates the appropriateness of the random-effects model, and the alternative hypothesis indicates the appropriateness of the fixed-effects model. If the significance level of the test is less than 0.05, the fixed-effects model is selected; otherwise, the random-effects model is appropriate. In addition, before the final estimation of the models, the required diagnostic tests are conducted. To examine autocorrelation of errors, the Durbin–Watson test or tests appropriate for panel data are used. To examine heteroscedasticity, the Breusch–Pagan test, White test, or modified tests for panel data can be used. If heteroscedasticity or autocorrelation exists, the models are estimated using robust standard errors so that the results have greater statistical validity.

The F-statistic is used to examine the overall significance of the model, and the t-statistic is used to examine the significance of the coefficients of each variable. The significance level in this study is set at 5%. Therefore, if the significance level of the t-statistic for a variable is less than 0.05, the effect of that variable on real earnings management is considered statistically significant. Moreover, the adjusted coefficient of determination is used to evaluate the explanatory power of the model.

**Research Hypotheses**

Based on the theoretical foundations and research models, the main hypotheses of the study are formulated as follows:

First hypothesis: Accounting conservatism has a significant effect on real earnings management in companies listed on the Tehran Stock Exchange and Iran Fara Bourse.

Second hypothesis: Board gender diversity has a significant effect on real earnings management in companies listed on the Tehran Stock Exchange and Iran Fara Bourse.

Third hypothesis: Board gender diversity moderates the relationship between accounting conservatism and real earnings management.

**Table 1. Summary of Operational Definitions of Variables**

| Variable Type | Symbol | Operational Definition |
|---|---|---|
| Dependent variable | REM | Real earnings management index obtained from the combination of abnormal operating cash flow, abnormal production, and abnormal discretionary expenses |
| Independent variable | CONACC | Accounting conservatism measured based on the Basu model |
| Moderating variable | BGEND | Dummy variable; takes the value of 1 if at least one female member is present on the board of directors and 0 otherwise |
| Control variable | BIND | Ratio of non-executive board members to total board members |
| Control variable | BEXP | Ratio of board members with financial expertise to total board members |
| Control variable | OWNC | Percentage of shares held by the largest shareholder |
| Control variable | LEV | Ratio of total liabilities to total assets |
| Control variable | SIZE | Firm size |

## 3. Findings and Results

In the first step, in order to identify the characteristics of the data and examine the dispersion of the research variables, descriptive statistics of the variables, including mean, standard deviation, minimum, and maximum values, were calculated. The research sample includes 277 companies listed on the Tehran Stock Exchange during the period from 2013 to 2022, comprising 2,770 observations. The results of the descriptive statistics are presented in Table 2.

Table 2 shows that the mean of real earnings management ($REM$)is equal to 0.342, indicating the existence of real earnings management behaviors among the sample companies. In addition, the mean of accounting conservatism ($CONSERV$)indicates differences among companies in applying conservative procedures in financial reporting. Among the corporate governance variables, the mean of board independence is 0.594, and the mean of board expertise is reported as 0.195.

**Table 2. Descriptive Statistics of Research Variables**

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| REM | 0.342 | 0.393 | 0.005 | 4.536 |
| CONSERV | 0.214 | 0.241 | -0.412 | 0.893 |
| BGEND | 0.089 | 0.285 | 0 | 1 |
| BIND | 0.594 | 0.173 | 0.200 | 0.900 |
| BEXP | 0.195 | 0.141 | 0 | 0.667 |
| OWNC | 0.378 | 0.201 | 0.050 | 0.890 |
| LEV | 0.568 | 0.203 | 0.090 | 0.960 |
| ROA | 0.158 | 0.148 | -0.320 | 0.640 |
| SIZE | 15.017 | 1.327 | 11.201 | 18.902 |

Overall, the standard deviation values show that the dispersion of the data is at an acceptable level and that the data are suitable for econometric analyses.

Before estimating the regression model, the Pearson correlation matrix was calculated to examine the preliminary relationships among variables and to ensure the absence of severe collinearity among independent variables. The results are presented in Table 3.

