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Aim and Scope:

The Journal of Emerging Technologies in Accounting (JETA) has started with the aim of expanding the concepts of accounting, auditing and finance in English in order to identify and eliminate gaps in these areas.

The Journal of Emerging Technologies in Accounting (JETA) accepts the articles in the form of Research Article, Review Article, Short Papers, Case-study, Methodologies including these items:

- Emerging technology in the field of Accounting and its future
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- Internal and external auditing and there innovation
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- Internal control and new technologies
- Integrated and modern accounting information systems in the organization
- Other research topics related to emerging technologies in accounting

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Correlation of the Simultaneous Maintenance of Debt, Equity, and Corporate Tax Avoidance

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Abstract

Objectives: The main goal of this research is to explore the relationship between simultaneously maintaining debt and equity and corporate tax avoidance. The study focuses solely on this objective.

Design/methodology/approach: Tax avoidance plays a crucial role in reducing a firm's payments to the government. Shareholders are incentivized to engage in tax avoidance practices, while financiers face the negative consequences of increased risks. However, when both debt and equity holders are present, financiers are less concerned about risk shifting as the risk is transferred between sectors. This can lead to a reduction in tax avoidance. Due to the lack of empirical studies in this area, this study examines the relationship between maintaining debt and equity simultaneously and corporate tax avoidance. A sample of 102 firms listed on the Tehran Stock Exchange from 2013 to 2014 was collected and analyzed using multiple regression.

Results: The test of research hypotheses revealed a significant negative relationship between maintaining debt and equity simultaneously and a firm's tax avoidance. This relationship was found to be significant across all three measures of tax avoidance (effective cash tax rate, the difference between accounting profit and taxable profit, and the final effective tax rate).

Innovation: This research is innovative as it explores the impact of maintaining debt and equity simultaneously on tax avoidance in Iran, a topic that has not been previously studied. Conducting such a study will help fill the existing research gap.

Keywords: tax avoidance, financing, the simultaneity of debt maintenance, and equity.

1. Introduction

Tax avoidance is the act of exploiting legal loopholes to minimize taxes. Since no organization is pleased with paying taxes, some organizations opt to avoid paying taxes altogether or reduce the amount they owe. This can be achieved through manipulating financial records, providing false financial information, or withholding information (Khani et al., 2013). While tax avoidance may benefit shareholders by shifting wealth from the government to the firm, it poses various risks for investors (Arena et al., 2019). Consequently, the interests of shareholders and investors diverge significantly when it comes to tax avoidance practices. However, when both debt and equity holders are present, investors' concerns about risk shifting are alleviated, as debt and equity holders simply transfer risk between segments. Additionally, debt and equity holders can reap the benefits of tax avoidance like other shareholders, giving them incentives to endorse tax avoidance.

1.1. Problem statement

Tax avoidance, as defined by Hanlon and Heitzman (2010) as the reduction of explicit taxes, has garnered significant attention in recent decades due to its important implications for corporate decision-making and public policy. The literature demonstrates substantial cross-sectional variation in the extent to which firms utilize tax avoidance strategies (e.g., Derang et al., 2008). Building on Slamrod's (2004) assertion that corporate tax compliance should be examined within the framework of agency theory, recent studies have delved into investigating the role of shareholder-manager conflict of interest in corporate tax strategies. Beyond the issue of shareholder-manager representation, a question emerges regarding whether the conflict of interest between financiers and shareholders impacts the firm's tax avoidance practices. This study aims to address this question by focusing on financial institutions that hold both debt claims and shares in the same firm (simultaneous holders of debt and equity).

Since Jensen and Meckling's seminal work in 1976, the literature on conflicts of interest between shareholders and creditors has been a primary source of various issues in corporate finance (Chu, 2018; Yang, 2021). One of the primary methods of transferring shareholder wealth from financial providers is through asset substitution, where firms undertake risky projects to enhance shareholder wealth at the expense of financial providers. While tax avoidance can create value for shareholders by shifting wealth from the government to corporations, it is also associated with risks for financiers (Hanlon and Heitzman, 2010; Hoopes et al., 2012; Arena et al., 2019). Consequently, the interests of shareholders and financiers diverge significantly in firms' tax avoidance strategies. Shareholders, as residual claimants in the firm, have incentives to engage in excessive tax avoidance practices to reap the unlimited benefits while shifting risks to financiers (Jensen and Meckling, 1976). Conversely, financial providers, as fixed claimants in the firm, bear the negative consequences of high risks without fully sharing in the rewards. Anticipating shareholders' risk-shifting motivations, financiers demand high debt costs to account for the effects of tax avoidance value (Barnia et al., 1981; Isin, 2018). Conversely, shareholders may avoid tax avoidance practices to evade incurring high debt costs. In situations where both debt and equity holders are present, financiers' concerns about risk shifting are mitigated as risk is transferred between equity and debt holders (Jiang et al., 2010; Anton and Lin, 2020). Additionally, holders of both debt and equity can leverage their tax planning expertise from the creditor side to identify sustainable tax avoidance opportunities (Galmore et al., 2019). Therefore, it is expected that simultaneous holders of debt and equity will increase tax avoidance practices.

Conversely, since managers have a fiduciary duty to act in the interests of shareholders, firms without simultaneous debt and equity holders may engage in excessive tax avoidance to boost equity value at the expense of creditors. When shareholders are also creditors, they consider creditors' risk preferences and

can avoid excessive tax avoidance. Furthermore, the dual ownership of debt and equity concentrates capital allocation for both types of holders and reduces portfolio diversification (Fama and Jensen, 1983; Garcia-Koehner et al., 2015). Consequently, simultaneous holders of debt and equity may face increased risks stemming from tax avoidance. Therefore, the presence of dual owners may lead to fewer tax avoidance practices.

Considering the two opposing predictions, the relationship between dual ownership of debt and equity and tax avoidance becomes an empirical question: what effect does holding debt and equity have on tax avoidance?

Investigating this issue in Iran is crucial because banks and credit institutions also own a significant portion of firm shares. It is necessary to conduct such a study because, firstly, examining the important role of simultaneous holders of debt and equity in reducing agency conflicts related to tax avoidance contributes to the tax avoidance literature. The results of this study have significant implications for academic researchers, policymakers, and provide a clear understanding of the fundamental risks of tax avoidance to all firm stakeholders. Secondly, this study adds to the growing literature on the simultaneous holding of debt and equity.

By conducting this study, investors' comprehension of the reasons for tax avoidance can be enhanced, thereby reducing the possibility of risk. Since the role of holding debt and equity and its impact on tax avoidance has not been previously investigated in Iran, conducting such a study would fill the existing research gap and enable researchers to conduct more studies in this field, building upon the present study.

2. Literature Review and Hypotheses

2.1. Hypothesis development

The literature on conflicts of interest between shareholders and creditors has been a major source of problems in corporate finance (Chu, 2018; Chava et al., 2019; Anton and Lin, 2020; Chen et al., 2020; Yang, 2021). The presence of co-holders of debt and equity reduces financiers' concerns about risk shifting, as they simply transfer risk from one sector (equity) to another (debt) (Jiang et al., 2010; Anton and Lin, 2020). Additionally, co-holders of debt and equity can benefit from tax avoidance like other shareholders, leading to incentives to support tax avoidance. Moreover, they can utilize their tax planning expertise from the creditor side to identify sustainable tax avoidance opportunities (Galmore et al., 2019). Therefore, it is expected that co-holders of debt and equity will increase tax avoidance simultaneously.

However, as managers have a fiduciary duty to act in the interests of shareholders, firms without concurrent debt and equity holders may engage in excessive tax avoidance practices to boost equity value at the expense of creditors. When shareholders are also creditors, they consider creditors' risk preferences and can prevent excessive tax avoidance. Furthermore, dual ownership of debt and equity concentrates capital allocation among holders and reduces portfolio diversification (Fama and Jensen, 1983; Garcia-Koehner et al., 2015). Consequently, holders of both debt and equity simultaneously may face increased risk from tax avoidance. Therefore, the presence of dual owners can result in fewer tax avoidance methods.

Jiang et al. (2010) discovered that simultaneous holders of debt and equity limit borrowing costs, thereby reducing the conflict of interest between shareholders and creditors. Anton and Lin (2020) found that holding debt and equity simultaneously enhances firms' investment efficiency. Yang (2021) demonstrated that holding debt and equity simultaneously leads to fewer patents but increases the market value of patents. Chava et al. (2019) observed that simultaneous holders of debt and equity decrease debt usage, which limits capital expenditures. Chu (2018) noted that firms with simultaneous debt and equity holders pay lower dividends to benefit creditors' profits. Tang et al. (2022) determined that dual ownership boosts corporate tax avoidance, explaining how simultaneous holders of debt and equity improve

corporate tax planning, and exploring how dual holders impact corporate tax strategies.

In light of the above, simultaneous holders of debt and equity may either increase or decrease tax avoidance. Therefore, the research hypothesis is proposed as follows:

Hypothesis: the simultaneous maintenance of debt and equity has a significant effect on the firm's tax avoidance.

2.2. Literature review

Tang et al. (2022), in a study titled "Simultaneous Holding of Debt and Equity and Corporate Tax Avoidance," investigated the role of financial institutions that act as both financiers and shareholders of a firm in tax avoidance. The study analyzed data from 98,175 firms between 1997 and 2017 using a difference-in-difference regression. The results indicated that financial institutions acting as both financiers and shareholders increased tax avoidance in firms. This effect was more prominent in firms with risk-taking managers and ownership by short-term investors. Additionally, tax avoidance was associated with lower debt costs when financial institutions were both financiers and shareholders.

Rahman and Leki (2021), in their study "Corporate Social Responsibility with an Emphasis on Tax Avoidance and Analysis of Financial Ratios," explored the impact of social responsibility and financial ratios on tax avoidance. The research examined a sample of 365 firms listed on the Shanghai and Shenzhen Stock Exchanges from 2005 to 2017 using multivariate regression. The findings revealed that engaging in social responsibility activities reduced tax avoidance, especially in firms actively participating in such activities. Moreover, firms with higher profitability, cash flow, and sales growth were more likely to engage in tax avoidance, while those with high liquidity were less likely to do so.

Li (2021), in a study titled "The Effect of Simultaneous Holding of Equity and Debt on Financial Obligations in Debt Contracts," investigated the impact of non-commercial banking institutions simultaneously holding debt and equity in the same firm on financial obligations in debt contracts. The research spanned from 2001 to 2018 and found that the presence of financial institutions acting as both financiers and shareholders of a firm was generally linked to the number of financial contracts. The study also highlighted that the use of financial contracts decreased when the interests of shareholders and creditors were aligned. Furthermore, the study showed that the effect of dual ownership on financial contracts was more pronounced when financial institutions held a significant portion of shares and loan claims in a borrower firm.

Colombo and Tera (2021), in their study "Interest Rate-Dividend Ratio: The Role of Shareholder Identity in Corporate Tax Avoidance," discussed the influence of majority shareholders on the payment policy of Brazilian public firms. The study analyzed a sample of 404 Brazilian firms over 12 years and found that the identity of the controlling shareholder affected profit distribution and the interest rate to dividend ratio. Institutional investors and firms listed in the special corporate governance section of the Novo Mercado stock exchange were associated with increased cash payments in the form of the interest rate to dividends ratio and reduced overall tax payments.

Chu et al. (2019), in their research titled "Simultaneous Holding of Debt and Equity and Solving Problems of Financial Distress," explored the impact of simultaneous holding of debt and equity on financial distress. The study examined a dataset of financially troubled firms that repaid debts from 2000 to 2014 and found that financial institutions acting as both financiers and shareholders were more likely to avoid bankruptcy through restructuring and court interventions, especially when loans were overcollateralized and expected bankruptcy costs were high.

Satish and Ebrahimi (1400), in their study "Substitution Relationship Between the Use of Financial Leverage in Capital Structure and Tax Avoidance," investigated the relationship between financial leverage in the capital structure and tax

avoidance in firms listed on the Tehran Stock Exchange. The study analyzed 1026 observations and found a significant negative relationship between financial leverage and tax avoidance, indicating a substitution effect of financial leverage. The study also highlighted the significant impact of the cost of financial leverage on this relationship.

Asadian Oghani et al. (2019), in their study "Effect of Ownership Structure on the Relationship Between Tax Avoidance and Cost of Debt," examined the impact of ownership structure on the relationship between tax avoidance and cost of debt. The study used a sample of 111 active firms on the Tehran Stock Exchange from 2010 to 2016 and employed multivariate linear regression. The results revealed a significant direct relationship between tax avoidance and the cost of debt, while the effect of ownership concentration and institutional ownership on this relationship was not statistically confirmed.

Kaviani and Shaisteh (2018), in their study "Investigating the Effect of Debt Cost and Institutional Ownership on Tax Avoidance in Firms Listed on the Tehran Stock Exchange," explored the correlation between debt cost, institutional ownership, and tax avoidance from 2011 to 2015. The study used generalized least squares regression to test hypotheses and found a negative relationship between debt cost, institutional ownership, and tax avoidance. This negative relationship suggested that tax avoidance could serve as a liability for the firm.

3. Methodology

3.1. Sample and data

The statistical population for the current research consists of all firms listed on the Tehran Stock Exchange. Therefore, firms within this statistical community that meet favorable conditions are chosen as statistical samples.

- Throughout the research period, these firms must have traded their shares at least once every three months.
- Excluded from this selection are investment firms, financial intermediaries, holding firms, and similar entities.
- The financial year should remain consistent throughout the review period.
- Audited financial statements and acfirming notes must be published and readily accessible.

Based on the aforementioned conditions and limitations, 102 firms were selected from those listed on the Tehran Stock Exchange for a total of 8 years (816 firm-years) as the statistical sample for the research.

3.2. Models

Based on the studies of Tang colleagues (2022), the hypothesis test model is as follows:

$$\mathrm{TA}_{it} = \beta_0 + \beta_1 Dual_{i.t} + \beta_{\mathrm{i}} Controls_{i.t} + \beta_{\mathrm{j}}\, IndustryFE_{i.t} + \beta_{\mathrm{k}} YearFE_{i.t} + \varepsilon_{it}$$

In the above relation, TA refers to tax avoidance, while DUAL refers to the simultaneous maintenance of debt and equity in the firm. Controls represent control variables, with Industry and Year serving as control variables for different industries and years. In the above relationship, if the coefficient β-1 is significant, then the research hypothesis is confirmed.

3.3. Research variables

3.3.1. The dependent variable

In the above relationship, TA represents tax avoidance, while DUAL refers to the simultaneous maintenance of debt and equity in the firm. Controls are variables used for control purposes, with Industry and Year serving as control variables for different years and industries. If the coefficient β-1 is significant, the research hypothesis regarding tax avoidance is confirmed.

To measure tax avoidance, three common measures are utilized. The first measure is the cash effective tax rate (CETR), calculated by dividing cash tax paid by profit before tax deduction (Hosni al-Qar

and Shahri Anaghiz, 2015). A higher CETR indicates lower tax avoidance, so the calculated effective tax rates are multiplied by -1.

The second measure is the difference between accounting profit and taxable profit (BTD). This is calculated by subtracting taxable profit from accounting profit and then dividing the result by total assets (Goh et al., 2016; Tang et al., 2022).

Additionally, the effective tax rate (ETR) is used to calculate tax avoidance, determined by the ratio of income tax to pre-tax profit and loss (Hanlon and Heitzman, 2010; Tang et al., 2022). This measure is also multiplied by -1.

3.3.2. Independent variables

The concept of holding both debt and equity simultaneously (Dual) is represented by a two-valued variable. If a firm has at least one financing institution that is also a shareholder in that firm, the variable is equal to one; otherwise, it is equal to zero.

3.3.3. control variables

Profitability (ROA): is equal to the ratio of earnings before interest and taxes to total assets.

Firm size (Size): is equal to the natural logarithm of total assets.

Financial leverage (Lev): is the ratio of debt to total assets.

