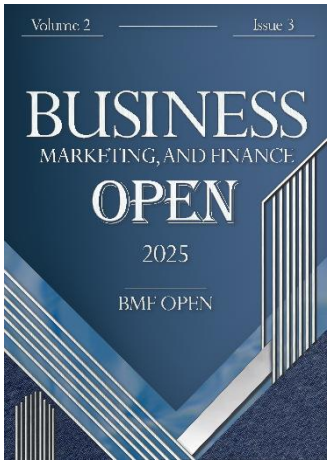
The Role of Management Ability, Political Influence, and Financial Pressure on Fraudulent Financial Reporting: The Moderating Role of Credit Rating and a Comprehensive Mathematical Model of Corporate Governance in Banks Listed on the Tehran Stock Exchange



Parviz Fazaljoo[1], Mehdi Khalilpour[2,*], Javad Ramezani[3], Ramazan Rezaian[4] and Javad Babaei Khalili[5]

[1] PhD Student, Department of Accounting, Noor Branch, Islamic Azad University, Noor, Iran;
[2] Assistant Professor, Department of Accounting, Noor Branch, Islamic Azad University, Noor, Iran;
[3] Assistant Professor, Department of Accounting, Noor Branch, Islamic Azad University, Noor, Iran;
[4] Assistant Professor, Department of Financial Mathematics and Statistics, Noor Branch, Islamic Azad University, Noor, Iran;
[5] Assistant Professor, Department of Accounting, Bandargaz Branch, Islamic Azad University, Bandargaz, Iran;
* Correspondence: khalilpourmehdi@gmail.com

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Abstract: One of the essential and significant factors influencing the quality of financial information and financial reporting is the political influence of management and business owners in the political environment and their relationships with political power circles. In this regard, the present study aims to examine the impact of management ability, political influence, and financial pressure on fraudulent financial reporting, considering the moderating role of credit rating and a comprehensive mathematical model of corporate governance in banks listed on the Tehran Stock Exchange. This study is applied in terms of its objective. The statistical population of this research includes all banks listed on the Tehran Stock Exchange during the period from 2015 to 2021. Considering the conditions and systematic elimination, 10 banks listed on the Tehran Stock Exchange were selected as the statistical sample. The testing and analysis of data were conducted using a multivariate regression model in the EViews software environment, and the generalized least squares (GLS) estimation method was employed. The results of data analysis indicate that credit rating and corporate governance influence the relationship between management ability, political influence, and financial pressure with fraudulent financial reporting in banks. The findings of this study can significantly assist policymakers, planners, and bank managers.

Keywords: Management ability, political influence, financial pressure, fraudulent financial reporting, bank ratings.

1. Introduction

For companies to survive and expand their activities, they need to make appropriate and timely investments. Financial reports should provide information that is useful for potential and actual investors, creditors, and other stakeholders in making rational investment decisions, granting credit, and similar financial decisions. Financial reports play a significant role in achieving these objectives, and improving their quality can enhance the efficiency of corporate

investments, safeguard and develop their resources, and benefit users of financial information. The qualitative characteristics of financial reporting and the factors influencing them are among the critical issues in accounting and a major concern for researchers in this field. These factors range from accounting and auditing principles and standards to organizational structures, management elements, and individual characteristics, all of which can affect financial reporting and its quality in various ways [1-5].

Financial reporting is considered a crucial source of information for economic decision-making, used by managers, investors, creditors, and other stakeholders to meet their informational needs [6]. Fraudulent financial reporting involves the deliberate misstatement or omission of amounts or disclosures in financial statements to deceive users of financial reports. This issue undermines investor confidence and casts doubt on the credibility and professional competence of accounting [7-9].

With the increasing expansion of financial markets, the primary role of accounting information in investment activities is to provide the necessary groundwork for the optimal allocation of resources. In the wake of recent financial scandals, investor confidence in the financial reporting system has been shaken, and financial reporting quality has emerged as a crucial factor in determining the credibility and reliability of reported figures. Consequently, ensuring the accuracy of accounting information and its outcomes has become a subject of interest for investors, managers, policymakers, and standard-setters. In recent years, fraudulent reporting and financial accounting fraud have significantly increased. Today, regulatory bodies, the accounting profession, and management are paying particular attention to the causes of fraud and the available mechanisms to prevent fraudulent behavior in financial reporting [10, 11].

Financial statement manipulation includes distorting their components by overstating assets, revenues, and profits or understating liabilities, expenses, and losses. When financial statements contain material misstatements to the extent that their components do not reflect economic reality, it is considered fraud. Despite numerous international studies on detecting fraud in financial reports, limited attention has been given to this issue domestically. Fraudulent financial reporting is particularly significant in Iran. The increasing number of publicly listed companies issuing securities to attract financial resources and efforts to minimize tax liabilities on profits are among the reasons for this issue's importance. Given the significance of detecting fraud in financial reporting to protect investor interests, this study aims to examine this matter [12, 13].