**Table 3. Pearson Correlation Matrix Among Research Variables**

| Variable | REM | CONSERV | BGEND | BIND | BEXP | LEV | ROA | SIZE |
|---|---|---|---|---|---|---|---|---|
| REM | 1 | | | | | | | |
| CONSERV | 0.04 | 1 | | | | | | |
| BGEND | -0.09 | 0.02 | 1 | | | | | |
| BIND | -0.03 | 0.05 | 0.01 | 1 | | | | |
| BEXP | -0.12 | 0.03 | 0.04 | 0.21 | 1 | | | |
| LEV | 0.15 | -0.06 | -0.01 | -0.03 | -0.02 | 1 | | |
| ROA | 0.11 | 0.04 | -0.02 | 0.06 | 0.08 | -0.18 | 1 | |
| SIZE | -0.10 | 0.07 | 0.03 | 0.09 | 0.05 | 0.13 | 0.17 | 1 |

Based on the results of Table 3, the correlation coefficients among the independent variables are relatively low, and none of the coefficients exceeds 0.7. Therefore, there is no severe collinearity problem among the independent variables.

To determine the appropriate model type, the Limer F test, also known as the Chow test, was first conducted. The results of this test are presented in Table 4.

**Table 4. Limer F Test**

| Test Statistic | Value | Significance Level |
|---|---|---|
| F | 8.73 | 0.000 |

Given the significance of the test, the assumption of using the pooled model is rejected, and the use of the panel data model is considered appropriate.

Next, the Hausman test was used to choose between the fixed-effects and random-effects models.

**Table 5. Hausman Test**

| Test Statistic | Value | Significance Level |
|---|---|---|
| Chi-square | 21.64 | 0.002 |

Given the significance of the Hausman test, the fixed-effects model was selected for estimating the research model.

To test the first and second hypotheses, the research regression model was estimated. The results are presented in Table 6.

**Table 6. Regression Results for the First and Second Hypotheses**

Dependent variable: real earnings management ($REM$)

| Variable | Coefficient | t-Statistic | Significance Level |
|---|---|---|---|
| CONSERV | 0.031 | 1.18 | 0.237 |
| BGEND | -0.051 | -2.31 | 0.021 |
| BIND | -0.014 | -0.89 | 0.372 |
| BEXP | -0.082 | -2.94 | 0.003 |
| OWNC | -0.019 | -1.12 | 0.264 |
| LEV | 0.091 | 3.27 | 0.001 |
| ROA | 0.073 | 2.46 | 0.014 |
| SIZE | -0.028 | -2.85 | 0.004 |

Model statistics:

$$R^2 = 0.172;\ \text{Wald statistic} = 243.30;\ \text{Significance level} = 0.000$$

Based on the results of Table 6, the coefficient of accounting conservatism is not statistically significant. Therefore, the first hypothesis of the study, which states that there is a relationship between accounting conservatism and real earnings management, is not supported.

Moreover, the coefficient of board gender diversity is negative and significant, indicating that the presence of women on the board of directors is associated with a reduction in real earnings management. Therefore, the second hypothesis of the study is supported.

To examine the moderating role of board gender diversity in the relationship between accounting conservatism and real earnings management, the interaction variable was entered into the model. The results are presented in Table 7.

**Table 7. Results of Testing the Third Hypothesis**

Dependent variable: $REM$

| Variable | Coefficient | t-Statistic | Significance Level |
|---|---|---|---|
| CONSERV | 0.028 | 1.01 | 0.311 |
| BGEND | -0.047 | -2.04 | 0.041 |
| $\boldsymbol{CONSERV \times BGEND}$ | -0.042 | -0.56 | 0.577 |

Model statistics:

$R^2 = 0.169$; Wald statistic = 240.50; Significance level = 0.000

According to the results of Table 7, the coefficient of the interaction variable of accounting conservatism and gender diversity is not significant. Therefore, board gender diversity does not play a moderating role in the relationship between accounting conservatism and real earnings management, and consequently, the third hypothesis of the study is not supported.