Institutional shareholders (Inst): is equal to the percentage of shares held by institutional shareholders (those with more than 5% of shares in the firm).

Loan percentage (Loan Percent): is equal to the ratio of the total loan received by the firm to the total debt of the firm.

Market-to-book value (MTB): is the ratio of the market value of equity to its book value.

Loss: If a firm has a loss in a year, it will be equal to one; otherwise, it will be zero.

Research and development cost (RD): If a firm has research and development cost in the financial year, it will be equal to one; otherwise, it will be zero.

Beta risk (Beta): is equal to the size of coordinated changes in stock return and market return (covariance of stock and market return) divided by the variance of market return.

Industry & Year: are control variables used to account for different years and industries in the model.

4. Results

4.1. Descriptive Statistics

Descriptive statistics encompass a set of methods used to collect, summarize, classify, and describe numerical data. This type of statistic helps to explain research findings and information, providing an overall framework or pattern of data for easier and more effective utilization. In essence, descriptive statistics allow for the expression of characteristics of a data set. Central and dispersion parameters are utilized for this purpose. These parameters enable the essential features of a data set to be summarized numerically, aiding in the comprehension of test results and facilitating comparisons with other tests and observations. Therefore, prior to testing research hypotheses, the research variables are briefly outlined in Tables 1-4. These tables include indicators for describing the research variables. It is important to note that descriptive statistics provided for discrete variables include frequency and percentage frequencies based on their nature.

As shown in Tables 1-4, the average tax avoidance, measured by effective cash tax rate, is -0.140. This indicates that 14% of firms' profits before tax deductions were paid as cash tax. The mean for this variable is -0.069, meaning half of the observations had an effective cash tax rate greater than -6.9%, and the other half had a lower rate. The highest effective tax rate observed was 0.011, while the lowest was -0.826. The standard deviation, which measures the dispersion of data around the average, is 0.202. It's important to note that the negative sign in the calculation of this variable indicates tax avoidance, as with the other indicators.

Furthermore, the average tax avoidance through the difference between accounting profit and taxable profit is 0.051, and the average tax avoidance using the effective tax rate, calculated as income tax divided by

profit and loss before tax, is -0.105. This means firms paid income tax equal to 10% of their pre-tax profits. Additionally, the average simultaneity of holding debt and equity is 0.094, indicating that approximately 9.5% of observations had at least one financial institution that was also a shareholder in the firm.

In the descriptive statistics table that follows, firms have an average profitability of 0.184, representing 18% of assets, profit before interest and tax. The average financial leverage is 0.544, meaning about 54% of their financial resources are financed through debt. Institutional shareholders hold 65% of the firm's shares, with a percentage of shares exceeding 5%. The market value to book value ratio of shares is 4.680, 9% of firms reported losses, 16% had research and development costs, and the beta risk, or systematic risk, is 68%.

Table 4.1. Descriptive statistics of research variables

Deviation Criterion	the least	the most	Middle	Average	Variable	symbol
0.202	-0.826	0.011	-0.069	-0.140	CETR	The effective cash tax rate
0.078	-0.048	0.269	0.024	0.051	BTD	Differences in accounting profit andTaxable profit
0.086	-0.245	0.000	-0.110	-0.105	ETR	Effective tax rate
0.293	0.000	1.000	0.000	0.094	DUAL	Debt maintenance, simultaneity, and Equity
0.137	-0.008	0.476	0.147	0.184	ROA	profitability
1.286	12.524	17.437	14.667	14.791	SIZE	size of thefirm
0.200	0.174	0.870	0.547	0.544	LEV	Financial Leverage
0.205	0.176	0.917	0.709	0.655	INST	Institutional shareholders
0.216	0.000	0.685	0.309	0.318	LOANPERCENT	Loan Percentage
4.438	0.813	17.905	2.916	4.680	MTB	Market value to book value
0.291	0.000	1.000	0.000	0.093	LOSS	loss
0.373	0.000	1.000	0.000	0.167	RD	Research and development costs
0.787	-0.682	2.408	0.596	0.681	BETA	Beta risk

4.2. Hypothesis test

The current research aims to investigate the following hypothesis:

Research Hypothesis: The simultaneous maintenance of debt and equity has a significant relationship with the firm's tax avoidance. Since the dependent variable is measured using three criteria, the design of the model for the hypothesis test is presented below.

4.2.1. Criteria for aneffective cash tax rate

The results of the hypothesis test show that there is a significant relationship between the simultaneous maintenance of debt and equity and the firm's tax avoidance. This relationship was measured using the effective cash tax rate and is presented in Tables 2-4.

As shown in Tables 2-4, the F statistic is 15.540, with a significance level of 0.05. Since this value is less than 0.05, we reject the null hypothesis at a 95% confidence level, indicating that the model is statistically significant. The adjusted coefficient of determination reveals that 33% of the variance in the dependent variable can be explained by the independent and control variables in the model. This suggests that each variable in the model plays a significant role.

In Table 6-4, the results of the research hypothesis show that the coefficient for the simultaneous maintenance of debt and equity is -0.032, indicating a negative impact on the effective cash tax rate. The t-statistic probability value for the coefficient of debt and equity maintenance (0.003) is significant at a 95% confidence level. Therefore, the research hypothesis that simultaneous maintenance of debt and equity

affects the firm's tax avoidance is supported by the effective cash tax rate. This implies that maintaining debt and equity simultaneously leads to a decrease in tax avoidance through the effective cash tax rate.

Table 4.2. Hypothesis test with the criterion of effective rate of cash taxes

$TA_{it} = \beta_0 + \beta_1 Dual_{i.t} + \beta_i Controls_{i.t} + \beta_j IndustryFE_{i.t} + \beta_k YearFE_{i.t} + \varepsilon_{it}$				
t statistic	**t statistic**	**standard error**	**Coefficient**	**Variable**
0.003	-2.999	0.011	-0.032	Simultaneous maintenance of debt and equity
0.000	6.634	0.046	0.308	profitability
0.005	2.802	0.003	0.009	size of thefirm
0.043	-2.027	0.018	-0.037	Financial Leverage
0.649	0.456	0.015	0.007	Institutional shareholders
0.001	-3.478	0.014	-0.050	Loan Percentage
0.060	-1.883	0.001	-0.001	Market value to book value
0.000	10.133	0.022	0.218	loss
0.006	-2.761	0.008	-0.023	Research and development costs
0.776	0.284	0.004	0.001	Beta risk
0.000	-5.630	0.051	-0.285	Constant
.It was controlled				Year - industry
The probability of the statisticf		f statistic		Adjusted coefficient of determination
0.000		15.540		0.333

4.2.2. difference between accounting profit and taxable profit

The results of the hypothesis test show that the simultaneous maintenance of debt and equity has a significant effect on the firm's tax avoidance. This is measured by the difference between accounting profit and taxable profit, and the results are presented in Table 3-4.

As shown in Table 7-4, the F-statistic is 25.331 with a significance level of 0.000. Since this value is less than 0.05, the null hypothesis at a 95% confidence level is rejected, indicating that the model is statistically significant. The adjusted coefficient of determination reveals that 45% of the variation in the dependent variable can be explained by the independent variables and controls in the model. This suggests that the model is overall meaningful, allowing for further analysis of the importance of each variable.

The results from Tables 3-4 support the research hypothesis, showing that the coefficient for debt and equity holding is -0.017, indicating a negative impact on the difference between accounting profit and taxable profit. The t-statistic probability for the coefficient of simultaneous debt and equity holding is 0.000, signifying significance at a 95% confidence level. This confirms the hypothesis that maintaining debt and equity simultaneously has a substantial effect on a firm's tax avoidance, as evidenced by the difference between accounting profit and taxable profit. Therefore, holding debt and equity together leads to reduced tax avoidance based on the criterion of the difference between accounting profit and taxable profit.

Table ۳-٤: Hypothesis test with the criterion of difference between accounting profit and taxable profit

$TA_{it} = \beta_0 + \beta_1 Dual_{i.t} + \beta_i Controls_{i.t} + \beta_j\ IndustryFE_{i.t} + \beta_k YearFE_{i.t} + \varepsilon_{it}$				
t statistic	**t statistic**	**standard error**	**Coefficient**	**Variable**
0.000	-5.358	0.003	-0.017	Simultaneous maintenance of debt and equity
0.000	14.336	0.020	0.286	profitability
0.000	4.996	0.002	0.009	size of thefirm
0.000	-4.542	0.015	-0.066	Financial Leverage
0.338	-0.958	0.013	-0.013	Institutional shareholders
0.002	-3.098	0.013	-0.040	Loan Percentage
0.176	1.355	0.000	0.001	Market value to book value
0.000	-5.455	0.004	-0.024	loss
0.000	-3.573	0.006	-0.020	Research and development costs
0.525	-0.636	0.002	-0.001	Beta risk
0.000	-4.071	0.015	-0.060	Constant
.It was controlled				Year - industry
The probability of the statisticf		f statistic		Adjusted coefficient of determination
0.000		25.331		0.455

4.2.3. Hypothesis test with effective tax rate criterion

The results of the hypothesis test, which examined the simultaneous maintenance of debt and equity and its significant effect on the firm's tax avoidance, are presented in Table 4-4. The criterion used was the difference between accounting profit and taxable profit.

Table 4.4. Hypothesis test with the effective rate of finance

$TA_{it} = \beta_0 + \beta_1 Dual_{i.t} + \beta_i Controls_{i.t} + \beta_j\ IndustryFE_{i.t} + \beta_k YearFE_{i.t} + \varepsilon_{it}$				
t statistic	**t statistic**	**standard error**	**Coefficient**	**Variable**
0.027	-2.212	0.005	-0.011	Simultaneous maintenance of debt and equity
0.014	-2.474	0.026	-0.065	profitability
0.000	4.789	0.002	0.009	size of thefirm
0.000	-3.712	0.013	-0.050	Financial Leverage
0.006	-2.778	0.011	-0.029	Institutional shareholders
0.403	0.836	0.010	0.009	Loan Percentage
0.762	0.302	0.001	0.000	Market value to book value
0.000	13.860	0.008	0.109	loss
0.000	-6.710	0.005	-0.032	Research and development costs
0.688	0.402	0.002	0.001	Beta risk
0.000	-6.008	0.026	-0.158	Constant
.It was controlled				Year - industry
The probability of the statisticf		f statistic		Adjusted coefficient of determination
0.000		21.633		0.415

As shown in Table 8-4, the F-statistic is equal to 21.633 and its probability value (significance level) is 0.000. Since this value is less than 0.05, the null hypothesis at the 95% confidence level is rejected, indicating that the model is statistically significant. The results pertaining to the adjusted coefficient of determination reveal that 41% of the changes in the dependent variable can be explained by the independent variables and model controls. This suggests that the model is overall meaningful, allowing for an analysis of the importance of each variable.

The results of the research hypothesis in Table 4-4 indicate that the coefficient for the simultaneous maintenance of debt and equity is -0.011, suggesting a negative impact on the effective tax rate. With a t-statistic probability of 0.027, the coefficient for debt and equity maintenance is statistically significant at the 95% confidence level. The research hypothesis that simultaneous maintenance of debt and equity significantly affects a firm's tax avoidance is supported by the effective tax rate criterion. This implies that maintaining both debt and equity simultaneously leads to a decrease in tax avoidance based on the effective tax rate.

5. Discussion

The results of the research hypothesis showed that the variable coefficient of debt and equity maintenance for all three tax avoidance criteria (cash effective tax rate, the difference between accounting profit and taxable profit, and effective tax rate) is equal to -0.032, -0.017, and -0.011, respectively. This indicates a negative effect of this variable on all types of tax avoidance criteria. According to the t-statistics probability, the variable coefficient of debt and equity maintenance is significant at the 95% probability level for all three criteria. Therefore, the hypothesis that simultaneous maintenance of debt and equity has a significant effect on the firm's tax avoidance was confirmed.

It can be inferred that since managers have a fiduciary duty to act in the interests of shareholders, firms without simultaneous ownership of debt and equity may use methods to avoid excessive taxes in order to increase the value of equity. Firm creditors bear the cost in this scenario. When shareholders are also creditors, they consider the risk preferences of creditors and may avoid excessive tax avoidance. Additionally, dual ownership of debt and equity increases the concentration of capital allocation for debt and equity holders, reducing portfolio diversification (Fama and Jensen, 1983; Garcia-Koehner et al., 2015). Consequently, holders of both debt and equity may face increased risk due to tax avoidance, leading to fewer tax avoidance methods. Jiang et al. (2010) found that simultaneous ownership of debt and equity limits borrowing costs, reducing conflicts of interest between shareholders and creditors. Anton and Lin (2020) discovered that holding debt and equity simultaneously enhances firms' investment efficiency. Yang (2021) demonstrated that holding debt and equity simultaneously results in fewer patents but improves the market value of patents. Chava et al. (2019) observed that simultaneous ownership of debt and equity reduces the use of debt that restricts capital expenditures. Chu (2018) concluded that firms with simultaneous debt and equity holders pay lower dividends to increase creditors' profits.

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The Effect of Financial Reporting Quality on the Relationship between Stock Price Crash Risk and Litigation Risk Against the Auditors

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Abstract

Objectives: The purpose of this study is to investigate the effect of financial reporting quality on the relationship between stock price crash risk and litigation risk against auditors.

Design/methodology/approach: This research utilizes multivariate regression to analyze the hypotheses. The statistical population of this study includes all firms listed on the Tehran Stock Exchange, with 131 firms selected using a systematic elimination sampling method. The study covers a period of 9 years, from 2014 to 2022.

Results: The testing of the first hypothesis revealed a direct and significant relationship between stock price crash risk and litigation risk against auditors. The second hypothesis demonstrated that financial reporting quality has a significant and inverse relationship with stock price crash risk and litigation risk against auditors. Additionally, financial reporting quality was found to have a significant and inverse relationship with litigation risk against auditors.

Contribution: This research provides evidence that stock price crash risk can increase auditors' litigation risk, and suggests that financial reporting quality can play a crucial role in this context.

Keywords: Stock Price Crash Risk, Litigation Risk, Financial Reporting Quality.

1. Introduction

If we want to provide a complete and comprehensive definition of the possibility of auditors being sued for their work and the high sensitivity of their position in the future, especially in cases of litigation against them or audit firms, we should refer back to the definition provided by Binez et al. (2012). They stated in their study that there are various scenarios that could arise due to the sensitivity of the audit job. Lawsuits may be filed against auditors in the future, and as defined by D'Angelo (1981), the quality of financial reporting is closely tied to the quality of the audit. If auditors perform their duties with the required quality, financial statements will be free of significant fraud and distortions (Baghomian and Rajabdorry, 2019).

Statistics and research conducted worldwide confirm that the most significant issue in the auditor community over the past three decades has been the level of litigation and complaints raised against auditors globally. In 2012, Badrestcher et al. reported that approximately $5.66 billion in damages were paid due to complaints against auditors, a figure of great concern (the American Audit Quality Center). Similarly, in Iran, Professor Dastgir's study highlighted official statistics on complaints against auditors, which are not publicly available but have shown an increasing trend. This rise in complaints has resulted in significant financial losses for many individuals. Apart from financial obligations to pay damages, this can severely damage their professional reputation, work quality, and the credibility of their institutions, sometimes irreparably (Ghadimpour and Dastgir, 2016).

Empirical and theoretical research findings indicate that audit scandals, which have led to criminal charges and the collapse of firms, coupled with the issue of stock price depreciation due to concealed information by corporate managers, necessitate greater involvement of the accounting community and auditors in addressing problems such as the risk of future stock price drops. Auditors play a crucial role in ensuring the quality of financial statements presented to the market, as evidenced by various studies (Wall, 2017; Akhlaghi et al., 2023).