Financial reports are among the most important products of the accounting process, primarily intended to provide information for evaluating performance, profitability, and forecasting future cash flows. Auditing has become a necessary and highly demanded profession globally due to widespread efforts to manipulate financial reports fraudulently. Preventing, detecting, and investigating fraud in corporate financial statements has become a pressing concern for auditors worldwide, leading to an increased demand for preventive or reactive anti-fraud services. Specifically, management ability is associated with fewer restatements of financial statements, greater earnings stability, higher accrual persistence, and lower estimation errors in doubtful accounts. Moreover, establishing a corporate governance system significantly enhances the effectiveness of board duties and compliance with legal requirements [14-16].

With the expansion of companies and financial institutions, the risk of separation between ownership and management increases, potentially leading companies toward financial crises. The need for corporate governance arises from the inherent conflicts of interest among different stakeholders within the corporate structure. Broadly speaking, corporate governance encompasses legal, cultural, and institutional arrangements that shape a company's direction and performance. Key actors in this system include shareholders and their ownership

structures, board members and their compositions, company management led by the CEO or executive director, and other stakeholders who can influence corporate operations [2, 17, 18].

In relationship-based economic systems, political connections serve as a vital source of value for politically affiliated companies. Such companies gain easier access to capital and other benefits through their connections, reducing their reliance on high-quality financial reporting [19]. In Iran, political affiliations play a significant role, as the predominance of state-owned enterprises and major industries influences the economy. Due to the state-centric economic structure, both managers and major shareholders often have political ties.

To date, limited research has focused on the impact of political connections on credit ratings. Therefore, further exploration of this relationship could expand the existing body of knowledge. Politically connected firms, supported by political figures, are better positioned to receive government assistance in adverse conditions and are less likely to default on debt repayments. Cole et al.'s study in China revealed that politically connected firms faced fewer financial constraints during crises due to government support and had a greater ability to fulfill their financial obligations. Similarly, Houston et al. argued that politically connected companies benefit from subsidies and financial assistance during crises, reducing their default risk and enhancing their credit ratings [20-22].

Conversely, some studies suggest that politically connected firms, due to their privileged access to financing, tend to have higher debt levels in their capital structures. The increased debt burden may limit their ability to meet financial obligations, leading to lower credit ratings than non-politically connected firms [23, 24].

Today, identifying the factors influencing credit ratings is essential for comparing firms' credit risks and assessing their competitive positioning. A company's financial status is closely linked to its ability to meet obligations to investors, creditors, and other stakeholders. Credit ratings serve as indicators of financial health, assisting investors in making informed investment decisions [20, 25-27].

Gong et al. (2018) described credit ratings as the current evaluation of a firm's ability to meet its financial obligations, without specific consideration of the nature and conditions of individual liabilities. Given these implications, companies are highly concerned about their credit standings, as their ratings influence not only their financial health but also their attractiveness to creditors and investors [28]. Moreover, potential creditors and investors closely monitor corporate credit ratings to guide their decision-making processes. Comparing firms' credit ratings helps investors select suitable investment opportunities while also determining the cost companies must incur to raise capital in financial markets [29]. Considering the theoretical literature on the influence of various factors on bank performance, it is important to note that Iran's banking industry operates under unique conditions. Several factors, including government dependency, political risks, macroeconomic conditions, and Iran's economic relations with the international community (especially sanctions), have significantly shaped the banking sector's performance. These factors not only affect profitability and revenue-generating capacity but also impact financial reporting quality [22, 30]. In recent years, financial reporting quality has emerged as a key consideration for users of banking information, with its improvement being a prerequisite for banking transparency and achieving efficient capital allocation. One of the critical issues arising from major financial scandals over the past decades is corporate governance, which has become a significant topic for investors [31, 32].

The increasing incidence of corporate fraud underscores the need for organizations to prioritize and reinforce fraud prevention and deterrence mechanisms [33]. In recent years, Iranian authorities have made efforts to introduce corporate governance frameworks and emphasize their role in monitoring economic entities. The Securities and Exchange Organization has taken steps to enhance financial reporting quality, including the issuance of internal control system guidelines for publicly listed companies on May 4, 2012. Additionally, in late 2012, the

organization approved the Audit Committee Charter and Internal Audit Unit framework, demonstrating a commitment to implementing corporate governance mechanisms [7].

Although corporate governance has a relatively long history in Iran, it remains a nascent concept in legal terms and requires further development and regulatory oversight [34]. The corporate governance framework has undergone multiple revisions, highlighting the evolving regulatory landscape.

Based on these considerations, this study aims to evaluate the impact of management ability, political influence, and financial pressure on fraudulent financial reporting, with a moderating role for credit rating and a comprehensive mathematical corporate governance model in banks listed on the Tehran Stock Exchange.

2. Methodology

Since this research uses past data to test hypotheses, it falls under the category of ex-post facto studies. It is a quasi-experimental study in the field of financial accounting research.