To ensure the validity of the model estimation results, the classical regression assumptions were examined. The results of the tests related to multicollinearity, heteroscedasticity, autocorrelation, and normality of the disturbance terms are presented in Table 8.

**Table 8. Results of Testing Econometric Assumptions**

| Test | Statistic | Significance Level | Result |
|---|---|---|---|
| VIF, mean | 2.31 | — | Absence of multicollinearity |
| Wooldridge test, autocorrelation | 15.42 | 0.000 | Presence of autocorrelation |
| Modified Wald test, heteroscedasticity | 328.15 | 0.000 | Presence of heteroscedasticity |
| Shapiro–Wilk test, normality | 0.942 | 0.000 | Non-normality |

Based on the results of Table 8, the VIF value is less than 10, indicating that there is no multicollinearity problem in the model. Moreover, the results of the Wooldridge test indicate the presence of serial autocorrelation in the disturbance terms. On the other hand, the modified Wald test indicates the presence of heteroscedasticity in the model. To address these problems, the model was estimated using the generalized least squares method. In addition, given the relatively large sample size, the non-normality of the disturbance terms will not have a substantial effect on the validity of the estimation results.

## 4. Discussion and Conclusion

The present study examined the relationship between accounting conservatism and real earnings management and investigated whether board gender diversity moderates this relationship in companies listed on the Tehran Stock Exchange and Iran Fara Bourse during the period from 2013 to 2022. The results of the first regression model showed that accounting conservatism did not have a statistically significant effect on real earnings management.

Specifically, the coefficient of accounting conservatism was positive but insignificant, indicating that conservative financial reporting, as measured in this study, did not meaningfully explain variations in managers' use of real earnings management practices. This finding suggests that, in the studied firms, the existence of conservative accounting practices alone may not be sufficient to constrain real earnings management, because real earnings management is conducted through operational decisions rather than direct accounting estimates. Unlike accrual-based earnings management, which can be more closely affected by accounting policies and recognition rules, real earnings management is embedded in managerial decisions related to sales policies, production volume, discretionary expenditures, and operating cash flows. Therefore, conservative reporting may limit the overstatement of accounting earnings through recognition and measurement practices, but it may not necessarily prevent managers from altering real business activities to reach desired earnings targets [7, 9].

The lack of a significant relationship between accounting conservatism and real earnings management can also be explained by the substitution perspective in earnings management research. When accounting conservatism restricts managerial discretion in accrual recognition, managers may shift toward real actions that are less directly controlled by accounting standards and external auditing procedures. In this sense, conservatism may reduce some forms of accounting manipulation while leaving room for operational manipulation. The finding of the present study is therefore consistent with the argument that real earnings management is more difficult to detect and constrain through conventional accounting mechanisms, because it may appear as normal business activity even when it is motivated by reporting objectives [3]. This result also aligns with the view that conservatism is not a universal mechanism for preventing all forms of earnings management; rather, its effectiveness depends on the nature of managerial discretion, the institutional environment, the strength of governance mechanisms, and the type of earnings management under investigation [8, 10].

From a theoretical standpoint, this finding indicates that accounting conservatism should be interpreted as a financial reporting quality attribute rather than as a complete governance mechanism. Conservatism improves the timeliness of loss recognition and may reduce information asymmetry, but it may not fully control managerial incentives to influence reported performance through real activities. This distinction is particularly important in emerging markets, where monitoring systems, analyst scrutiny, enforcement quality, and investor protection mechanisms may be less developed than in advanced capital markets. In such environments, managers may have stronger incentives to rely on operational tools of earnings management, especially when they face pressure to meet earnings benchmarks, satisfy creditors, maintain market expectations, or protect their reputation. Accordingly, the insignificant effect of conservatism in this study may reflect the fact that real earnings management is driven more by managerial incentives, operational flexibility, and governance effectiveness than by conservative accounting recognition alone [1, 4].