The sudden fluctuations in stock prices have drawn the attention of academics and capital market professionals in recent years, both in terms of price drops and increases. Given the significance of stock returns to investors, the phenomenon of stock price declines, resulting in sharp decreases in returns, has garnered more research interest compared to price increases (Ebrahimi et al., 2017). Diversification in research has identified financial reporting quality as a potential solution to mitigate future stock price declines. One of the primary objectives of accounting reporting is to provide valuable information about an entity's financial performance to a wide range of users. The income statement, when prepared and presented in accordance with accounting standards, offers valuable insights into a firm's financial performance for shareholders and investors (Izedi et al., 2021; Akhlaghi et al., 2024).

Many researchers attribute stock price declines to internal firm management practices. When information is disseminated randomly in the market, regardless of its nature, firms do not experience sudden drops in stock value. If firms prioritize spreading positive news over negative news and keep negative information hidden, it can lead to a buildup of negative news, resulting in a sudden decline in stock value. Auditors are the final checkpoint to verify the accuracy of corporate financial information. Failure to identify inaccuracies intentionally or unintentionally can result in backlash from shareholders and stakeholders (Fakhari and Nasiri, 2013).

Given the significance of this issue and the risks faced by the audit profession, this study aims to explore the impact of stock price crash risk on firms on litigation and the likelihood of lawsuits against auditors.

Research in this area defines financial reporting quality as the ability of financial statements to convey information about the firm's operations, particularly forecasting its expected cash flows to investors. This is based on the belief that accruals enhance the

informational value of profits by reducing the impact of unsustainable fluctuations in cash flows (Biddle et al., 2009). Financial reporting quality distinguishes useful information from other data, promoting the usefulness of information for investors, creditors, managers, and other stakeholders (Piri et al., 2014). Financial information transparency has always been considered one of the most influential variables in determining investment strategies in the market. Quality financial reporting can be defined as the accuracy of financial reporting in reflecting information about the operations and cash flows of a for-profit entity (Bashirimanesh and Pakdel, 2019).

When evaluating financial reporting quality, two general approaches are typically used: one focuses on the needs of users, while the other supports investors and shareholders. The user-oriented approach determines financial reporting quality based on the usefulness of financial information (relevance and reliability). On the other hand, the investor-oriented approach defines financial reporting quality in terms of full and fair disclosure for shareholders. In this context, financial reporting quality entails complete and transparent financial information that prevents misleading or creating ambiguity for users (Taghizadeh Khanghah and Zeinali, 2015; Azizi et al., 2023). Therefore, this study aims to investigate whether financial reporting quality influences the relationship between stock price crash risk and litigation risk against auditors.

Auditors, as trusted individuals and intermediaries between stakeholders and firms, frequently encounter risks in their roles, referred to as audit risks in audit standards. While previous research has extensively discussed risks such as undetected risks, the issue of lawsuits against auditors and its implications have received less attention (Jabbarzadeh Kangarloui et al., 2014). Given the importance of financial transparency in corporate reporting for shareholders, which can impact returns and stock prices, auditors may face legal and criminal issues if discrepancies arise. Investors and stakeholders rely on auditors to provide accurate financial statements, and any discrepancies could lead to a decline in stock prices. This study aims to address the gap in research regarding the relationship between stock price crash risk and litigation risk against auditors.

The results of this research can serve as a guide for accounting and audit researchers, as well as managers and auditors, in understanding factors that may contribute to stock price crash risk. Considering that the quality of financial reports plays a crucial role in managing these risks, financial professionals should pay close attention to this aspect. Improving audit quality can help prevent potential complaints against auditors. This research aims to provide both practical and theoretical insights. The research structure includes expanding on theoretical foundations, hypotheses, and empirical bases, detailing the methodology and operational definitions of research variables, and presenting the findings and conclusions.

2. Theoretical Development of the Hypothesis

Conservative managers do not always have an incentive to disclose asymmetric information because in such a situation, the maintenance costs and non-disclosure of negative news will outweigh its benefits. However, in situations where information asymmetry between managers and investors is high, the costs of non-disclosure of negative news and their accumulation within the firm will be less than its benefits (Hajiha and Ranjbarnawi, 2018). Managers are motivated to hide negative news within the firm. When the sum of bad news reaches a tipping point, the accumulation of this bad news becomes inevitable, and it is likely to be disclosed to all foreign investors outside the market at once, leading to a drop in the stock price of firms (Foroughi & Mirzaei, 2012). Sometimes, information enters the market randomly, and the process of disseminating information, whether good or bad, is systematically carried out (Fakhari and Nasiri, 2020). In this case, the published information has a symmetric distribution and gradually reflects in the stock price, preventing price bubbles and stock price falls. However, when information asymmetry

between managers and investors is high, the costs of disclosing negative news and accumulating it within the firm will be less than its benefits (Hajiha and Ranjbar Navi, 2018). While the conservatism of managers is an important feature of the accounting information system and a stable principle in accounting, this factor can affect the risks of the firm's projects and increase overall risks. According to this view, the conservatism of the owner can increase audit risk and litigation risk against the auditor (Fendrersky & Safari Gerielli, 2018).

Audit risk is the risk of not discovering significant distortions in accounting information related to profit, cash flow, and financial situation by auditors. Auditors are required to obtain reasonable assurance of the absence of such distortions as a result of the audit (Dulabi, 2019). Identifying bad news and the possibility of breaching debt conditions leading to financial crises and bankruptcy increases the risk of the firm. Therefore, it is more likely that shareholders of firms facing a crisis and higher risk will file complaints against their auditor, increasing the risk of lawsuits against the auditor. In firms where managers accumulate negative news and do not disclose it, the firms are likely to experience a crisis and a drop in stock price. As a result, blame is often placed on the auditors (Abdi et al., 2018). This forms the basis of the first hypothesis of the research presented as follows:

H1: There is a significant relationship between the risk of a stock price crash and the risk of litigation against the auditor.

Many researchers believe that the decline in stock prices is attributed to the management of internal information. In cases where information is unintentionally leaked to the market, and the process of distributing information is systematic, regardless of its nature, it can be said that the published information has an asymmetric distribution. In other words, if managers promptly disclose all information, it will lead to an asymmetric distribution in the returns of shares. This implies that the average positive returns on good news should be equal to the average negative returns on bad news. Business unit managers often try to conceal bad news while promoting good news about the firm (Kothari et al., 2009).

Financial reporting quality serves as the criteria that distinguish useful information from other information and enhance the utility of information. Furthermore, financial reporting quality pertains to the usefulness of financial statements for investors, creditors, managers, and other stakeholders, ensuring that all news and facts about the firm are conveyed in the quality financial reports (Mehravar and Kargar, 2019). Accurate and timely financial reporting holds significant value, and individuals exposed to the opportunities and risks of capital market fluctuations are well aware of its importance. Considering the value of accounting information, it is imperative to explore various aspects of this information, such as calculation, presentation, quantity, quality, and other related factors, through different research studies (Nikbakht and Khan Beigi, 2018).

The impact of the quality of disclosed information is that higher quality information disclosed by a firm reduces the emotional behavior of investors. A superior disclosure policy alleviates investor concerns regarding confidential transactions within the organization and inappropriate selection issues. Previous research findings indicate that disparities in the quality of accounting information provided by firms have an asymmetric influence on investor confidence, with higher quality accounting information easing investment complexities. Independent auditors play a crucial role in instilling confidence in investors by meticulously reviewing firm financial statements. Conflicts of interest and potential events involving reporting and fraudulent activities drive auditors to enhance the quality of audits, significantly reducing information asymmetry between internal and external stakeholders. Competent and skilled auditors are able to prevent legal disputes by thoroughly examining financial statements, presenting accurate statements, and enhancing audit quality (Ebrahimi Kordlar & Javani Ghalandari, 2016).

Given the theoretical foundations and the notion that stock price crash risk stems from concealing and accumulating negative news and a lack of transparency in financial reporting, improving financial reporting quality will undoubtedly mitigate the risk of stock price crashes. The second hypothesis posits that the primary responsibility for verifying and transferring financial reporting quality outside the auditor's firm lies in reducing the risk of stock price crashes.

H2: The quality of financial reporting significantly affects the relationship between stock price crash risk and litigation risk against the auditor.

3. Background of the Research

Zhao (2021) emphasizes in a study titled "Auditor Unusual Fee and Stock Price Risk" that the occasional widespread stock price fluctuations in the global stock market underscore the importance of researching the risk of stock price declines. It is crucial to consider the impact of unusual audit costs on the risk of stock price drops. The relationship between risk reduction and abnormal costs: Audits can serve as an early warning system for potential stock price declines. The results indicate a significant correlation between abnormal audit costs and the risk of stock price crashes.

Demeyst et al. (2020), in a study titled "Practical Summary of Factors Affecting the Results of Legal Claims Against Auditors," summarized the factors influencing legal claims against auditors based on interviews with 27 leading litigation attorneys. They discussed the factors contributing to lawsuits against auditors in the United States and how these factors impact the outcomes of such lawsuits. These findings have significant implications for audit firms, particularly auditors. Factors such as the motivation behind legal claims, the extent of financial losses suffered by firms, auditors' ability to pay, and the anticipated costs of litigation are crucial in determining the outcomes of these cases. Unlike court settlements, many claims can be resolved through negotiation.

Huck (2020), in a study titled "The Role of Audit Firms in Detecting Fraud in Preventing Claims Against Auditors," highlights the negative impact of financial and economic crises on developing countries and their populations. The research emphasizes the vital role audit firms play in the economy by helping firms conduct their business activities efficiently. The failure of audit firms can have devastating consequences for themselves, their clients, and shareholders. The study also suggests that audit firms may face conflicts of interest arising from controversial situations.

Cheng et al. (2020), in a study titled "Transparency of Operating Cash Flows and Stock Price Crash Risk," suggest that opaque operating cash flows can increase the risk of stock price crashes, while accruals management can significantly affect stock price crash risks.

Hay and Ron (2018) examined the relationship between financing constraints and the risk of stock price crashes, finding that increased financing restrictions lead to a higher risk of stock price crashes.

Chen et al. (2017) investigated the link between profit smoothing and the risk of stock price crashes. They found that high levels of profit smoothing are associated with an increased risk of stock price crashes, especially for firms with fewer analysts and smaller institutional shareholders, as well as positive voluntary accruals. Profit smoothing was also linked to significant negative returns in the three months following the profit announcement.

Wall (2017) suggested that increasing the use of information technology can reduce the risk of litigation against auditors.

Alder and Besley (2017), in a study focusing on information technology and auditing, pointed out that improper use of technology and hacking of confidential documents can pose risks to auditors, potentially increasing litigation risks. They found a significant relationship between the level of information technology in firms and litigation against auditors.

Yuan and Zhang (2016), in a study on "Real Effects on Corporate Financial and Accounting Statements," demonstrated how lawsuits and fraud disclosures can significantly devalue a firm, disrupt financing and investment, and reduce the firm's reputation. This can lead to difficulties in obtaining foreign funds and a decrease in foreign financing, hindering profitable investments.

Yangyang et al. (2015) discovered that lawsuits against auditors and complaints from owners can influence auditor behavior and prompt both parties to proceed cautiously.

Casterolla et al. (2007) argued that litigation against auditors stems from negligence, audit failures, and a lack of auditing quality. They defined litigation against auditors as defects in professional procedures that result in legal action due to audit quality issues.

4. Research Method

Due to the basic theoretical foundations related to the variables being studied, the present study is classified as applied research in terms of its purpose and method of execution. It is categorized as descriptive-causal research because it does not manipulate independent variables to measure their effects on dependent variables, but rather observes them as they are. Historical and post-event data were collected using library and archival methods to test the research hypotheses.

The statistical population of the study includes all firms listed on the Tehran Stock Exchange. After excluding firms with financial periods ending at times other than the end of March, firms that changed their financial period during the research period, those with insufficient information for comparability, as well as investment firms, banks, and insurance firms, a sample of 131 firms was selected using a systematic screening pattern.

Data from these firms were collected over a 9-year period from 2014 to 2022 to ensure a sufficient sample size for analysis. The combined data were homogenized to account for the different nature of the firms' activities and reports. Regression analysis was then conducted using Eviews 12 software, logistic regression, and other appropriate statistical methods to test the research hypotheses.

5. Regression models of research

The first model:

$$LIT\ SCORE_{j,t} = \beta_1 + \beta 2\ NCSKEW_{i,t} + \beta 3\ M/B_{i,t} + \beta 4\ ROA_{i,t} + \beta 5\ LOSS_{i,t} + \beta 6\ DEBT_{i,t} + \beta 7\ LEV_{i,t} + e_{i,t}$$

The second model:

$$LIT\ SCORE_{j,t} = \beta 1 + \beta 2 NCSKEW_{i,t} + \beta 3\ FRQ_{i,t} + \beta 4\ (NCSKEW_{i,t} * FRQ_{i,t}) + \beta 5\ M/B_{i,t} + \beta 6\ ROA_{i,t} + \beta 7\ LOSS_{i,t} + \beta 8\ DEBT_{i,t} + \beta 9\ LEV_{i,t} + ei,t$$

5.1. Variable definition

Dependent Variable: Litigation Risk Against Auditor (LITSCORE)

Because lawsuits against auditors can be influenced by various factors, it is necessary to utilize a comprehensive model for investigation. This model should be based on previous findings (Shu, 1999) and research conducted by Krishnan and Zhang (2005), JabbarZadeh et al. (2014), and RajabDorry and Baghoumian (2019). The investigation into litigation risk against auditors will be conducted as follows:

LITSCORE=0.276*SIZE+1.153*INV+2.075*REC+1.251*ROA+1.501*LEV+0.301*GROWTH-0.371*RET+0.235-10.049

as follows:

LIT SCORE: Litigation Score Against Auditor

SIZE: Natural logarithm of total assets at the end of the year

INV: Inventory divided by total assets

REC: accounts receivable by total assets

ROA: Return on assets

LEV: Total liabilities divided by total assets

GROWTH: Sales – Last year's sales / last year's sales

RET: Rate of return on stocks: stock price of the year (t+1) - stock price of the year (t)+dividend/ stock price of the year (t)

We use the equation provided above to assess the litigation risk against the auditor. We then categorize the sample firms into high-risk and low-risk groups. Firms with scores above the average will be classified as high risk, while others will be considered low risk. The high-risk group will be ranked as (1) and the low-risk group as (0).

Independent Variable: Stock Price Crash Risk (NCSKEW):

The Negative Skew Model of Return on Equity:
To measure this criterion, the negative coefficient of skewness of Chen et al. (2001) and Cheng (2020) is used as follows: The higher the negative coefficient of skewness, the more likely the firm is to fall in the stock price.

$NCSKEWi,t=-n(n-1)^{2.3}\sum wj,t3)/(n-1)(n-2)(\sum wj,t2)^{2.3})$

NCSKEW: Negative Skew Specific Monthly Returns of the Firm i per month t during the fiscal year
Wi,t: The firm's specific month returns I in week t.
N: The number of months whose returns are calculated.
To measure the firm's specific monthly returns, the relationship (1) is used:

$$W_{jt} = Ln\ (1+\varepsilon_{j,t})$$

Wj, t: Firm j specific monthly returns at month t during the fiscal year.
EJ, *t*: Thr residual term of the following model:

$r_{j,t}= \beta_{0+}\ \beta_1 r_{mt-2} + \beta_2\ r_{mt-1} + \beta_3\ r_{mt} + \beta_4\ r_{mt+1} + \beta_5\ r_{mt+2} + \varepsilon_{j,t}$

$r_{J,\ T}$: return on J's stock in month t during the fiscal year.
Rm,t is the market return in month t (To calculate the monthly market return, the index at the beginning of the month is deducted from the end of the month and the result is divided by the index at the beginning of the month).