In this study, a questionnaire was used to assign weights to the research variables. The respondents in this survey-based research include professional and academic experts such as faculty members and doctoral students, audit managers, chief executive officers, board members of companies, and managers and analysts of investment firms, brokerage firms, and investment funds.

To gather expert opinions on the weighting and importance of the criteria considered for measuring corporate governance, a questionnaire was prepared using one of the multi-criteria decision-making models and was distributed among the experts. The collected responses were then analyzed, and the weight of each criterion influencing corporate governance was determined using the Shannon entropy method. Subsequently, the required data for measuring each corporate governance criterion was collected from databases, standardized, and integrated into a comprehensive corporate governance index model.

The statistical population of this study includes all banks listed on the Tehran Stock Exchange during the period from 2015 to 2021. The reasons for selecting this population include:

1. Accessibility of stock exchange data
2. Accuracy of stock exchange information
3. High reliability and validity of stock exchange information

The sampling method in this research is systematic elimination. The sample selection includes banks that meet all of the following conditions:

1. To ensure sample homogeneity, banks must have been listed on the Tehran Stock Exchange before 2015 and must have had their shares traded on the exchange since 2011.
2. To select active banks, their transactions on the Tehran Stock Exchange must not have been interrupted for more than six months during the 2015–2021 period.
3. To enhance comparability, the fiscal year of the banks must end in March.
4. Banks must not have changed their business activities or fiscal year during the study period.
5. Access to the required financial information of the banks must be possible.

Based on these criteria and systematic elimination, 10 banks were selected as the final sample.

To assign weights to the metrics used in calculating the corporate governance index, expert opinions were utilized. An electronic questionnaire containing 20 questions, each representing a metric in the model, was sent to 36 professional and academic experts, including faculty members with expertise in corporate governance research, investment firm analysts, brokerage professionals, and accounting standard-setters. Experts were asked to provide

their opinions on the weighting of these 20 metrics. All completed questionnaires were collected, and the weight of each metric was determined using the Shannon entropy technique.

The required data for this study were collected using two methods:

1. Library Research: To establish the theoretical foundations and core concepts of this study, a literature review was conducted. All theoretical studies and previous research findings were compiled from domestic and international books and journals and reviewed in relation to the current research topic. The global information network (Internet) was also used as a source.
2. Field Studies: The financial statements of companies were used to gather empirical data for this study.

The collected data were processed using Excel software and analyzed with EViews 10. The hypotheses were tested using Levin, Lin, and Chu tests, the Chow test (F-Limer statistic), the Hausman test, and regression analysis to examine stationarity, autocorrelation, panel data selection (homogeneity or heterogeneity), and variable impact types.

Independent Variables

The independent variables of this research include management ability, political influence, and financial pressure.

1. Management Ability
2. To evaluate management ability, the methodology of Mika and Sanchez (2017) was applied. A two-stage process based on data envelopment analysis (DEA) was used to assess banking efficiency.

In the first stage, the bank efficiency score was determined using DEA based on inputs and outputs. DEA is a linear programming method that estimates an efficiency frontier for all banks, assigning efficiency scores between 0 and 1 to each bank. Bank efficiency is assessed by comparing inputs (resources) and outputs (results) relative to the optimal efficiency frontier.

The efficiency model using data envelopment analysis is formulated as follows:

Table 1. Research Variables for Evaluating Management Ability

Output Variables	Input Variables
Total bank deposits	Total tangible assets
Total bank loans	Net income
Total investments	General and administrative expenses
Total revenues	Financial expenses
-	Rental expenses

In the above input-output model, the ratio of outputs to inputs represents a decision-making efficiency index.

The management efficiency index is a numerical value between 0 and 1, where 1 indicates full management efficiency, and 0 indicates no efficiency.

After estimating the DEA scores for each bank in the first stage, the following regression model is applied to all bank-year observations:

$$DEAScore(i,t) = \beta 0 + \beta 1\ SIZE(i,t) + \beta 2\ Market\_Share(i,t) + \beta 3\ Cash\text{-}Flow(i,t) + \beta 4\ Age(i,t) + \beta 5\ BR(i,t) + \varepsilon(i,t)$$

Where:

- DEAScore(i,t) = Efficiency score of bank *i* in year *t*
- SIZE(i,t) = Bank size in year *t*
- Market_Share(i,t) = Market share of bank *i* in year *t* based on total banking sector deposits
- Cash-Flow(i,t) = Cash flow from operating activities of bank *i* in year *t*

- Age(i,t) = Age of bank *i* in year *t*
- BR(i,t) = Independence of the board of directors in year *t*
- ε(i,t) = Model residuals representing the management ability index

The management ability index (EVALUATION) is calculated as:

EVALUATION = DEAScore - (DEAScore)̂

2. Political Influence
3. This variable is divided into two components:

- Political Relations - Political Management (POLITIC1): A binary variable where 1 is assigned if a government representative is on the board of directors, and 0 otherwise.
- Political Relations - Government Influence (POLITIC2): The percentage of shares directly or indirectly held by the government.