The second hypothesis of the study was supported. The results showed that board gender diversity had a negative and statistically significant effect on real earnings management. This finding indicates that the presence of at least one female director on the board is associated with lower levels of real earnings management among the sample firms. This result provides evidence for the monitoring and governance role of gender-diverse boards. Female board members may contribute to higher monitoring quality, more careful evaluation of managerial decisions, greater concern for ethical conduct, and stronger emphasis on transparency in financial reporting. Since real earnings management often involves operating decisions that may damage long-term firm value, a gender-diverse board may be more likely to question short-term managerial actions that appear inconsistent with sustainable performance. This finding is consistent with agency theory, which suggests that a more diverse and

independent board can reduce managerial opportunism and improve the alignment between managerial actions and shareholder interests [13, 14].

The negative association between board gender diversity and real earnings management is also in line with prior empirical evidence showing that female directors contribute to higher earnings quality and lower earnings manipulation. Studies on board composition and financial reporting quality have argued that female directors may improve board deliberation, reduce groupthink, and increase the quality of oversight over financial reporting processes. The finding of the present study supports this perspective by showing that board gender diversity is not only related to accrual-based reporting quality but also to real earnings management, which is more operational and potentially more difficult to detect. This result is aligned with evidence from international studies indicating that gender diversity on corporate boards is associated with lower earnings management and stronger financial reporting quality [16, 17]. It is also consistent with research emphasizing the importance of female directors' voice and critical mass in improving financial reporting quality and strengthening board monitoring effectiveness [15].

The significance of board gender diversity in reducing real earnings management is particularly important in the context of Iranian listed companies. In many emerging markets, including Iran, ownership concentration, family ownership, state influence, and limited capital market transparency may affect the effectiveness of external governance mechanisms. Under such conditions, internal governance mechanisms, especially the board of directors, become more important in monitoring managerial behavior. The findings suggest that even the presence of at least one female board member may enhance oversight and reduce managerial opportunism in operational decisions related to earnings management. This result corresponds with recent Iranian studies that have emphasized the role of board characteristics, governance mechanisms, audit committee quality, and management accounting systems in improving reporting quality and firm performance [2, 11, 12]. It also supports the broader argument that governance mechanisms can influence earnings quality by shaping managerial incentives and strengthening accountability structures [6].

The third hypothesis of the study was not supported. The coefficient of the interaction term between accounting conservatism and board gender diversity was negative but statistically insignificant, indicating that board gender diversity did not significantly moderate the relationship between accounting conservatism and real earnings management. This means that although gender diversity directly reduces real earnings management, it does not significantly change the effect of accounting conservatism on real earnings management. In other words, the presence of female directors appears to function as an independent governance mechanism rather than as a factor that strengthens or weakens the influence of conservatism on real earnings management. This finding suggests that accounting conservatism and board gender diversity may operate through different channels: conservatism through financial reporting recognition and measurement rules, and gender diversity through board monitoring, ethical oversight, and governance quality.

The insignificant moderating effect may also be explained by the limited level of female representation on corporate boards. The descriptive statistics showed that the mean value of board gender diversity was 0.089, indicating that only a relatively small proportion of firm-year observations included at least one female board member. When female representation is low, female directors may not have sufficient influence, voting power, committee participation, or critical mass to reshape the relationship between accounting conservatism and managerial reporting behavior. Prior research has suggested that the governance impact of female directors may depend not only on their presence but also on their number, independence, expertise, authority, and ability to influence board decisions [15, 18]. Therefore, while the presence of women on boards may directly improve

monitoring, the low level of representation may not be strong enough to modify the effect of an accounting attribute such as conservatism on real earnings management.

This result can also be interpreted in light of recent studies on the relationship between board gender diversity and accounting conservatism. Prior research has indicated that board gender diversity may be associated with conservative reporting behavior, especially when firms have stronger corporate social responsibility orientation or when female directors have meaningful influence on board decisions [18, 19]. However, the present study shows that such influence may not necessarily extend to the moderating relationship between conservatism and real earnings management. This distinction is important because accounting conservatism concerns the timing and asymmetry of gain and loss recognition, whereas real earnings management concerns operational decisions. Female directors may improve monitoring of managerial behavior, but their ability to link conservative accounting signals to real operating decisions may depend on the board's financial expertise, access to internal information, audit committee effectiveness, and the overall governance environment.