Moderating Variable: Financial Reporting Quality (FRQ)

To calculate the quality of financial reporting, accruals quality has been used in this study.
Jones' modified model is the strongest model for measuring accruals quality. Based on the modified Jones model (1995), the quality of accruals is calculated based on model (1).
Model (1)

$$\frac{\text{TAC}_{\text{it}}}{\text{TA}_{\text{it}-1}} = \alpha_0\left(\frac{1}{\text{TA}_{\text{it}-1}}\right) + \alpha_1\left(\frac{\Delta REV_{it}}{TA_{it-1}}\right) - \alpha_2\left(\frac{\Delta REC_{it}}{TA_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{TA_{it-1}}\right) + \varepsilon_{\text{it}}$$

In this model:
$TAC_{i,t}$ =total accruals of the firm i in year t
TACi,t= Ei,t – OCFi,t
Ei, T=Net Profit
OCFi,t =Operational cash flow
ΔREVi,t: change in firm sales revenue from year t to t-1
ΔRECi,t: Changes in accounts receivable from year t to t-1
PPEi,t: Gross property, plant, and equipment at year t
TAi, T-1: Total book value of assets of the firm I at year T-1
εi, t: The residuals of the model.
In this research, to obtain the quality of accruals, the error of the absolute value model is taken and multiplied by the negative number 1.

Control variables

ROA: Net profit is divided by total assets.
DEBT: Long-term liabilities divided by total assets.
MB: The market value of the capital to the book value of the capital at the end of the financial year.
LOSS: A dummy variable that takes 1 if the firm's income is negative in the current period, and 0 otherwise.
LEV: the sum of the total liabilities divided by the sum of the total assets is used.

Research Findings

Descriptive statistics of research variables: The findings of the research include descriptive statistics and inferential statistics, which are first presented in the table below descriptive statistics.

For instance, the average value for the financial leverage variable is 0.57, indicating that the majority of the data is centered around this point. One of the most crucial measures of dispersion is the standard deviation. The standard deviation for Market value to book value is 3.07, while for the financial reporting quality variable it is -0.09. This suggests that these two variables have the highest and lowest standard deviations, respectively. The minimum and maximum values reflect the lowest and highest values within each variable. For instance, the highest financial leverage amount is 12.1, which is a hundredfold increase.

As can be seen in Table 3, the total number of firms under investigation is equal to 1179, of which 625 firms ,equivalent to 53.01% of the firms ,have the possibility of filing a lawsuit against the auditor, and in 554firm-years, that means that 46.99% of the year - there was no risk of filing a lawsuit against the auditor.

As can be seen in Table 4, the total of the surveyed firms is 1179. Among them, the number of 126 firms, equivalent to 10.69 percent of the firms, has been a loss of 1053 firm-years, i.e., 89.31 percent of the firm-years, and has not been unprofitable.

The results of Table 6 show that the Stock Price Crash Risk has a positive coefficient (0.089) and a significance level of less than 5% (0.028), indicating a significant relationship with Litigation Risk. Therefore, the first hypothesis is accepted. Additionally, all control variables demonstrate a significant relationship with the dependent variable.

McFadden's coefficient is calculated as 0.17, suggesting that 17% of the changes in the dependent variable are likely numerically between zero and one. The LR statistic is 280.04, with a significance level of less than 5%, confirming that the fitted model is valid.

The results of Table 8 show that the interaction between Financial Reporting Quality and Stock Price Crash Risk has a negative coefficient of -1.04, with a significance level of less than 5% (0.016), indicating that the second hypothesis is accepted. Additionally, financial reporting quality has a negative coefficient of -0.32, with a significance level of less than 5% (0.004), suggesting an inverse and significant relationship with Litigation Risk. Furthermore, all control variables exhibit a significant relationship with the dependent variable.

McFadden's coefficient is calculated to be 0.17, indicating that 17% of the changes in the dependent variable are likely numerically between zero and one. The LR statistic is 66.286, with a significance level of less than 5%, indicating that the fitted model has sufficient validity.

According to the results of Table 9, it is evident that the accuracy percentage of model predictions in the research models is over 50%, demonstrating the fitness and accuracy of the model.

According to the results of Table 10, it can be seen that the level of significance of the Hosmer-Lemeshow test for the model research is greater than 5%, indicating an optimal fit of the regression model.

Table (1): Descriptive statistics of quantitative research variables

Variable	Mean	Max.	Min.	Std. v
NCSKEW	-1.10	3.95	-3.97	1.62
FRQ	-0.10	-0.010	-0.46	-0.09
ROA	0.17	0.47	-0.010	0.13
MB	4.42	9.99	1.11	3.07
LEV	0.57	1.12	0.14	0.20
DEBT	0.068	0.29	0.004	0.007

Table(2). Frequency risk of Litigation risk against

Description	Frequency	percentage
1	625	53.01
0	554	46.99
total	1179	100

Table(3). frequency of the firm's Loss variable

Description	Frequency	percentage
1	126	10.69
0	1053	89.31
total	1179	100

Table5: First hypothesis test result

Variable	Coefficients	Std	z statistic	Sig
NCSKEW	0.089	0.040	2.19	0.028
MB	-0.15	0.023	-6.44	0.000
ROA	4.66	0.66	6.98	0.000
LEV	6.59	0.47	13.88	0.000
LOSS	-0.73	0.24	-3.00	0.002
DEBT	3.03	0.99	-3.32	0.000
C	-3.39	0.23	-10.55	0.000
Other information statistics				
LR statistics		280.04		
Sig		0.0000		
McFadden Coefficient		0.17		

Table7: Second hypothesis test result

symbol	Coefficients	Std	z statistic	Sig
NCSKEW	0.19	0.061	3.23	0.001
FRQ	-0.32	0.11	-2.81	0.004
NCSKEW * FRQ	-1.04	0.43	-2.39	0.016
MB	-0.15	0.023	-6.42	0.000
ROA	4.54	0.67	6.73	0.000
LEV	6.51	0.47	13.66	0.000
LOSS	-0.78	0.24	-3.17	0.001
DEBT	-3.19	1.00	-3.19	0.001
C	-3.26	0.32	-9.39	0.000
Other information statistics				
LR Statistics		286.66		
Sig		0.0000		
McFadden Coefficient		0.17		

Table (9): accuracy percentages of model prediction

model name	Total forecast
(model) 1	70.31 percent
(model) 2	70.57 percent

Table10: The results of the Hosmer- Lemeshow test

hypothesis	test statistic	Sig
(model) 1	5.34	0.71
(model) 2	11.43	0.17

Findings and discussions

The purpose of this study is to investigate the impact of financial reporting quality on the relationship between stock price crash risk and litigation risk against auditors. The main hypothesis predicts a connection between stock price crash risk and litigation risk against auditors. The first hypothesis test revealed a direct and significant relationship between stock price crash risk and litigation risk against auditors, with a positive coefficient. This suggests that higher stock price crash risks increase the likelihood of audit lawsuits. Investors and stakeholders rely on auditors' reports for transparency in financial statements. In cases of fraud, auditors are often held accountable as stakeholders believe they failed to identify financial discrepancies leading to stock price collapse, losses, and potential bankruptcy. Therefore, experienced, unbiased auditors who perform their duties diligently can reduce the risk of future lawsuits by identifying and reporting violations promptly. Transparency in financial reporting can mitigate litigation risk against auditors. These findings align with Keyghobadi and Fathi (2019), who found a direct relationship between auditors' reports, work quality, and stock price crash risk. The second hypothesis explores whether financial reporting quality can decrease stock price crash risk by thoroughly examining and promptly disclosing important financial issues, thereby reducing litigation risk against auditors. According to the statistical results of the second hypothesis test in the fourth chapter, it was found that the interaction of financial reporting quality and the stock price crash risk has a significance level of less than 5%. The negative and reverse coefficients can be attributed to the litigation risk against the auditor, which is quite impressive. Additionally, financial reporting quality with a negative coefficient shows a significant inverse relationship with the litigation risk against the auditor. As the quality of financial reports improves, the risk of lawsuits against the auditor decreases.

The main factor influencing decision-making by capital market agents and shareholders for investment is the continued cooperation with firms that provide transparent financial statements to the market, along with auditors' comments on them. When financial statements are transparent and free of significant distortions, investors can benefit in the future. However, problems arise when financial statements do not accurately reflect the realities of the firms, leading to a lack of transparency.

When a firm's true financial situation is revealed and stock prices drop, investors may believe that auditors failed to disclose the truth, increasing the likelihood of lawsuits against them. On the other hand, if auditors provide accurate information and financial reporting is done at a reasonable level, the firm's stock price will not drop significantly, reducing the risk of lawsuits against auditors.

The results of the second hypothesis of the research align with the findings of Foroughi et al. (2011) and Mehravar and Kargar (2019), who discovered that non-transparent financial information increases the risk of stock price collapse, while

transparent information decreases this risk. Similarly, Agility and Ghaderi (2015) and Rahimian et al. (2016) found that non-disclosure of important distortions (low quality of financial reporting) can increase the risk of litigation and lawsuits against auditors.

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The Impact of Political Communication on the Risk of Litigation Against the Auditor, Taking into Account the Role of Audit Quality

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Abstract

Objectives: The present study aims to investigate the impact of political communication on the risk of lawsuits against auditors, considering the role of audit quality.

Design/methodology/approach: This research is applied and, from a methodological standpoint, is causal correlation. The statistical population of the study consisted of all firms listed on the Tehran Stock Exchange. Using systematic sampling, 131 firms were selected as the study sample and studied over a 7-year period from 2016 to 2022.

Results: The results of testing the research hypotheses showed a relationship between political communication and the risk of lawsuits against auditors in the first hypothesis. The second hypothesis demonstrated the effect of the interaction of audit quality and political communication on lawsuits against auditors.

Innovation: This ongoing research provides evidence that political communication reduces the risk of lawsuits against auditors and improves the quality of auditing.

Keywords: Political Communication, Audit Claims, Audit Quality, Auditor Expertise.

1. Introduction

The theory of political economy has been present in world economic literature since the second half of the twentieth century, particularly with the spread and influence of the liberal school. This theory has not only been considered by economists and politicians, but sociologists have also contributed to its development and explanation. The theory is based on the idea that economics and politics mutually influence each other. Political activities and decisions have direct and indirect impacts on economic activities, and vice versa (MehdiFard and Royaei, 2014). The government's influence and political support can be examined in two aspects: advantages and disadvantages. Political support from the government can lead to value creation for a firm. While government support brings advantages such as lower financing costs for a particular firm, it may also lead to inefficiencies in the firm's performance (Rahnema RoodPoshti and Mohseni, 2018).

If discrepancies in financial statements go unnoticed by expert auditors, they will be held accountable for this, as investors and stakeholders rely on the audit community and their opinions for future investment decisions. The quality of financial reporting is derived from current earnings data of firms to forecast future profits (Biddle et al., 2009). Financial reporting quality distinguishes useful information from other data, enhancing the usefulness of information. Financial information transparency has always been a crucial factor in determining investment strategies in financial markets. Despite this, firm managers, who are primarily responsible for preparing financial statements, may have incentives to manipulate financial information to protect their interests. Managers often avoid disclosing negative news about the firm and only publish positive news (Foroughi et al., 2011). With the increasing trend of investing in stock markets and the capital market, the significance of firm information and financial statements will be amplified. Audit firms are crucial in overseeing these statements, and quality audits require auditors to gather reliable evidence and sufficient information to make informed judgments and provide fraud-free financial statements to the capital market (Doulabi, 2019). Lawsuits against auditors refer to cases where auditors face legal action resulting from their audit activities (Jabbarzadeh Kangarloui et al., 2014).

Firms with political ties to the government have been found to have lower financial reporting quality. Therefore, this research seeks to investigate the relationship between political connections and financial reporting quality. The research structure involves expanding on theoretical foundations, hypotheses, and empirical bases, detailing the methodology and operational definitions of research variables, and presenting the research findings and conclusions.

2. Theoretical foundations and the development of research hypotheses

2.1. Political communication and lawsuits against the auditor

Studies on firms with political connections have shown that political communication can impact a firm in both positive and negative ways. Some studies highlight the benefits of political communication, such as securing low-interest bank loans. However, other studies have indicated that political communication can harm a firm by leading to lower quality accounting information, the appointment of managers and board members lacking competence and efficiency (Bubakari et al., 2010).

Financial reporting quality is crucial in distinguishing useful information from irrelevant data and enhancing the overall usefulness of financial statements. High-quality financial reporting ensures that information is effectively communicated to stakeholders such as investors, creditors, and managers (Mehravar & Kargar, 2019). Firms with strong political ties may not feel the need to respond to market pressures to enhance information quality, resulting in poorer accounting information.

Given the significant role of the government in the Iranian economy, occurrences of financial statement revisions and their severity are used as indicators of low-quality accounting information. There is a positive correlation between political communication and financial statement restatements, indicating that a firm's political relations can influence the quality of its accounting information (Khajavi et al., 2021).

Accurate and timely financial reporting holds immense value for those exposed to the fluctuations of capital markets. It is essential to examine various dimensions of accounting information, such as quantity, quality, and presentation methods, through different research studies (Khalifa Soltani et al., 2018). Independent auditors play a crucial role in instilling confidence in the quality of financial statements by detecting and preventing conflicts of interest, potential fraudulent activities, and enhancing audit quality. Skilled auditors can meticulously review financial statements, ensure their accuracy, and improve overall audit quality to mitigate legal risks (Ebrahimi Kordlar and Javani Ghalandari, 2016).

Therefore, based on the aforementioned points, the second hypothesis of this research can be formulated as follows:

H1: There is a significant relationship between political communication and the risk of lawsuits against auditors.

2.2. Quality of Auditing, Political Communication and Reduction of Lawsuits

Financial reporting serves as a means of communication among investors, market agents, managers, and firm owners, transferring financial information to both internal and external stakeholders. Financial reporting standards dictate that the purpose of financial statements is to provide valuable presentations, conveying a wealth of information to the markets. This information is beneficial for current and potential investors, as well as creditors who utilize the financial data provided. Managers use financial statements for various decision-making processes, evaluating management performance, calculating corporate liabilities, and making tax assessments. Therefore, for financial accountability, statements must be accurately and transparently expressed in accordance with financial reporting standards (Etemadi & Abdoli, 2017).

The criteria for information quality align with Romney and Austin Barrett's (2012) book, "Accounting Information Systems." These criteria state that information must be relevant, complete, reliable, timely, understandable, verifiable, and accessible. However, in reality, many firms fail to meet these criteria in their financial statements. One reason for this discrepancy is corporate agents engaging in fraudulent activities to profit from various groups or individuals within firms (Jayanti et al., 2021).

With the globalization of the business market and the increasing demand for transparent information among investors, shareholders, and society as a whole, the quality of financial reporting has become a key component of corporate strategy. The value of accounting information and financial reporting in the market, particularly concerning investor income, has become a central focus of accounting research (Chen et al., 2012). Emphasis is placed on the overall quality of financial reporting and the specific role of auditors, as high-quality financial reporting enables more informed decision-making by investors, guiding the optimal allocation of resources (Piri et al., 2014).

The separation of ownership from management allows managers to make decisions that may align with their interests but contradict those of shareholders. In earnings management studies, voluntary accruals, which management can manipulate, play a significant role. Accruals bridge the gap between income and cash flow; therefore, assuming cash flows remain unaltered, the manipulation of profits relies on adjusting optional accruals. Audit procedures mitigate the estimated error in accruals, neutralizing managers' opportunistic smoothing in pre-audit financial statements. The auditor's report on statements and other financial information serves as a crucial tool in ensuring the

reliability of corporate information, creating a link between auditors' findings and both internal and external stakeholders in the form of audit opinions. This process aids in identifying issues within firms, reducing the risk of litigation against auditors by enhancing the quality of financial statements (Etemadi & Abdoli, 2017).

Based on the aforementioned content, the second hypothesis of the research is presented as follows:

H2: There is a significant relationship between political communication and the Risk of litigation against auditors.

3. Research Background

Khaksar et al. (2021) conducted a study titled "The Relationship between Political Relations with Audit Quality and Auditor's Expertise in the Industry," aiming to determine if political relations can enhance audit quality and auditor expertise in the industry. The study utilized a multivariate regression model to test the hypothesis. The results indicated a significant and negative relationship between political relations and audit expertise, suggesting that firms with strong political ties increase competition in the audit market, leading to reduced audit quality.