3. Financial Pressure - Economic Crisis (EM Score)
4. Economic crisis periods (EM Score) refer to fluctuations in economic activity, typically represented by GDP growth rates. The study follows Mokhtarzadeh (2008) and Khodamipour et al. (2012) and utilizes data from the Iranian Statistics Center and the Central Bank of Iran.

The economic cycle is defined based on the average economic growth rate over the study period (2015–2021). Years with growth rates above the average are classified as non-crisis periods, while years with growth rates below the average are classified as economic crisis periods. The economic crisis variable is a binary variable, with 1 assigned to crisis years and 0 to non-crisis years.

To evaluate financial distress, the Altman Z-score is used, calculated as follows:

Z = 3.25 * X1 + 6.56 * X2 + 3.26 * X3 + 6.72 * X4 + 0.999 * X5

Where:

- X1 = Working capital / Total assets
- X2 = Retained earnings / Total assets
- X3 = Earnings before interest and taxes / Total assets
- X4 = Book value of equity / Total liabilities

Banks with Altman Z-scores below 1.1 are classified as financially distressed, while banks with Z-scores above 2.6 are considered financially healthy.

Dependent Variable: Fraudulent Financial Reporting

The dependent variable, fraudulent financial reporting, is measured using Beneish's M-score model, which includes eight variables for identifying financial fraud likelihood:

M = 0.002 + 0.665TATA + 0.257LVGI + 0.024SGAI − 0.641DEPI + 0.190SGI + 0.004AQI − 0.032GMI + 0.061DSRI

If M-Score > 0.5, the company is likely engaged in earnings manipulation.

Moderating Variable: Credit Rating

To determine bank credit ratings, the Emerging Market Score Model is used, which assesses financial conditions, exchange rate vulnerability, industry security, and competitive strength.

P(j it) represents the value of factor j for company i in year t.

It is evident that if M is the total number of factors influencing corporate governance, then M = |S| + |K|, where |S| denotes the number of elements in set S and |K| denotes the number of elements in set K (Fakhari & Rezaei Pitenoee, 2017).

Theorem (1): If for two companies indexed as a and b, the following holds:

$P(s\ at) \leq P(s\ bt)$ for all s in S

and

$P(k\ at) \leq P(k\ bt)$ for all k in K

then, $CG(at) \leq CG(bt)$.

Theorem (2): Additionally, for company indexed as a, we have:

$0 \leq CG(at) \leq 1$

Proof:

To prove Theorem (1), it is clear that if $P(s\ at) \leq P(s\ bt)$, then

$P(s\ bt) / \max(1 \leq i \leq N) \{P(s\ it)\} \leq P(s\ at) / \max(1 \leq i \leq N) \{P(s\ it)\}$

On the other hand, if $P(k\ at) \leq P(k\ bt)$, then

$\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ at) \leq \max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ bt)$

Thus,

$\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ bt) / \max(1 \leq i \leq N) \{\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ it)\}$

$\leq$

$\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ at) / \max(1 \leq i \leq N) \{\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ it)\}$

Since $W(j\ at) \geq 0$, we obtain:

$CG(at) \leq CG(bt)$

To prove Theorem (2), it is evident that $CG(at) \geq 0$. To establish the other inequality:

$P(s\ at) \leq \max(1 \leq i \leq N) \{P(s\ it)\}$ for all s in S

Thus,

$P(s\ at) / \max(1 \leq i \leq N) \{P(s\ it)\} \leq 1$

Similarly,

$\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ at) \leq \max(1 \leq i \leq N) \{\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ it)\}$

Thus,

$\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ at) / \max(1 \leq i \leq N) \{\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ it)\} \leq 1$

Therefore,

$CG(at) = sum(s\ in\ S)\ W(s\ at) * P(s\ at) / \max(1 \leq i \leq N) \{P(s\ it)\}$

- $sum(k\ in\ K)\ W(k\ at) * (\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ at)) / \max(1 \leq i \leq N) \{\max(1 \leq i \leq N) \{P(k\ it)\} - P(k\ it)\}$

$\leq sum(s\ in\ S)\ W(s\ at) + sum(k\ in\ K)\ W(k\ at)$

Since $\{1,2,3,\ldots,M\} = S \cup K$ and $sum(1 \leq j \leq M)\ W(j\ at) = 1$, it follows that:

$sum(s\ in\ S)\ W(s\ at) + sum(k\ in\ K)\ W(k\ at) = 1$

Thus,

$CG(at) \leq 1$

Hypothesis Testing Models

First Model:

$Mscore(it) = \alpha 0 + \alpha 1\ EVALUATION(it) + \alpha 2\ Zscore(it) + \alpha 3\ (EVALUATION(it) * Zscore(it))$

- $\alpha 4\ Age(it) + \alpha 5\ Size(it) + \alpha 6\ GWTH(it) + \alpha 7\ TANG(it) + \varepsilon(it)$

Second Model:

$Mscore(it) = \alpha 0 + \alpha 1\ POLITIC(it) + \alpha 2\ Zscore(it) + \alpha 3\ (POLITIC(it) * Zscore(it))$