The control variables also provide meaningful insights into the determinants of real earnings management. Board financial expertise had a negative and significant effect on real earnings management, indicating that boards with greater financial expertise are more capable of detecting, questioning, and limiting opportunistic reporting-related decisions. This finding supports the view that technical financial knowledge at the board level can improve oversight of reporting quality and reduce managerial discretion. Financial leverage had a positive and significant effect on real earnings management, suggesting that highly leveraged firms may have stronger incentives to manipulate real activities in order to meet debt-related expectations or avoid violation of contractual constraints. Return on assets also had a positive and significant relationship with real earnings management, which may indicate that better-performing firms still engage in real activities manipulation to sustain performance trends or meet market expectations. Firm size had a negative and significant effect, suggesting that larger firms may be subject to stronger monitoring, greater public scrutiny, more developed internal controls, and higher reporting discipline. These findings are consistent with the broader literature on earnings quality, governance, and firm-level determinants of financial reporting behavior [21, 22].

Overall, the findings of this study contribute to the literature by showing that accounting conservatism alone does not significantly reduce real earnings management, whereas board gender diversity has a direct constraining effect on such behavior. These results indicate that real earnings management is more closely related to governance quality and managerial monitoring than to conservative accounting recognition alone. The study therefore extends the literature on corporate governance and earnings quality by demonstrating that board gender diversity can be an effective monitoring mechanism in an emerging capital market. At the same time, the insignificant moderating effect shows that the presence of female directors may not be sufficient to alter the relationship between conservatism and real earnings management unless gender diversity reaches a level that allows female directors to exercise substantial influence over board decisions. Therefore, the findings suggest that improving financial reporting quality requires a combination of accounting discipline, board diversity, financial expertise, regulatory oversight, and effective internal governance structures [13, 14, 17].

This study has several limitations that should be considered when interpreting the findings. First, the study was conducted using data from companies listed on the Tehran Stock Exchange and Iran Fara Bourse, and therefore the findings may not be fully generalizable to unlisted firms, financial institutions, or companies operating in other institutional environments. Second, the measurement of board gender diversity was based on the presence of at least one female director, while this binary measure does not capture the number of female directors, their

independence, financial expertise, committee membership, professional background, or real influence in board decision-making. Third, the measurement of real earnings management was based on established abnormal cash flow, production cost, and discretionary expense models, but such models may not capture all forms of operational manipulation. Fourth, although the study used panel data and diagnostic tests to improve estimation validity, unobservable managerial, institutional, and behavioral factors may still affect the results.

Future studies are recommended to examine board gender diversity using more detailed measures, such as the proportion of female directors, the presence of women on audit committees, female board independence, female financial expertise, and critical mass of female directors. Future researchers may also compare the effects of board gender diversity on accrual-based earnings management and real earnings management simultaneously to determine whether female directors are more effective in constraining one form of earnings management than the other. In addition, future studies can investigate the moderating or mediating roles of audit quality, internal audit effectiveness, ownership concentration, managerial overconfidence, corporate social responsibility, institutional ownership, and board financial expertise. Comparative studies across industries, ownership types, or emerging and developed markets can also provide deeper insight into the institutional conditions under which accounting conservatism and gender-diverse boards influence financial reporting quality.

The findings of this study suggest that companies, regulators, and capital market policymakers should pay greater attention to board composition as a practical mechanism for improving financial reporting quality. Firms should consider increasing the meaningful participation of women on boards rather than limiting gender diversity to symbolic representation. In addition, boards should strengthen financial expertise, improve monitoring of operational decisions, and evaluate whether managerial actions related to sales, production, and discretionary expenditures are consistent with long-term value creation. Regulators and professional bodies can also encourage listed companies to disclose more detailed information about board diversity, board expertise, and the role of directors in financial reporting oversight. Investors and analysts should consider board gender diversity and board financial expertise as relevant governance indicators when evaluating the credibility of reported earnings and the likelihood of real earnings management.

**Authors' Contributions**

Authors equally contributed to this article.

**Ethical Considerations**

All procedures performed in this study were under the ethical standards.

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**Conflict of Interest**

The authors report no conflict of interest.

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