Khalil et al. (2021) reviewed "Political Communication, Political Corruption, and Auditing," noting that most studies on the economic impact of political communication were conducted in an Asian context. Political communication was found to increase the likelihood of favorable audit opinions, but also correlated with higher audit costs and longer audit delays, potentially compromising auditor independence. Studies on the economic consequences of political corruption in auditing were primarily focused on the U.S., revealing that political corruption was associated with increased audit costs, longer audit delays, and a higher likelihood of receiving unqualified audit opinions.

Arno and Giulio (2021) explored "Managing Litigation Risk through Corporate Pay Policy," observing that firms adjust their payment policies to anticipate future litigation costs. Analysis of lawsuits involving U.S. firms showed that those facing significant litigation risks tended to pay lower dividends and sometimes lower profits, favoring stock repurchases over dividends. Firms with liquidity constraints reduced share repurchases when faced with settlement costs, indicating that high-risk firms adjust their payment strategies accordingly.

Sun et al. (2021) investigated "Audit Committee's Financial Expertise, Judicial Litigation Risk, and Tax Services Provided by the Auditor," highlighting the impact of the Sarbanes-Oxley Act on audit committees' oversight responsibilities. The study found that firms with accounting financial experts on audit committees experienced fewer tax errors, but those with higher prior litigation risks had relatively higher tax errors, suggesting a trade-off between financial reporting quality and auditor independence in cases of tax errors.

Meyst et al. (2020) examined factors influencing lawsuits against auditors in the U.S. and their outcomes, noting that legal claims against auditors often revolved around economic losses, auditors' financial capacity, and the cost of pursuing lawsuits. Many lawsuits were resolved through negotiation rather than litigation.

Hossein et al. (2020) studied "The Impact of Corporate Political Communications on Audit Quality," finding that politically connected firms faced representation costs due to ineffective asset utilization. The study emphasized that audits cannot coexist in corrupt environments, underscoring the importance of audit quality.

Hucke (2020) explored the role of audit firms in fraud detection and the global economy, emphasizing the need to eliminate conflicts of interest in auditing. The study highlighted the critical role of audit firms in facilitating efficient business operations and reducing the risk of lawsuits through enhanced audit quality.

Melol et al. (2018) investigated the impact of political communication on Tunisian firms' performance and value, concluding that political connections improved firm performance and value, attracting investors who believed politically connected

firms could achieve higher profits.Wang et al. (2017) focused on " Political Communication and Financial Reporting Fraudulently," suggesting that increased management ability led to improved financial reporting quality, particularly in non-governmental firms.

Wang (2015) found that political connections influenced the risk of stock price crashes, with government-controlled firms experiencing higher risks. In contrast, private firms hiring politically connected managers reduced the risk of stock price crashes, highlighting the importance of good governance in mitigating risks.

Ling et al. (2016) noted that firms with strong political connections had easier access to long-term funding sources, but excessive political intervention could weaken the firm's overall stability.

Yuan and Zhang (2016) studied the impact of financial statement quality on auditors' litigation risk, revealing that poor financial statement quality could devalue a firm, disrupt financing, and increase the risk of lawsuits due to information asymmetry and declining reputation.

4. Research Methodology

The present study is classified as applied research due to the basic theoretical foundations related to the studied variables, both in terms of purpose of implementation and method of execution. It is also classified as descriptive-causal research because it investigates the variables as they are without changing them to measure their effects on each other. Historical and post-event data were collected using library and archival methods to test the research hypotheses.

The statistical population of the study includes all listed firms on the Tehran Stock Exchange, excluding firms with financial periods other than the end of March, those that changed their financial period during the research period, firms with insufficient information for comparability, as well as investment firms, banks, and insurance firms. A total of 135 firms were selected using a systematic screening pattern, and data were collected over a 7-year period from 2016 to 2022 to ensure a sufficient sample size.

Regression analysis was conducted using Eviews 12 software, including logistic regression and other appropriate statistical methods for the final testing of hypotheses. The combined data, along with the dimensions of time and place in different periods, provided the researcher with complete and reliable information.

5. Regression models of research

Model First Hypothesis Test

$$LIT\ SCORE_{j,t} = \beta 1 + \beta_2\ STATE_{i,t} + \beta 3\ LEV_{i,t} + \beta 4\ MB_{i,t} + \beta_5\ ROA_{i,t} + \beta 6\ SIZE_{i,t} + \beta 7\ LOSS_{i,t+} \varepsilon_{it}$$

Model Second Hypothesis Test

$$LIT\ SCORE_{j,t} = \beta 1 + \beta_2\ STATE_{i,t} + \beta 3\ SPECIAL_{i,t} + \beta 4\ (STATE_{i,t} \times SPECIAL_{i,t}) + \beta_5\ LEV_{i,t} + \beta 6\ MB_{i,t} + \beta 7\ ROA_{i,t} + \beta 8\ SIZE_{i,t} + \beta 9\ LOSS_{i,t+}\ \varepsilon_{it}$$

Operational Definitions of Variables

Dependent Variable Of Research: Auditor Litigation Risk' (LITSCORE)

Due to the various factors involved in lawsuits against auditors, it is essential to utilize a comprehensive model for investigation. This model should be based on previous findings (Shu, 1999) and should follow the research of Krishna and Zhang (2005), Jabbar Zadeh et al. (2014), and Rajab Dari and Baghomian (2019). The risk of a lawsuit against an auditor can be assessed in the following manner:

Equation (1):

LITSCORE=0.276*SIZE+1.153*INV+2.075*REC+1.251*ROA+1.501*LEV+0.301*GROWTH-0.371*RET+0.235-10.049

LIT SCORE: LITIGATION SCORE AGAINST AUDITOR

SIZE: Natural logarithm of total assets at the end of the year

INV: Inventory divided by total assets

REC: accounts receivable by total assets

ROA: Return on assets
LEV: Total liabilities divided by total assets
GROWTH: Sales – Last year's sales / last year's sales
RET: Composite stock returns by the end of the year and the last day of the fiscal year.
Lawsuits against auditors are binary variables, with values of either 0 or 1. Equation (1) is used to assess the risk of litigation against auditors. Firms being studied are categorized into groups based on whether they have a risk of litigation or not.

Once the litigation score from equation (1) is determined, the average scores for all years are calculated for each firm. If a firm's litigation score for a particular year is higher than the average score for that year, they are placed in the high-risk group and given a score of 1. If a firm's litigation score for a year is below the average for that year, they are placed in the low-risk group and given a score of 0 (Jabbar Zadeh Kangarloui et al., 2014 & Baghoumiyan & Rajab, 2019).

Independent Variable Research: Political Communications (State)

The variable has two values (0 and 1): if the largest shareholder is a government firm or government-affiliated firm, code 1 or zero will be awarded (Mehravar & Kargar, 2019).

Moderator Variable: Quality of Audit (Special)

According to Salehi and Mahmoudabad (2017), in order to measure audit quality, the expertise of the auditor within a specific industry is considered. This concept is elaborated upon below:
The auditor's expertise is determined by evaluating their knowledge and experience within a particular industry, as well as the differentiation of their audit firm from competitors in that industry. By examining the market share of audit firms servicing a specific industry, we can gauge the expertise of the institution within that industry. For instance, an audit organization with a significant market share in the automotive industry would be considered an expert in that field.
Specialization within the industry is a binary variable. If an audit firm possesses the necessary expertise within its industry, it is assigned a value of 1; otherwise, it receives a value of 0. This variable is calculated using the Palmgrass Method (1988), specifically the market share approach, which identifies the audit firm as an expert that has excelled and differentiated itself from competitors.
The auditor's expertise within the industry is calculated by dividing the total assets of all owners of a specific audit firm within an industry by the total assets of all owners within that industry. The market share must exceed 1.2 times the average market share of firms within the industry. Firms meeting this criteria are assigned a code of 1, while those that do not are assigned a code of 0.

Control variables

Leverage (LEV): (Khodadadi et al., 2015): Ratio of total liabilities to total assets
Firm Size: The size of the firm in the form of a natural logarithm of total assets (Khodadadi et al., 2015).
Growth opportunity (MB): The ratio of market value to the book value of shareholders.
Return on assets (ROA): The ratio of net profit to total assets.
LOSS: A virtual variable that, if the firm's earnings are negative, the number (1) or (0) is accrued.

Research Findings

Descriptive statistics of research variables: The findings of the research include descriptive statistics and inferential statistics, which are first presented in .the table below descriptive statistics

Table(1).Descriptive statistics

Variable	Mean	Max.	Min.	standard deviation
LEV	0.56	1.08	0.14	0.20
ROA	0.12	0.41	-0.050	0.12
MB	3.40	8.03	1.05	2.16
SIZE	14.50	18.53	11.03	1.41

The main centrality index is the average, which indicates the balance point and the center of gravity of the distribution and is a good indicator to show the centrality of the data. For example, the average value for the financial leverage variable is equal to 0.56 percent, which shows that most of the data is concentrated on this point. In general, dispersion parameters are measures to determine the degree of dispersion from each other or the degree of dispersion of them compared to the average. One of the most important dispersion parameters is the standard deviation. The value of this parameter for the growth opportunity variable is equal to 2.16 and the return on assets variable is equal to 0.12 percent, which shows that these two variables have the highest and lowest standard deviation, respectively. Minimum and maximum also show the minimum and maximum in each variable. For example, the largest amount of financial leverage is equal to 1.08 percent.

As can be seen in Table 2, the total number of firms under investigation is equal to 917 cases, of which 485 firms, equivalent to 52.89 percent of the firms, have the possibility of filing a lawsuit against the auditor in the firm, and in 432 Year-firm means 47.11% of year-firms, there was no risk of filing a lawsuit against the auditor.

As can be seen in Table 3, the total number of firms under investigation is equal to 917, of which 103 firms, equivalent to 11.23 percent of the firms, are loss-making and 814 firms, which is 88.77 percent of the years. Firms have not been unprofitable.

As can be seen in Table4the total number of , year-firms under review is equal to917 of which ,531 year-firms equal to57.91of the year-firms do not % have expert auditors and386 year-firms equal to 42.09of the year-firms have auditors who specialize % .in the industry

As can be seen in Table 5, the total number of year-firms under investigation is equal to 917, of which 496 firm-years equal to 54.10% of firms have political relations and 421 year-firms equal to 45.90% of firms without relations. They have been political.

Table(2). Frequency distribution of the probability of the risk of filing a lawsuit against the auditor

Description	Abundance	Abundance percentage
1	485	52.89
0	432	47.11
total	917	100

Table(3). Frequency distribution of the firm's loss variable

Description	Percentage	Frequency
1	103	11.23
0	814	88.77
total	917	100

Table(4). Frequency distribution of the auditor's expertise

Description	Frequency	percentage
without auditor expertise in the industry(0	531	57.91
with auditor expertise in the industry(1)	386	42.09
total	917	100

Table(5).Frequency distribution of political communication

Description	Frequency	percentage
0	421	45.90
1	496	54.10
total	917	100

Table(6).Result Test: The first hypothesis

$LIT\ SCORE_{j,t} = \beta 1 + \beta_2 STATE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MB_{i,t} + \beta_5 ROA_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 LOSS_{i,t} + e_{i,t}$				
Variable	**Coefficients**	**standard error**	**z statistic**	**Sig**
STATE	0.281	0.116	2.415	0.015
SIZE	0.551	0.052	10.54	0.0000
ROA	3.83	0.69	5.54	0.0000
MB	-0.30	0.030	-10.23-	0.0000
LOSS	-0.129	0.214	-0.602	0.546
LEV	5.38	0.419	12.81	0.0000
Width from the origin	-9.70	0.76	-12.67	0.0000
Other information statistics				
LR statistics		451.13		
Prob.		0.0000		
McFadden coefficient		0.35		

The results from Table 6 indicate that the political communication variable, with a positive coefficient of 0.281 and a significance level of less than 5% (0.015), has a direct and significant relationship with the risk of lawsuits against the auditor. As a result, the first hypothesis is accepted with a confidence level of 95%. Additionally, control variables also show a significant relationship with the dependent variable, with a significance level of less than 5% (excluding the firm's loss).

McFadden's coefficient is calculated to be 35%, suggesting that 35% of the changes in the dependent variable are likely to fall between zero and one. In simpler terms, the research variables account for 35% of the changes in the dependent variable. The LR statistic is reported as 451.13, with a significance level of less than 5%. This suggests that the model used is valid and reliable.

The results from Table 7 indicate that the interaction between political communication and audit quality (auditors' expertise) has a negative coefficient of -0.9 with a significance level of less than 5% (0.001), showing an inverse and significant relationship with the risk of lawsuits against the auditor. Therefore, the second hypothesis is accepted at a 95% confidence level. Additionally, the audit quality variable has a negative coefficient of -0.32 with a significance level of less than 5% (0.013), also demonstrating an inverse and significant relationship with the risk of lawsuits against the auditor. The control variables show a significance level of less than

5%, indicating a significant relationship with the dependent variable (excluding loss-making firms).

McFadden's coefficient is calculated at 36%, suggesting that 36% of the changes in the dependent variable are likely to fall between zero and one. The LR statistic is 466.16, with a significance level of less than 5%, indicating that the fitted model is valid.

According to the results of Table 8, it can be seen that the accuracy percentage of model prediction in the research models is more than 50%, which indicates the desirability and accuracy of the model.

Table(7). Result Test The Second hypothesis

$LIT\ SCORE_{j,t} = \beta 1 + \beta_2 STATE_{i,t} + \beta_3 SPECIAL_{i,t} + \beta_4 (STATE_{i,t} \times SPECIAL_{i,t}) + \beta_5 LEV_{i,t} + \beta_6 MB_{i,t} + \beta_7 ROA_{i,t} + \beta_8 SIZE_{i,t} + \beta_9 LOSS_{i,t} + \epsilon_{i,t}$				
Variable	**Coefficients**	**standard error**	**z statistic**	**Sig**
STATE	0.27	0.117	2.31	0.020
SPECIAL	-0.32	0.133	-2.47	0.013
STATE * SPECIAL	-0.99	0.31	-3.20	0.0014
SIZE	0.48	0.055	8.62	0.0000
ROA	3.81	0.70	5.44	0.0000
MB	-0.31	0.030	10.12	0.0000
LOSS	-0.15	0.21	-0.70	0.48
LEV	5.42	0.43	12.59	0.0000
Width from the origin		-8.56	10.51	0.0000
Other information statistics				
LR statistics			466.16	
significance level(Prob.)			0.0000	
McFadden coefficient			0.36	

Table 8: Accuracy percentages of model predictions

model name	Dependent variable name	Total forecast
(irst modelF) Percentage accuracy of model prediction	The risk of lawsuits against the auditor	70.63percent
Percentage accuracy of model prediction (second model)	The risk of lawsuits against the auditor	71.30percent

Research Results

The purpose of this study was to investigate the effect of political communication on the risk of lawsuits against auditors by considering the role of audit quality. The main hypothesis of the research indicates that there is a relationship between political communication and the risk of lawsuits against auditors. The examination of the first hypothesis revealed that political communication has a direct and significant relationship with the risk of lawsuits against auditors, as evidenced by a positive coefficient and a significance level of less than 5%. This suggests that as authorities interfere with firms and influence their financial statements, the likelihood of lawsuits against auditors increases.

Investors and stakeholders rely on auditors to ensure the accuracy and transparency of financial statements. If auditors fail to detect financial irregularities or fraud, stakeholders may hold them accountable, leading to losses or even bankruptcy. However, auditors can mitigate this risk by being experienced, unbiased, and diligent in their duties. By identifying and reporting any violations of the law or stakeholders' interests, auditors can limit government influence and reduce the risk of future lawsuits.

The results of the first hypothesis align with previous studies by Khajavi et al. (2021), Khaksar et

al. (2021), Khalil et al. (2021), and Hussein et al. (2020), which all suggest that political relations can impact the quality of auditing and increase the risk of lawsuits against auditors.