- $\alpha 4\ Age(it) + \alpha 5\ Size(it) + \alpha 6\ GWTH(it) + \alpha 7\ TANG(it) + \varepsilon(it)$

Third Model:

Mscore(it) = α0 + α1 EMScore(it) + α2 Zscore(it) + α3 (EMScore(it) * Zscore(it))

- α4 Age(it) + α5 Size(it) + α6 GWTH(it) + α7 TANG(it) + ε(it)

Fourth Model:

Mscore(it) = α0 + α1 EVALUATION(it) + α2 CG(it) + α3 (EVALUATION(it) * CG(it))

- α4 Age(it) + α5 Size(it) + α6 GWTH(it) + α7 TANG(it) + ε(it)

Fifth Model:

Mscore(it) = α0 + α1 POLITIC(it) + α2 CG(it) + α3 (POLITIC(it) * CG(it))

- α4 Age(it) + α5 Size(it) + α6 GWTH(it) + α7 TANG(it) + ε(it)

Sixth Model:

Mscore(it) = α0 + α1 CG(it) + α2 CG(it) + α3 (EMScore(it) * CG(it))

- α4 Age(it) + α5 Size(it) + α6 GWTH(it) + α7 TANG(it) + ε(it)

3. Findings

Panel data stationarity tests are generally performed using two methods: the unit root test for common data and the unit root test for each cross-section separately. Levin, Lin, and Chu (2002) demonstrated that in panel data, using the unit root test for common data provides greater statistical power compared to performing separate unit root tests for each cross-section. Therefore, in this study, the Levin, Lin, and Chu test is used to examine the stationarity of variables.

The stationarity results of the variables, based on the Levin, Lin, and Chu test, are presented in Table 2 under two conditions: with an intercept and with both an intercept and trend. The results indicate that the stationarity condition for all variables is met under the intercept and trend condition.

Table 2. Levin, Lin, and Chu Test Results for Stationarity Analysis of Variables

Variable	Levin, Lin, and Chu t-statistic	p-value
Deposits	-3.673	0.0001
Loans	-5.768	0.0000
Investment	-12.161	0.0000
Intinco	-3.636	0.0001
PPE	-9.044	0.0000
Int	-4.994	0.0000
Labor	-7.284	0.0000
Intexp	-9.675	0.0000
Rentalexp	-12.503	0.0000
DEAscore	-28.382	0.0000
Size	-4.274	0.0000
Market Share	-3.506	0.0002
Cash Flow	-10.449	0.0000
Age	-2.617	0.0044
BR	-34.396	0.0000
EMscore	-21.886	0.0000
Mscore	-10.324	0.0000
Zscore	-10.932	0.0000
Tang	-2.815	0.0024
Politic	-25.229	0.0000
CG	-32.652	0.0000

An examination of Table 6 reveals that the p-value for all studied variables is less than the 0.05 significance level in the Levin, Lin, and Chu test. Therefore, at this level of error, the null hypothesis of non-stationarity is rejected, and the variables are considered stationary.

Estimation Results of the Research Model

Before proceeding with regression model analysis, the following two aspects need to be considered:

1. Since the observations in this study are collected across different cross-sections, an important question in empirical studies is whether the data can be pooled or if the model varies across different cross-sections. This necessitates examining whether there is heterogeneity among cross-sections. If heterogeneity exists, the panel data method is applied, whereas if heterogeneity is absent, the pooled ordinary least squares (OLS) method is used. To determine this, the F-Limer test is applied. The null hypothesis (H0) in this test states that the intercepts are homogeneous (pooled OLS), while the alternative hypothesis (H1) suggests heterogeneity (panel data method).
2. Before estimating the regression model, it is necessary to determine whether fixed effects or random effects should be used. For this purpose, the Hausman test is applied. The test statistic follows a chi-square distribution with degrees of freedom equal to the number of independent variables. The null hypothesis (H0) suggests that the random effects model is appropriate, whereas the alternative hypothesis (H1) indicates that the fixed effects model is preferable. If the p-value from the Hausman test is less than 0.05, the null hypothesis (H0) is rejected, and the fixed effects model is selected. Otherwise, if the p-value is greater than 0.05, the null hypothesis is accepted, and the random effects model is used.

The results of the F-Limer test for the research models are presented in Table 3.

Table 3. F-Limer Test Results

Model	p-value	Computed F-statistic	Test Result
First	0.000	2.655566	Reject H0
Second	0.000	2.667829	Reject H0
Third	0.000	2.669632	Reject H0
Fourth	0.000	2.675486	Reject H0
Fifth	0.000	2.712541	Reject H0

As seen in Table 3, the p-values obtained for the F-statistic are all below 0.05, indicating that the null hypothesis (H0) is rejected. Consequently, panel data methodology is used for model estimation.

To determine whether the fixed effects or random effects model should be applied, the Hausman test results are provided in Table 4.