The second hypothesis of the research examines auditors' expertise as a factor in audit quality. It aims to determine whether enhancing audit quality through expert resources can decrease the influence of authorities, ensuring thorough scrutiny and timely disclosure of all key items in financial statements, and subsequently reducing the risk of auditor lawsuits. The statistical analysis in the fourth chapter revealed that the interaction of audit quality with political communication had a significant impact on the risk of litigation against auditors, with a negative coefficient and a significance level below 5%. Furthermore, a negative coefficient and a significance level below 5% indicated a significant inverse relationship between audit quality and the risk of lawsuits against auditors. Improving audit quality by employing expert staff can not only enhance the quality of financial reports issued to the capital markets but also reduce the risk of lawsuits against auditors.

The credibility of financial statements presented to the market and the auditor's statement plays a crucial role in decision-making for capital market agents and firm stakeholders. Transparency and accuracy in financial reporting are essential for investors to make informed decisions. However, when financial statements lack transparency or do not accurately reflect a firm's reality, the risk of lawsuits against auditors increases. In every industry within the capital market, there are audit firms specializing in specific sectors. These firms possess expertise in the industry's financial statements, activities, and standards, reducing the risk of lawsuits by providing accurate assessments and insights.

The interactive relationship between an auditor's expertise and political connections can significantly impact the risk of lawsuits. By increasing their expertise and focusing on specific industries, auditors can familiarize themselves with industry-specific financial statements and standards, improving the quality of their work and minimizing future uncertainties. The findings of this study align with previous research by Hook et al. (2020), Yuan and Zhang (2016), Rahimian et al. (2018), and Salehi and Abdoli (2018), which suggest that enhancing audit quality and auditors' expertise can mitigate the risk of lawsuits.

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Examining the moderating role of the quality of financial audits and sustainability assurance on the relationship between environmental, social, and governance factors and the payment and growth of company dividends: evidence from Iran

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Abstract

Objectives: This research examines the relationship between environmental, social, and governance scores and dividend distribution decisions of companies, taking into account the moderating role of financial audit quality to ensure sustainability.

Design/methodology/approach: This research is applied, with a causal correlation methodology.
Despite limitations, a sample of 152 firms was selected for the years 2018-2022. Multivariate linear regression based on panel data was used to test the research hypotheses.

Results: Panel regression analyses reveal a positive and significant correlation between ESG scores and dividend payouts. This suggests that companies with strong environmental, social, and governance practices prioritize stakeholders and shareholders, maintaining dividend payments. However, companies that prioritize high-quality ESG practices experience slower dividend growth. Additionally, audit quality negatively moderates the relationship between ESG scores and dividend payouts, particularly for companies audited by A-rated firms. Quality assurance of ESG factors did not yield statistically significant results.

Innovation: The findings have implications for investors, management, analysts, and policymakers, offering valuable insights for companies looking to enhance their sustainability practices.

Keywords: Audit quality, dividend payment, dividend growth, environmental, social, and governance factors.

1. Introduction

The recent international approach to environmental and social issues has had a significant impact on business practices, leading to a departure from traditional methods. This shift has presented new challenges for management and investors, as companies now need to allocate resources towards environmental, social, and governance policies that align with investor and societal expectations. This has shifted the investment priorities from focusing solely on dividends to also considering sustainability practices, as highlighted by Booth and Zhou (2017).

This shift towards sustainable practices can create a financial conflict as companies balance investments in environmental, social, and governance projects with compensating investors through dividend payments. Companies that prioritize sustainability practices are seen favorably by investors and shareholders, reflecting a commitment to long-term success. Mandatory sustainability reporting for large non-profit organizations has become common practice globally since 2017, alongside financial audits.

In Iran, sustainability reporting was previously voluntary, but new guidelines in 2022 now require companies to report on sustainability practices with disciplinary penalties for non-compliance. This research aims to explore dividend payment methods in companies with an environmental, social, and governance focus, examining dividend payment and growth ratios. The study will also analyze the role of financial and non-financial audits in moderating the relationship between environmental, social, governance factors, and dividend payouts.

By understanding how environmental, social, and governance factors influence dividend growth, this research aims to shed light on the impact of sustainability policies on dividend decisions. Additionally, the study will investigate the importance of financial auditing and sustainability assurance in shaping the relationship between these factors and dividend payouts. This research will provide insights into the role of audits in influencing corporate reporting, financial decisions, risk management, and compliance with regulations.

The research will be structured as follows:

Section 2 will cover the literature review and hypothesis development, Section 3 will detail the data collection method and research design, Section 4 will present the experimental results and analysis, and the conclusion will be provided in the final section.

2. Literature review and hypothesis development

Theoretically, non-financial disclosures can impact dividend decisions through two interconnected channels: the debt cost channel and the profit channel. In the debt cost channel, non-financial disclosure reduces knowledge disparities between insiders and investors, increases access to financial resources (Shokrzadeh, 2022), lowers capital costs, and encourages managers to distribute dividends. The cost of capital and dividend payout have an inverse relationship because when financing costs are low, external financing constraints are less burdensome for companies (Cheung et al., 2018). Consequently, without restrictive constraints, companies can distribute dividends (Cao et al., 2017). Non-financial reports on environmental, social, and governance practices offer more insight into the company, aiding investors in evaluating potential environmental and social responsibilities (El Ghoul et al., 2011). Cuadrado-Ballesteros et al. (2016) suggest that reduced information asymmetry due to high disclosure and transparency practices lowers transaction costs and positively influences a company's willingness to pay dividends. Insufficient disclosure and investor uncertainty can lead to limited investments and higher return demands (Dhaliwal et al., 2011), affecting dividend decisions. Signaling theory suggests that increased knowledge boosts investor confidence in managerial decisions, leading them to invest in companies with strong corporate governance reputations. Reports on environmental, social, and governance practices signal to financial markets that a company can manage environmental and social risks.

Investors link this disclosure to robust corporate governance (Cheung et al., 2018), high social capital, and good credit (Birkey et al., 2016), resulting in lower unsystematic risk (El Ghoul et al., 2011). Lower perceived corporate disclosure risks mean lower excess debt costs and higher capacity for cash dividend payments. The second channel is profit, showing how non-financial disclosures reflect a company's shareholder commitment, crucial for business profitability. Consumers value a company's social and environmental responsibility, impacting market share changes, financial results, and dividend-paying capabilities (Seighali and Amirpanahi, 2020). Profit is a crucial factor in dividend payments (Mitton, 2004). Non-financial disclosure can boost earnings by enhancing brand equity, engaging stakeholders, increasing employee productivity, and improving asset allocation. These benefits contribute to favorable dividend policies and higher earnings, benefiting investors, businesses, and stakeholders (Cheung et al., 2018). El Ghoul et al. (2011) suggest that socially responsible corporate behavior shields companies from market uncertainty, enabling steady income streams for dividend payments. Some studies show a positive link between corporate sustainability responsibility and profit-sharing (Benlemlih, 2019; Cheung et al., 2018; Rakotomavo, 2012), indicating that sustainability practices lead to sustainable profit-sharing policies (Jarboui, Samet 2017). Cheung et al. (2018) found that companies with high sustainability responsibility scores have higher profit-sharing levels due to reduced perceived risk and improved stakeholder relationships, especially in non-financial corporations. Rakotomavo (2012) noted a correlation between CSR efforts and profit-sharing before the 2007 financial crisis in the United States. However, the impact may vary based on organizational, institutional contexts, and country characteristics. Niccolo et al. (2020) and Ni and Zhang (2019) found a negative relationship between environmental, social, governance practices, and dividend payments by Chinese listed companies. Cheung et al. (2018) argue that the debt cost and profit channels can lead to a negative relationship between environmental, social, governance practices, and dividends. Companies benefiting from lower debt costs may reinvest profits or allocate free cash flow elsewhere. Conversely, profitability gains from environmental, social, and governance practices may require time and financial investments in the long term. These investments can reduce liquidity and profitability due to their relatively high costs (Duque-Grisales & Aguilera-Caracuel, 2021).

This is why investors with a longer-term perspective prefer companies with higher environmental, social, and governance scores, while those with a short-term view prefer the opposite (Starks et al., 2017). However, as Pan (2020) suggests, institutional investors should encourage their managers to consider environmental, social, and governance issues in public credit assessments and monitor them to enhance risk management. Dividend policy and corporate governance mechanisms are complementary tools to mitigate agency costs (Farooque et al., 2021). Companies that offer higher dividends are more likely to adopt good governance practices and implement robust monitoring and control systems that improve company performance and dividend payouts (Jan Abadi and Jami, 2020; Elmagrhi et al., 2017; Erdas & Simoes, 2020). Additionally, firms with strong corporate governance tend to pay out more dividends (Adjaoud & Ben-Amar, 2010).

In general, various aspects defining environmental, social, and governance practices have a strategic and significant impact on a company's operations, financial performance, and, consequently, dividend decisions. Companies that prioritize environmental, social, and governance issues, transparency, and disclosure quality exemplify quality reporting, demonstrating their commitment to enhancing governance standards and building a positive reputation (Dhaliwal et al., 2011; Zahid & Simga-Mugan, 2019). By doing so, these firms attract investors and secure debt at a lower cost, which may benefit their dividend policy (El Ghoul et al., 2011). Therefore, these firms are inclined to disclose CSR activities more than others to convey

unobservable firm characteristics (e.g., efforts to reduce opportunism), ultimately helping to lower their cost of capital and, consequently, maintain sufficient liquidity to pay dividends.

However, evidence supporting the relationship between environmental, social, governance, and non-financial disclosure scores and dividend payout practices remains scarce (Verga Matos et al., 2020), and contradictory results may still arise. Based on these arguments, it is predicted that environmental, social, and governance scores will significantly impact dividend payments. Previous empirical research has shown that higher audit quality benefits market participants by ensuring that financial statements accurately reflect a firm's activities (DeFond & Zhang, 2014). Auditors, due to their credibility and professional risks, address client characteristics and potential agency issues in their audit reports (Ali & Lesage, 2013; Griffin et al., 2010). They also advise companies on appropriate disclosure of financial and non-financial information, valuation, and risk assessment. Their influence on a company's financial performance and governance practices affects profit figures, dividend distribution, and resource allocation for sustainability practices.

Lee and Lee (2013) also argue that higher audit quality enhances the value of financial statements, particularly in portraying business success and providing investors with more accurate assessments of business value. Top auditors are typically more effective in preventing earnings manipulation and delivering high-quality audits (Becker et al., 1998). According to agency theory, auditing is a crucial monitoring strategy to reduce information asymmetry, prevent exploitative activities, and enhance the performance and transparency of environmental, social, and governance practices (Jensen & Meckling, 1976). The audit theory literature emphasizes the importance of audit quality for external auditors' success (Knechel et al., 2013). One parameter used in prior research to evaluate auditor quality is the size of the audit firm. DeAngelo (1981) suggests that audit firm quality increases with size or reputation. Larger and more well-known audit firms safeguard their reputations by providing clients with superior yet targeted audits (Bacha et al., 2020). Larger audit firms (such as A-rated firms in Iran or the Big Four audit firms) conduct higher-quality audits due to their extensive experience (Choi et al., 2010) and increased audit efforts (Tahriri and Afsai, 2021; Francis & Yu, 2009). The owners of the top audit firms consistently demonstrate exceptional transparency and sustainability responsibility (Agyei-Mensah, 2019).

Large audit firms provide superior audit quality (Francis, 2011) because they have more resources to utilize during audits, invest significantly in human capital and technology, and enhance the reliability of provided information, including non-financial data. Auditors from major auditing firms, due to their expertise and precision, bolster environmental, social, and governance practices, particularly in governance and environmental initiatives, aligning with international sustainability regulations and efforts. Concurrently, they mitigate earnings manipulation, overestimation of dividends, and underscore confidence in the company's operations. Consequently, audit quality, determined by auditors' type and attributes, becomes a crucial moderating factor in understanding profit-sharing policies and practices. Audit quality plays a vital role in enhancing the credibility of financial statements and financial information, reducing financing costs, and curbing managerial opportunistic behavior (Huguet & Gandía, 2016). Large audit firms are linked to high-quality audit performance (Hammami & Zadeh, 2020), leading to reduced information asymmetry and increased transparency.

Farooque et al. (2021) and Mitton (2004) demonstrate that large audit firms positively and significantly impact dividend policy. In contrast, Deshmukh et al. (2003) argue that higher information asymmetry resulting from poor auditing leads to diminished dividend payouts to shareholders. The success of environmental, social, and governance practices and transparency in corporate activities is associated with higher audit quality, enhancing the

legitimacy and credibility of the company (Hammami & Zadeh, 2020).

External financial audits encompass a thorough risk assessment of all aspects of the business that could influence the accuracy of financial information, including financing, environmental, social, and governance practices, corporate credit risk, resource allocation, and profitability. Financial auditors are implicitly trained in environmental, social, and governance practices and strategies to deter corporate misconduct, aid companies in enhancing performance, and mitigate credit risk (Asante-Appiah & Lambert, 2022). The supervisory and corrective role of dual-quality auditing can enhance the company's financial outcomes, including profit-sharing policies and environmental, social, and governance ratings, while preventing manipulation and financial misconduct that could adversely impact reported profitability and other financial metrics.

Considering the correlation between financial and non-financial audits, environmental, social, and governance ratings reporting, and dividend payments, audit quality serves as a moderating factor that influences the relationship between environmental, social, and governance ratings and dividends. It also elevates the quality of environmental, social, and governance measures concerning financial reporting and trust in the company's financial decisions, emphasizing the financial ramifications of environmental, social, and governance ratings. Therefore, it is anticipated that audit quality moderates the link between environmental, social, and governance ratings and dividend distributions.

Non-financial reporting assurance, especially when provided by large audit firms, can impact the relationship between environmental, social, and governance practices and profit-sharing decisions, contingent on the extent to which they offer detailed information on environmental, social, and governance ratings. However, since this assurance is a nascent aspect of audits that is still evolving and optional in many countries, its influence may not be as pronounced as that of financial audits on corporate practices and investment decisions.

In addition to serving as an indicator of the company's accountability to stakeholders, ensuring the disclosure of environmental, social, and governance ratings showcases the company's dedication to these practices and enhances the reporting of environmental, social, and governance activities. This aids in comprehending and evaluating the benefits of environmental, social, and governance practices. Del Giudice and Rigamonti (2020) discovered a significant disparity between audited and unaudited environmental, social, and governance practices information, which is notably more substantial in companies utilizing an external auditor to report environmental, social, and governance ratings, reducing information asymmetry between companies and market participants.

Asante-Appiah & Lambert (2022) also elucidate the expertise and professional authority of financial auditors in providing sustainability assurance services. However, their findings from a sample of American companies suggest that the positive relationship between ensuring environmental, social, and governance ratings and a company's financial outcomes can vary based on the predominant component of these practices. Martínez-Ferrero and García-Sa´nchez (2017) and Bacha et al. (2020) highlight the association between audit quality, corporate sustainability performance, reduced debt costs, and increased credibility of sustainability information, which is often insufficient or unreliable without corroborating evidence. They emphasize that auditors from major auditing firms are preferred for sustainability assurance services due to their credibility and expertise. Bacha et al. (2020) demonstrated that heightened audit quality, attributed to top audit firms, instills greater confidence in banks, prompting them to rely on financial and non-financial information when making credit decisions, leading to lower debt costs for socially responsible companies.

Thus, through the cost of debt channel, a reduction in debt costs can facilitate dividend payments (Cheung

et al., 2018), along with diminished information asymmetry due to reliable disclosure of environmental, social, and governance practices, as posited by agency and signaling theories.

2.1. Research hypotheses

According to the theoretical foundations presented in the theoretical framework and research background, the research hypotheses are as follows:

Hypothesis 1. The relationship between environmental, social, and governance scores and dividend payment ratio and dividend growth.

Hypothesis 2. Audit quality moderates the relationship between environmental, social, and governance scores and dividend payment ratio and dividend growth.