Table 4. Hausman Test Results for Fixed vs. Random Effects Model Selection

Model	Hausman Test p-value	Test Result
First	0.0785	Do not reject H0
Second	0.1144	Do not reject H0
Third	0.0985	Do not reject H0
Fourth	0.1451	Do not reject H0
Fifth	0.3212	Do not reject H0

Since the p-values from the Hausman test for all five models exceed 0.05, the null hypothesis is not rejected. Therefore, the random effects model is deemed appropriate for estimating the regression equations.

As a result, to estimate the model, the generalized least squares (GLS) method is applied.

One of the most important classical assumptions in regression analysis is the homogeneity or equality of error variance. If this assumption is violated, the error terms will exhibit heteroscedasticity. If the condition of homoscedasticity is not met, the ordinary least squares (OLS) estimators will not have the best linear unbiased estimator (BLUE) property, leading to inefficient estimations with unnecessarily large confidence intervals. Consequently, t-tests and F-tests may yield misleading results.

In this study, the Likelihood Ratio (LR) test was used to detect heteroscedasticity. The results are presented in Table 5.

Table 5. Likelihood Ratio Test Results for Variance Homogeneity Identification

Model	Null Hypothesis	Chi-Square Statistic	p-value	Test Result
First	No heteroscedasticity	355.9754	0.000	Reject H0
Second	No heteroscedasticity	354.6548	0.000	Reject H0
Third	No heteroscedasticity	356.2541	0.000	Reject H0
Fourth	No heteroscedasticity	357.3214	0.000	Reject H0
Fifth	No heteroscedasticity	355.6541	0.000	Reject H0
Sixth	No heteroscedasticity	355.6658	0.000	Reject H0

Based on Table 5, the regression model exhibits heteroscedasticity. To address this issue, the Estimated Generalized Least Squares (EGLS) method was applied for model estimation.

Table 6. Estimation Results for the First Model Using the Estimated Generalized Least Squares (EGLS) Method

Variable	Symbol	Coefficient	t-statistic	p-value
Management Ability	EVALUATION	-0.22	-2.768	0.0255
Credit Rating	Zscoreit	-0.134	-3.048	0.0360
Management Ability * Credit Rating	EVALUATION * Zscoreit	0.184	4.077	0.0000
Firm Age	AGE	-0.123	-8.294	0.0000
Firm Size	SIZE	0.080	5.004	0.0323
Growth Opportunities	GWTH	-0.074	-3.547	0.0000
Fixed Asset Ratio	TANG	-0.098	-2.624	0.0162
Intercept	C	0.546	4.31	0.0000

Durbin-Watson Statistic = 2.078, R-squared = 0.685, Adjusted R-squared = 0.664

Since the Durbin-Watson statistic is 2.078, the absence of autocorrelation among errors is confirmed. Additionally, based on the coefficient of determination, it can be stated that 69% of the variation in the dependent variable is explained by the independent variables.

Table 7. Estimation Results for the Second Model Using the Estimated Generalized Least Squares (EGLS) Method

Variable	Symbol	Coefficient	t-statistic	p-value
Political Influence	EVALUATION	-0.333	-8.55	0.0161
Credit Rating	POLITIC	-0.128	-2.90	0.0352
Political Influence * Credit Rating	POLITIC * Zscoreit	0.196	4.49	0.0318
Firm Age	AGE	-0.118	-7.89	0.0000
Firm Size	SIZE	0.079	5.43	0.9098
Growth Opportunities	GWTH	-0.080	-2.56	0.1515
Fixed Asset Ratio	TANG	-0.096	-2.63	0.0000
Intercept	C	0.486	2.75	0.0000

Durbin-Watson Statistic = 1.98, R-squared = 0.654, Adjusted R-squared = 0.632

Since the Durbin-Watson statistic is 1.98, the absence of autocorrelation among errors is confirmed. The model explains 65% of the variation in the dependent variable.

Table 8. Estimation Results for the Third Model Using the Estimated Generalized Least Squares (EGLS) Method

Variable	Symbol	Coefficient	t-statistic	p-value
Political Influence	EVALUATION	0.26	2.032	0.0419
Credit Rating	POLITIC	-0.13	-2.054	0.0397
Political Influence * Credit Rating	POLITIC * Zscoreit	-0.17	-2.143	0.0318
Firm Age	AGE	-0.12	-2.026	0.0433
Firm Size	SIZE	0.08	5.546	0.0000
Growth Opportunities	GWTH	0.07	-1.431	0.1515
Fixed Asset Ratio	TANG	0.095	-1.078	0.2832
Intercept	C	0.623	5.43	0.0000

Durbin-Watson Statistic = 2.12, R-squared = 0.642, Adjusted R-squared = 0.623

Since the Durbin-Watson statistic is 2.12, the absence of autocorrelation among errors is confirmed. The model explains 64% of the variation in the dependent variable.