Hypothesis 3. Audit quality of non-financial disclosure moderates the relationship between environmental, social, and governance scores and dividend payment ratio and dividend growth.

3. Methodology

3.1. Statistical population and samples

This correlational research involved collecting and analyzing quantitative data longitudinally and retrospectively. The statistical population consisted of all firms listed on the Tehran Stock Exchange from 2014 to 2022, whose shares are publicly traded. To gather and analyze the necessary data, we utilized the information provided by capital market publishers and Rahavard Novin software. A systematic sampling method was employed to select the samples, resulting in 152 firms being chosen as the statistical sample.

1) All data required for the research should be available for the firms under survey;
2) The financial year of the firms should end on March;
3) The financial year should not change in the time frame of the research;
4) It should not belong to investment companies, financial intermediaries, banks, and leasing firms.

3.2. Research Model and Variables

Model of the first research hypothesis

$$Div\_Payout)Div\_Growth(=\alpha+\beta1ESGit +\beta2BSizeit + \beta3BIndeit +\beta4CEODit + \beta5FLit+\beta6Size(TA)it + \beta7SGit + \beta8ROAit + \beta9REit +\beta10FCFit +\beta11iTaxit +\varepsilon it$$

Model (1)

Model of the second research hypothesis

$$Div\_Payout)\ Div\_Growth(\ =\alpha+\ \beta1ESGit +\beta2Big4it +\beta3Big4\times ESGit + \beta4BSizeit + \beta5BIndeit + \beta6CEODit + \beta7Flit +\beta8Size(TA)it +\beta9SGit + \beta10ROAit + \beta11REit +\beta12FCFit + \beta13iTaxit +\varepsilon it$$

Model (2)

Model of the third research hypothesis

$$Div\_Payout)\ \ Div\_Growth(\ \ =\alpha+\ \ \beta1ESG_{it} +\beta2Big4CSR_{it} + \beta3Big4CSR_{it} \times ESGit + \beta4BSize_{it} + \beta5BInde_{it} + \beta6CEOD_{it} + \beta7Fl_{it} +\beta8Size(TA)_{it} +\beta9SG_{it} + \beta10ROA_{it} + \beta11RE_{it} +\beta12FCF_{it} + \beta13iTax_{it} +\varepsilon_{it}$$

Model (3)

Table 1 - Definitions of Variables (Vander Bauwhede & Van Cauwenberge, 2022؛ Zahid et al ،2022a, Ould Daoud Ellili ، 2020؛ Sheikh et al ،2021؛ Yilmaz et al ،2022).

Meaning	*Category*	*Name*	*Symbol*
ratio of dividends paid to total assets	Dependent	dividend	Div_Payout
percentage growth in the difference between the current year's and last year's dividends over last year's dividend	Dependent	dividend	Div_Growth
It is measured based on the environmental, social, and governance points determined in the annual reports of Tehran Stock Exchange companies on the Kodal website. The score is a combination of corporate disclosure based on corporate, social, and environmental governance. These scores are determined based on numerous financial and non-financial indicators collected from companies' disclosures in annual reports. The ESG index, whose name is made from the combination of the first three letters of the words' environment (Environment), social concerns (Social), and corporate governance (Governance), measures aspects of the activities of companies and businesses.	Independent	Environmental, social, and corporate governance disclosure	ESG
The Securities and Exchange Organization classified the trusted institutions of the exchange into four classes: "first", "second", "third" and "fourth". According to this rating, the institutions of the "first" group should probably have a higher audit quality than the certified auditors of other groups. Therefore, the audit of large owners has been assigned to the trusted audit institutions of the "first" group. It can be said that in the absence of any criteria for the quality of auditors in Iran, the Securities and Exchange Organization has proposed a rating as a criterion for distinguishing the quality of auditors in the country. Big4 is the quality rating variable of audit institutions, which is measured as a dummy variable that is measured as 1 if the audit institutions have a quality rating of A and 0 otherwise.	Moderator	Quality rating of audit institutions	Big4
The variable of the sustainability responsibility audit of the company by an independent auditor, a member of the audit institutes with a quality rating A, in companies that provide a sustainability assurance report for their non-financial information by an independent auditor, a member of the audit institutes with a quality rating A, takes the value of 1, and 0 otherwise	Moderator	The audit of the company's sustainability responsibility by an independent auditor, a member of audit institutes with a quality rating of A	Big4CSR
control		refers to the total number of directors in the corporate boards	BSize
Control		the number of independent directors in corporate boards	BInde
Control		Financial Leverage	FL
Control		depicts the dual role of the CEO as a director of the board	CEOD
Control		company size	Size(TA)
Control		sales growth	SG
Control		the return on assets	ROA
Control		the natural logarithm of retained earnings	RE
Control		the natural logarithm-free cash flows available	FCF
Control		the effective income tax rate	ITax

4. Research Findings

4.1. Descriptive statist

Table 2 presents descriptive statistics for the primary variables used in the analyses. These indicators mainly include information about central indicators such as mean and median, as well as information about dispersion indicators such as standard deviation. The most important central indicator is the average, which is a good indicator to show the centrality of data. For example, the ESG Index has an average value of 1.44, indicating that most data is focused around this point. In general, the dispersion parameters are the criteria for determining the dispersion of each variable or their dispersion relative to the mean. One of the most important dispersion parameters is the standard deviation. The value of this parameter for the financial leverage (FL) variable is 0.29.

Table 2. Descriptive statistics of the observed research variables

Sd	Min	Max	Middle	Mean	variables
0.113518	0.000003	0.415728	0.020215	0.059336	Div_Payout
0.787634	-0.76188	0.496405	0.227059	0.242762	*DivGrowth*
0.299674	0.722222	2.166667	1.444444	1.445041	*ESG*
0.163971	0	1	1	0.972393	*Big4*
0.262803	3	6	5	4.992331	*BSize*
0.171634	0.2	1	0.6	0.660251	*BInde*
0.128888	0	1	0	0.016871	*CEOD*
0.294402	0.031295	0.618298	0.498538	0.514443	*FL*
0.669201	4.953914	9.145192	6.674136	6.741931	*Size*
0.900044	2.925828	8.699528	5.899295	5.882162	*RE*
10.17701	-1	2.515417	0.479699	0.480624	*SG*
0.223115	-0.00147	0.495477	0.224649	0.249711	*ROA*
0.840195	2.792392	8.668921	5.673711	5.685226	*FCF*
5.184226	-0.79391	0.48071	0.130253	0.148342	*TAX*
0.32657	0	1	1	0.878834	*Big4CSR*

4.2. The results of the first research hypothesis:

Table 3 shows less than 5%, so we conclude that the model is generally statistically acceptable, and the high value of the Fisher statistic indicates that there is a strong relationship between variables in this model. As the coefficient of determination and the adjusted coefficient of determination indicate, it confirms the high power of the model explanation. Based on the value provided by the Watson-Durbin statistic, which can be confirmed by the lack of correlation in the model, there is no need to review this statistic due to the short period. Now, considering the significant confirmation of the whole fitted model, the meaningful analysis of each of the explanatory variables is discussed. As shown in the table below, for each coefficient variable, the t statistic, and finally, the value of p, each of the variables in the model is referenced to the p column or the same level of significance. Now, concerning the value of p, if the arbitrary error α is compared with the values of p, one can consider the meaning of each of the variables. Also, considering that the value of the variance inflation factor (VIF) for all research variables is less than five, there is no problem with collinearity in the model. The first hypothesis model shows the effect of environmental, social, and governance scores on dividend payments and dividend growth. The results

show that the environmental, social, and governance score and its components have a significant positive effect on the dividend payout ratio and prove that participation in environmental, social, and governance practices does not cancel the interests of shareholders, but rather limits agency conflicts. It reduces information asymmetry and sends positive signals to financial markets. This finding supports and complements the studies of Verga Matos et al. (2020) and Salah & Amar (2022). This study, on the other hand, emphasizes and investigates the ability to pay dividends from the internal aspect of the company and measures the dividend payout ratio by the amount of dividends paid divided by total assets, thus showing how much of the shareholders' interest is related to the size of the company. Despite increasing dividends as part of the potential profitability created by environmental, social, and governance practices, environmental, social, and governance scores have a negative effect on dividend growth, which reflects the small changes in dividend amounts over time and the fact that the cost of environmental, social, and governance activities becomes a cost for shareholders and reduces the growth rate of dividends. Thus, they may prefer dividend distributions due to investment efficiency, but environmental, social, and governance practices change the variation in dividend amounts over time. This is a new finding because dividend growth has not been studied in terms of its relationship with environmental, social, and governance scores. As Ni & Zhang (2019) stated in the context of China, considering the dividend payment criteria in the form of dividends divided by assets or dividends divided by sales of a period, this new finding shows a negative relationship between environmental, social, and governance, and It shows dividend distribution. The main reasons for the negative relationship between the environmental, social, and governance score and dividend growth can be a decrease in profitability, debt costs and payments resulting from environmental, social, and governance investment, higher current costs of maintaining environmental, social, and governance measures, or agency problems. Apart from the warnings that this result raises for shareholders and management, more research questions are raised about the long-term environmental, social, and governance implications for companies' financial results. Therefore, it is possible that if there are significant changes in the views of profit sharing, the legislators are concerned about the possible reduction of investors' incentives to support environmental, social, and governance projects. Like Yarram (2015), in a study on Australian companies, it can be concluded that corporate governance practices reflected by environmental, social, and governance components have a significant positive effect on the decision to pay dividends. This suggests that in an environment characterized by high levels of investor protection and well-developed stock markets, governance mechanisms work well to contribute to business sustainability and protect shareholder interests through a generous dividend policy.Guizani (2018) also found out. However, among the specific governance characteristics that are controlled in the model, such as board size, board independence, and CEO duality, it seems that only board size significantly affects the dividend payout ratio. Hence, apart from all other factors, a large board size leads to higher profit allocation.

Table 3: Estimation of the coefficients of the model.1

$Div=\alpha+\beta1ESGit+\beta2BSizeit+\beta3BIndeit+\beta4CEODit+\beta5FLit+\beta6Size(TA)it+\beta7SGit+\beta8ROAit+\beta9REit+\beta10FCFit+\beta11iTaxit+\varepsilon it$								
Div_Growth				***Div_Payout***				**Variables**
VIF	**Probability**	**t-statics**	**Coefficient**	***VIF***	**Probability**	**t-statics**	**Coefficient**	
1.028395	0.0424	2.032085-	0.00001-	1.022294	0.0493	1.968269	0.018221	*ESG*
1.017877	0.7387	0.333668	0.003062	1.019374	0.0491	1.970175	0.017494	*BSize*
1.464873	0.5622	0.579710	0.028149	1.110465	0.3186	0.997804-	0.191574-	*BInde*
1.032614	0.8577	0.179319-	0.000445-	1.181204	0.7756	0.285085-	0.000226-	*CEOD*

$Div=\alpha+\beta1ESGit+\beta2BSizeit+\beta3BIndeit+\beta4CEODit+\beta5FLit+\beta6Size(TA)it+\beta7SGit+\beta8ROAit+\beta9REit+\beta10FCFit+\beta11iTaxit+\varepsilon it$								
Div_Growth				*Div_Payout*				**Variables**
VIF	**Probability**	**t-statics**	**Coefficient**	***VIF***	**Probability**	**t-statics**	**Coefficient**	
1.078883	0.1271	1.527082-	0.071350-	1.025285	0.0903	1.695436-	0.015519-	*SIZE*
1.086373	0.0026	3.020043	0.228389	1.149605	0.6291	0.483131-	0.005673-	*FL*
1.018751	0.4743	0.715855	0.006412	1.023217	0.1859	1.323907-	0.011812-	*SG*
2.268569	0.0000	13.66604	0.054824	1.131136	0.0209	2.314435	0.144995	*ROA*
1.403321	0.0466	1.992499	0.104649	1.025110	0.9116	0.111090	0.000981	*RE*
-1.056224	0.0000	13.75640-	75.38245-	1.210504	0.3137	1.007927	0.021444	*FCF*
1.019961	0.0000	42.19668	0.806232	1.025168	0.8139	0.235477	0.00002	*ITax*
-	0.0000	13.49365	75.74855	-	0.0000	13.75640	75.38245	*C*
0.740981				0.741045				R-squared
0.736917				0.737513				Adjusted R-squared
206.9155				238.0991				F-statistic
0				0				F-probability level
2.170381				2.206488				Durbin-Watson

4.3. The results of the second hypothesis

As shown in Table 4, the quality of financial audits significantly moderates the relationship between environmental, social, and governance indicators and profit-sharing values. The comparison of models 1 and 2 shows that the influence of environmental, social, and governance factors on dividend payments is affected by the inclusion of the variable of an A-rank auditor in the equation. The audit of financial statements by A-rank auditors has a negative effect on the impact of environmental, social, and governance activities on the company's dividends. Therefore, environmental, social, and governance factors, along with an increase in audit quality, reduce dividend payment and growth during the analyzed period. In other words, when companies are audited by audit institutions with a quality rating of A and have high environmental, social, and governance scores, they tend to pay less in dividends. Due to their supervisory role, financial auditors influence the company's resource allocation decisions through their signal to shareholders (Hammami & Zadeh, 2020), which affects the relationship between environmental, social, governance, and dividend factors. Additionally, audit quality is generally associated with higher earnings quality (Asante-Appiah and Lambert, 2022), prudence in financial estimates, and a lower risk of misstatement, resulting in safer profit-sharing decisions in the context of increased environmental, social, and governance activities. This benefits shareholders.

Table 4: Estimation of the coefficients of the model.2

$Div=\alpha+\beta1ESG_{it}+\beta2Big4_{it}+\beta3Big4\times ESG_{it}+\beta4BSize_{it}+\beta5BInde_{it}+\beta6CEOD_{it}+\beta7Fl_{it}+\beta8Size(TA)_{it}+\beta9SG_{it}+\beta10ROA_{it}+\beta11RE_{it}+\beta12FCF_{it}+\beta13iTax_{it}+\varepsilon_{it}$								
Div_Growth				*Div_Payout*				**Variables**
VIF	**Probability**	**t-statics**	**Coefficient**	***VIF***	**Probability**	**t-statics**	**Coefficient**	
2.039862	0.0490	1.968746-	0.031250-	1.052058	0.0358	2.102619	0.050313	*ESG*
1.240685	0.4295	0.790424	0.00001	1.240685	0.4295	0.790424	0.00001	*Big4*
1.015112	0.0524	1.941886-	0.044640-	3.115765	0.0035	2.925649-	0.004757-	*Big4*ESG*

$Div = \alpha + \beta 1ESG_{it} + \beta 2Big4_{it} + \beta 3Big4 \times ESG_{it} + \beta 4BSize_{it} + \beta 5BInde_{it} + \beta 6CEOD_{it} + \beta 7Fl_{it} + \beta 8Size(TA)_{it} + \beta 9SG_{it} + \beta 10ROA_{it} + \beta 11RE_{it} + \beta 12FCF_{it} + \beta 13iTax_{it} + \varepsilon_{it}$								
Div_Growth				***Div_Payout***				**Variables**
VIF	**Probability**	**t-statics**	**Coefficient**	***VIF***	**Probability**	**t-statics**	**Coefficient**	
1.016508	0.5700	0.568320-	0.013232-	3.162338	0.0484	1.976249-	0.000126-	*BSize*
1.589586	0.5650	0.575614	0.066420	1.023647	0.7811	0.277902-	0.006307-	*BInde*
1.072356	0.4183	0.809722	0.003174	.806691	0.0406	2.050206	0.088698	*CEOD*
1.065951	0.0703	1.811863-	0.202537-	1.146182	0.0159	2.414543	0.004263	*SIZE*
1.109467	0.4030	0.836567-	0.162057-	1.024256	0.4336	0.783360-	0.018242-	*FL*
1.016691	0.0619	1.869191-	0.042617-	1.204068	0.3405	0.953744-	0.028610-	*SG*
1.696604	0.0094	2.604225-	0.021155-	1.027797	0.1097	1.601259	0.036472	*ROA*
1.526682	0.1642	1.392239-	0.161879-	1.161914	0.0637	1.856699-	0.280355-	*RE*
1.680245	0.0096	2.596090-	0.020954-	1.032941	0.1093	1.603065	0.036324	*FCF*
1.532695	0.1586	1.410730-	0.164595-	1.277477	0.6078	0.513449	0.027130	*ITax*
-	0.0090	2.618851	29.10980	-	0.0083	2.643806	29.56996	*C*
0.350992				0.361261				R-squared
0.336795				0.345193				Adjusted R-squared
24.72285				22.48204				F-statistic
0				0				F-probability level
2.010738				2.001338				Durbin-Watson

4.4. The results of the third hypothesis

As indicated in Table 5, the results of the estimations for the third hypothesis model in this research show that the correlation between environmental, social, and governance scores and profit-sharing values is not influenced by the assurance of non-financial disclosures. The assurance of non-financial environmental, social, and governance information, regardless of the auditor's type or presence, does not significantly impact the company's dividend policies. This demonstrates trust and confidence in environmental, social, and governance practices and is unrelated to the auditor's involvement in the process. This finding aligns with the research findings of Thompson et al. (2022).