Table 9. Estimation Results for the Fourth Model Using the Estimated Generalized Least Squares (EGLS) Method

Variable	Symbol	Coefficient	t-statistic	p-value
Management Ability	EVALUATION	0.223	2.39	0.0222
Corporate Governance	CG	-0.125	-2.05	0.0482
Management Ability * Corporate Governance	CG * EVALUATION	0.169	2.97	0.0054
Bank Age	AGE	-0.119	-1.95	0.0597
Bank Size	SIZE	0.081	3.11	0.0038
Growth Opportunities	GWTH	-0.079	-2.006	0.0530
Fixed Asset Ratio	TANG	-0.095	-2.68	0.0113
Intercept	C	0.643	4.62	0.0000

Durbin-Watson Statistic = 2.33, R-squared = 0.645, Adjusted R-squared = 0.626

Since the Durbin-Watson statistic is 2.33, the absence of autocorrelation among errors is confirmed. The model explains 64% of the variation in the dependent variable.

Table 10. Estimation Results for the Fifth Model Using the Estimated Generalized Least Squares (EGLS) Method

Variable	Symbol	Coefficient	t-statistic	p-value
Political Influence	EVALUATION	-0.323	-2.517	0.169
Corporate Governance	CG	-0.125	-2.82	0.0005
Political Influence * Corporate Governance	POLITIC * CG	0.196	2.08	0.0452
Firm Age	AGE	-0.12	-3.71	0.0008
Firm Size	SIZE	0.0812	2.22	0.0330
Growth Opportunities	GWTH	-0.081	-2.21	0.0340
Fixed Asset Ratio	TANG	-0.095	-1.7	0.0881
Intercept	C	0.479	6.32	0.0000

Durbin-Watson Statistic = 2.35, R-squared = 0.649, Adjusted R-squared = 0.632

Since the Durbin-Watson statistic is 2.35, the absence of autocorrelation among errors is confirmed. Additionally, based on the coefficient of determination, it can be stated that 65% of the variation in the dependent variable is explained by the independent variables.

Table 11. Estimation Results for the Seventh Model Using the Estimated Generalized Least Squares (EGLS) Method

Variable	Symbol	Coefficient	t-statistic	p-value
Political Influence	EVALUATION	0.26	2.52	0.0167
Corporate Governance	CG	-0.12	-3.57	0.0011
Financial Pressure * Corporate Governance	POLITIC * CG	-0.17	-2.09	0.0441
Firm Age	AGE	-0.13	-2.75	0.0095
Firm Size	SIZE	0.081	6.45	0.0000
Growth Opportunities	GWTH	-0.079	-1.761	0.0875
Fixed Asset Ratio	TANG	-0.099	-1.766	0.0866
Intercept	C	0.69	4.76	0.0000

Durbin-Watson Statistic = 2.036, R-squared = 0.640, Adjusted R-squared = 0.639

Since the Durbin-Watson statistic is 2.036, the absence of autocorrelation among errors is confirmed. Additionally, based on the coefficient of determination, it can be stated that 64% of the variation in the dependent variable is explained by the independent variables.

4. Discussion and Conclusion

The findings of this study confirm that credit ratings significantly influence the relationship between management ability and fraudulent financial reporting in banks. The statistical results demonstrate that for every unit increase in credit ratings, the relationship between management ability and fraudulent reporting strengthens by 0.18. This positive relationship suggests that higher credit ratings serve as a mechanism that enhances managerial accountability, reducing the likelihood of financial misrepresentation. The results align with prior research which also found that higher credit ratings improve financial transparency and reduce the motivation for earnings manipulation [29, 35].

From a theoretical perspective, credit rating agencies play a crucial role in financial markets by reducing information asymmetry between firms and investors [36]. When issuing credit ratings, these agencies analyze both quantitative and qualitative financial indicators and produce an assessment that reflects the firm's creditworthiness and risk exposure [37, 38]. Higher credit ratings signal stronger financial standing and future cash flow stability, reducing the need for managers to manipulate earnings to meet market expectations [39, 40]. The study findings corroborate the notion that robust credit ratings not only enhance managerial credibility but also discourage fraudulent reporting in the banking sector.

The second hypothesis examined the influence of credit ratings on the relationship between political influence and fraudulent financial reporting. The results indicate that higher credit ratings amplify the effect of political influence on financial misrepresentation by 0.19 units. This suggests that politically connected banks, regardless of their credit rating, may still engage in fraudulent financial reporting. Political connections can influence financial reporting in two opposing ways. On the one hand, political ties can provide access to financial resources, reducing the need for earnings manipulation. On the other hand, political influence can also create incentives for financial misreporting, particularly when regulatory oversight is weak. Research suggests that firms with strong political ties may benefit from preferential treatment, bailouts, or access to low-cost financing, reducing financial pressures

and incentives for manipulation [29]. However, in certain cases, these connections may encourage opportunistic behavior, leading to more aggressive earnings management strategies. The findings of this study suggest that credit ratings moderate this relationship, reinforcing the impact of political influence on financial reporting practices.

The third hypothesis tested the effect of credit ratings on the relationship between financial pressure and fraudulent financial reporting in banks. The results show that higher credit ratings weaken the impact of financial distress on fraudulent reporting by 0.17 units. This negative coefficient suggests that banks with stronger credit ratings are less likely to engage in fraudulent financial activities when experiencing financial distress. The study aligns prior studies [25, 29, 41-44] which argue that reducing information asymmetry lowers agency risk and strengthens investor confidence, ultimately mitigating financial distress.

There are three key mechanisms through which credit ratings influence the relationship between financial pressure and fraudulent financial reporting. First, lower information asymmetry improves monitoring and corporate governance, reducing the likelihood of opportunistic behavior by managers. Second, firms with stronger credit ratings have greater access to capital, allowing them to meet financial obligations without resorting to earnings manipulation. Third, reduced investor uncertainty lowers financing costs, making it easier for firms to sustain profitability and reduce financial stress (Lambert et al., 2012). Given these factors, credit ratings play a crucial role in minimizing the adverse effects of financial pressure on fraudulent reporting in banks.

The fourth hypothesis assessed the effect of corporate governance on the relationship between management ability and fraudulent financial reporting. The results indicate that stronger corporate governance mechanisms reinforce the relationship between management ability and financial transparency by 0.17 units. These findings align with prior findings [25, 29, 41, 42, 44, 45] which emphasize the importance of corporate governance in ensuring the reliability of financial reports.

A well-functioning corporate governance system improves financial reporting quality by strengthening internal controls, enhancing managerial accountability, and increasing investor confidence. Financial statements serve as a critical communication tool between management and stakeholders, providing transparency into a firm's financial position. However, without adequate governance structures, managers may engage in opportunistic behavior, distorting financial statements to conceal poor performance. Previous corporate scandals, such as Enron and WorldCom, have demonstrated the devastating consequences of weak corporate governance on financial markets. These cases underscore the need for effective oversight mechanisms that reduce the risk of fraudulent reporting.

The fifth hypothesis tested the effect of corporate governance on the relationship between political influence and fraudulent financial reporting. The results indicate that stronger corporate governance increases the effect of political influence on financial reporting transparency by 0.19 units. These findings suggest that corporate governance serves as a safeguard against political interference, improving financial disclosure quality.

Prior research [25, 31, 40] has demonstrated that corporate governance mechanisms, such as independent audit committees and board oversight, play a critical role in preventing financial misrepresentation. Frequent board meetings increase management oversight, reducing the risk of fraudulent reporting. Additionally, institutional investors, who have significant ownership stakes in firms, act as effective monitors, ensuring that managers act in the best interests of shareholders. Given these findings, corporate governance can serve as a moderating factor that enhances the role of political influence in improving financial reporting integrity.

The final hypothesis explored the impact of corporate governance on the relationship between financial pressure and fraudulent financial reporting. The results indicate that corporate governance weakens this relationship by 0.17 units, meaning that strong governance structures reduce the likelihood of financial fraud under financial distress.

The study supports the prior findings which[41, 46-48] highlight the role of corporate governance in reducing financial misconduct.

Effective governance structures help mitigate agency conflicts and improve financial transparency, reducing the need for earnings manipulation. In companies with weak governance, top executives may exploit financial distress to justify earnings management. However, in firms with strong governance, audit committees, independent boards, and shareholder oversight create barriers against fraudulent reporting. These mechanisms ensure that financial statements accurately reflect a firm's financial health, even under economic uncertainty.

This study is subject to several limitations. First, the research focuses solely on banks listed on the Tehran Stock Exchange, which may limit the generalizability of the findings to other industries. Second, the study uses secondary financial data, which may not fully capture the nuances of managerial decision-making and ethical considerations in financial reporting. Third, external factors, such as economic conditions, regulatory changes, and geopolitical risks, were not explicitly controlled for in the analysis. Future research should consider these contextual variables to enhance the robustness of the findings.

Future studies could explore the role of blockchain technology in enhancing financial transparency and reducing fraudulent reporting in banks. Additionally, researchers should investigate how managerial personality traits, such as narcissism, Machiavellianism, and psychopathy, influence financial misconduct. Another promising avenue for research is the effectiveness of ethics training programs for bank managers and employees in reducing fraudulent reporting. Moreover, future studies could develop machine learning models to predict financial fraud in banks, leveraging artificial intelligence and big data analytics. Finally, examining the impact of digital transformation on internal control systems may provide valuable insights into how technology can mitigate fraudulent financial practices.

To mitigate fraudulent financial reporting, bank managers should enhance corporate governance mechanisms, ensuring strong internal controls and independent oversight. Regulatory authorities should strengthen monitoring frameworks to reduce the influence of political connections on financial disclosure quality. Additionally, credit rating agencies should adopt more rigorous methodologies to assess the financial integrity of banks, incorporating non-financial factors, such as governance effectiveness and ethical leadership. Finally, financial institutions should invest in ethics training and fraud detection systems to promote a culture of accountability and transparency in banking operations.

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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