Stock investors seek investment opportunities when positive environmental, social, and governance factors suggest future growth. Ni and Zhang (2019) suggest that the majority of investors may be driven by financial rather than ethical reasons when using environmental, social, and governance data. An alternative perspective can further elucidate these new findings regarding the role of audit quality in dividends and information quality as signaling mechanisms. Dividends serve as a resolution to agency conflicts, and environmental, social, and governance practices, particularly those supported by financial audits, help reduce information asymmetry, better safeguard shareholders, and meet corporate expectations. By demonstrating commitment and disclosing private information, they mitigate interest through costly payments (Ni and Zhang, 2019).

Managers, shareholders, and policymakers may question whether these factors compromise the quality of a company's environmental, social, governance, or audit practices. Given the significant role of audit quality in lending, ensuring environmental, social, and governance practices, and activities in general, it is reasonable to assume that investors accept the potential negative impact on dividends in the form of additional costs.

Table 5: Estimation of the coefficients of the model.3

$Div = \alpha + \beta 1ESGit + \beta 2Big4CSRit + \beta 3Big4CSRit \times ESGit + \beta 4BSizeit + \beta 5BIndeit + \beta 6CEODit + \beta 7Flit + \beta 8Size(TA)it + \beta 9SGit + \beta 10ROAit + \beta 11REit + \beta 12FCFit + \beta 13iTaxit + \varepsilon it$								
Div_Growth				***Div_Payout***				**Variables**
VIF	**Probability**	**t-statics**	**Coefficient**	***VIF***	**Probability**	**t-statics**	**Coefficient**	
1.021421	0.0219	2.438628-	0.609577-	1.294206	0.0000	7.151468	0.656482	*ESG*
2.242625	0.1612	1.442000	0.00001	1.819681	0.8665	0.168206	0.0009	*Big4CSR*
1.552434	0.7614	0.306898	0.042578	1.814718	0.9199	0.100586-	0.000006-	*Big4CSR × ESG*
2.037958	0.3554	0.940913	0.00002	1.187085	0.0000	5.810127-	0.853894-	*BSize*
2.698995	0.4788	0.718586-	0.108771-	1.317317	0.6047	0.518311-	0.0002-	*BInde*
1.005894	0.5846	0.546866-	0.042171-	1.323816	0.0000	5.779690	0.280950	*CEOD*
1.525094	0.7023	0.382375	0.087757	1.486029	0.9314	0.086120-	0.00001-	*SIZE*
1.006546	0.6294	0.482798	0.225040	1.332387	0.3632	0.910768	0.048123	*FL*
1.259754	0.4312	0.787458-	0.113984-	1.266300	0.0461	2.039190-	0.515152-	*SG*
1.047964	0.2438	1.166480-	0.000544-	2.964930	0.0006	3.657869	0.00002	*ROA*
1.631119	0.0732	1.793702	0.394429	1.251741	0.1172	1.590612	1.011827	*RE*
1.131850	0.0106	2.560283	0.215839	1.200394	0.4676	0.731369	0.00001	*FCF*
1.167990	0.2195	1.228736-	0.184528-	2.657229	0.3199	1.003358-	0.204744-	*ITax*
-	0.0005	3.489630	2.033682	-	0.0011	3.304965	1.220823	*C*
0.373098				0.381563				R-squared
0.359385				0.365469				Adjusted R-squared
27.20669				23.70961				F-statistic
0				0				F-probability level
1.921864				2.018428				Durbin-Watson

5. Discussion and Conclusions

The lack of empirical evidence regarding the influence of environmental, social, and governance factors on dividend payment decisions, dividend growth, and the moderating role of audit quality in relation to these factors in Iran has motivated this research. Existing literature on this subject is limited, highlighting the necessity of expanding research to a broader context. This study provides theoretical and empirical support for a positive correlation between environmental, social, and governance scores, dividend payout ratio, and dividend growth. Furthermore, the findings suggest that the association between these factors and dividend policy is significantly and negatively impacted by the audit quality of institutions rated as A. These results indicate that environmental, social, and governance reporting, along with profit-sharing policies, serve as alternatives to mitigate information asymmetry and address agency issues.

Despite the positive link between environmental, social, and governance scores and dividend payments, a novel discovery of this study is the negative relationship between these scores and profit growth. An implication of this research is that companies can enhance stakeholder relationships by increasing their environmental, social, and governance initiatives and dividend payouts, thereby reducing information asymmetry. Consequently, shareholders value companies that exhibit various financial and non-financial attributes, such as environmental, social, governance practices, and profit-sharing in dividend distributions, which enhances trust among investors and society. These factors also influence investment and financing decisions.

This study suggests that shareholders seeking a larger share of dividend distributions should consider a company's investment strategy. Companies with higher environmental, social, and governance scores tend to engage in responsible investment practices, which may lead to higher dividend payments. Additionally, the study underscores the importance of audit quality in the relationship between environmental, social, and governance scores and dividend distributions. Therefore, policymakers should encourage companies to enhance audit quality, despite potential short-term tensions that audits may introduce in dividend payment decisions.

Description

This article is the output of a research design.

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Investigating the Relationship between Audit Quality and Commercial Credit by Considering the Role of Owner's Internal Controls

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Abstract

Objectives: The present study aimed to investigate the relationship between audit quality and business credibility while considering the role of internal control by the employer.

Design/methodology/approach: To achieve the research objectives, a sample of 140 firms listed on the stock exchange was selected using a systematic exclusion pattern, and data was collected over 8 years from 2015 to 2022. A linear multivariate regression model was used to test the research hypotheses.

Results: The results of testing the research hypotheses indicated that the quality of audits enhances the business reputation of firms. Additionally, the quality of internal controls can impact the relationship between audit quality and commercial credit.

Innovation: This research provides evidence that improving the quality of auditing can increase access to business credit, and that internal controls play a significant role in this process.

Keywords: Business Credit, Audit Quality, internal Controls.

1. Introduction

Commercial credit is an important source of financing for firms (Lou, 2022). Financial managers are responsible for deciding how much commercial credit to use in various economic situations. Commercial credit, as a source of financing (as opposed to bank financing or equity issuance), is the most widely used in the market but has been largely neglected to date, despite being one of the most important sources of financing for small and medium-sized enterprises, as well as large commercial enterprises (Asif and Nisar, 2022). Previous literature shows that commercial credit accounts for almost a quarter of a firm's total assets and about half of its short-term liabilities in two different examples of medium-sized British and small-sized American firms. It can be used to convey information to banks to reduce information asymmetry and during corporate validation (Silaghi, Moraux, 2019). Additionally, commercial credit is the most crucial source of short-term financing, playing an essential role in the business activities of every firm and indicating the level of trust suppliers and creditors have in the firms (Ablations et al., 2021). Firms with high commercial credit receive goods and services from suppliers without immediate payment. Banks and other creditors also provide facilities by assessing the firm's commercial credit (Izedinia and Taheri, 2016). Previous research, such as that by Petersen and Rajan (1997), has shown that corporate managers choose commercial credit based on the firm's characteristics and capabilities. However, various factors can affect the level of commercial credit a firm receives, and the perceived level often differs from the optimal level. In these situations, firms may not fully utilize their capabilities. Managers strive to achieve the target commercial validity more quickly (Lou, 2022).

Previous studies indicate that the structure of financial statements can impact the acquisition, evaluation, and measurement of their informational content. Poor-quality financial statements make it challenging for investors to extract the necessary information (Dadashi & Nowrouzi, 2020). Investors tend to favor firms with clear, legible, and accurate financial statements (Seifzadeh et al., 2021). If financial statements are of poor quality, investors may struggle to evaluate them, relying on other information instead. This may decrease their sensitivity to the firm's accounting information, potentially affecting their decision-making process (Bagheri Azghandi et al., 2018). Therefore, investors may rely more on non-accounting information in such circumstances, with the effect of other environmental information on their judgment being significant (Lou, 2022). In a study titled "The Effect of Readability of Financial Reports on Commercial Credit Considering the Role of Managers' Ability," Mahdavi et al. (2022) found that report readability is crucial for effective communication with users of firm information. Firms with higher-quality financial reports tend to receive more commercial credit from suppliers, as they provide valuable information about the firm's financial performance.

Internal control is a dynamic system that addresses various risks and deviations from policies and procedures. By establishing a representative relationship, conflicts of interest can arise between managers, shareholders, and other stakeholders, potentially leading to actions that benefit managers rather than shareholders and stakeholders. Strong internal control within a firm can help mitigate management opportunistic behaviors, conflicts of interest, and moral risks, thereby earning investors' trust in the firm. Internal control is a vital aspect of an organization's governance system, essential for achieving organizational goals and enhancing stakeholder value (Abedini et al., 2019). Given the above, the question arises: Does the quality of internal controls impact the relationship between audit quality and corporate credibility? The structure of the research will first expand on the theoretical foundations, hypotheses, and empirical bases, followed by the methodology and operational definitions of the research variables, and finally, the findings and conclusions will be presented.

Theoretical, empirical, and hypotheses

Business credit is an essential source of financing for firms of all sizes globally. Firms require financial resources to take advantage of investment opportunities, so it is crucial to determine financial resources and their utilization in a way that allows the firm to progress towards development and profitability (Kamyabi & Gorjian, 2016). Commercial credit involves an agreement between buyers and sellers, where sellers allow buyers to defer payment for goods and services purchased. This deferred payment period is set by the sellers (Aflatooni & Nowrouzi, 2020). The benefit of commercial credit is that customers can acquire goods without immediate cash payment, instead recording a debit or payable account on their balance sheet for future payment. This makes accounts receivable act as a substitute for cash, making commercial credit a short-term investment tool (Silaghi & Moraux, 2019).

Firms with high business credit levels can obtain goods and services without upfront cash payments. Creditors assess a firm's business credit to determine the level of risk involved. If a firm's ability to repay debt is low, creditors may demand higher interest rates. Therefore, firms strive to improve their business credit ratings continuously (Ma et al., 2022). Creditors are also concerned about potential financial crises faced by debtors, as credit decisions impact a firm's future financial flexibility (Moradi & Karami, 2019). Discussion of a firm's credit status is crucial not only for the firms themselves but also for stakeholders such as creditors and investors. Suppliers consider the long-term financial stability of customers when establishing relationships, as many firms rely on commercial credit for financing both purchases and supplies (Aflatooni & Nemati, 2018). Studies have explored the demand and supply of commercial credit, emphasizing the importance of customers' long-term financial health for suppliers (Abuhammous, 2021).

Lou (2022) suggests that firms set business credit receivable and payable targets and actively work towards achieving them. Financial reports are vital information for decision-makers in the capital market, including shareholders, analysts, and financial creditors. Therefore, these reports should be easily comprehensible (Salehi et al., 2020; Mahdavi et al., 2022). Information asymmetry in business credit decisions has been identified as a significant factor, with the quality of financial reports and disclosures influencing business credit levels (Pike et al., 2005; Chen et al., 2017; Aflatooni & Nemati, 2018). Enhancing the overall quality of disclosure and reducing information asymmetry through high-quality financial reports directly impacts commercial credibility (Mahdavi et al., 2022).

The quality of financial statements is influenced by the quality of a firm's audit. Given the increasing investment in stock markets and the importance of firm information, audit firms play a crucial role in ensuring the reliability of financial statements and preventing fraud (Doolabi, 2019). With globalization and the demand for transparency, the quality of financial reporting has become a key aspect of corporate strategy, aiding informed decision-making by investors and optimal resource allocation (Chen et al., 2012). Auditors play a critical role in reducing errors in financial statements, ensuring the reliability of corporate information for creditors and investors. Therefore, the first hypothesis of this research is as follows:

Hypothesis 1: There is a significant relationship between audit quality and the credibility of a business.

In order to achieve short-term and long-term goals, fulfill missions and visions, maintain financial stability and profitability, deal with unexpected events, and respond to demands from investors, governments, and other stakeholders, a firm must have a reliable internal control system that is free from weaknesses and is effective. Internal control is not a specific situation, but a series of sequential and pervasive measures that permeate and extend to all activities of the organization. These actions occur continuously within the organization's operations and exist

comprehensively and inseparably in alignment with the organization's management (Taherinia et al., 2022).

Managers of organizations and institutions place great importance on internal controls because they understand that weaknesses in internal controls can prevent the firm from achieving its main goals and deviate it from its intended path. An effective internal control system, without weaknesses, will increase trust in financial figures and information in financial statements, enabling effective decision-making and ultimately contributing to the achievement of the firm's goals. Following the 2008 scandal and the enactment of the Sarbanes-Oxley Act, internal controls have garnered significant attention. It is crucial for auditors to meticulously identify and address all weaknesses in internal controls, which may be specific to certain units or more general and prevalent across all units.

The proper design and implementation of an effective internal control system in economic units is paramount for its success. An effective internal control system promotes financial accountability and transparency, ensures compliance with laws and regulations, and helps prevent fraud and financial abuse. Internal control is a vital component of organizational management, encompassing the programs, methods, and procedures utilized to achieve the organization's mission and overarching goals. Failure to adhere to these regulations will be recognized as weaknesses in internal control, hindering firms from reaching their objectives.

The primary objective of an organization's internal control system is to provide reasonable assurance to executive management that the specified goals for operations and programs are attainable (Hajiha et al., 2017). Wang et al. (2023) conducted a study on supply chain transparency, suppliers, and business credit, suggesting that while previous studies have explored the financial benefits of enhancing supply chain disclosure transparency, many firms are still concealing information in this regard. Their research findings indicate that firms with lower supply chain transparency tend to receive more commercial credit. Lou (2022) examined the impact of COVID-19 on the adjustment of commercial credit rates, revealing that COVID-19 significantly accelerated the convergence of U.S. firms towards target business credit rates, particularly for firms facing higher operational risks.

Koo and Chung (2022) investigated the influence of managerial ability on business credit and found that firms with higher managerial ability were linked to increased business credit receivables. The impact of managerial ability on accounts payable was more pronounced for firms with lower credit quality or greater financial constraints. Dao et al. (2022) conducted a study titled "Effective Internal Controls and Business Credibility," presenting evidence that firms with stronger internal controls demonstrate greater effectiveness and expedite their business credit agreements. They also noted that firms with ineffective internal controls tend to have a higher demand for commercial credit. Therefore, the second hypothesis of the research is as follows:

Hypothesis 2: Internal controls affect the relationship between audit quality and business credibility.

Research Methodology

The present research is applied, and from a methodological perspective, correlation is considered causal (post-event). The statistical population studied in this research includes all the firms listed on the Tehran Stock Exchange, with the period under study being 2015–2022. Firms listed on the Tehran Stock Exchange that meet the following criteria have been selected as a sample: end of financial year of firms, which is the end of March. Throughout the 8-year period, the financial period for the review has remained consistent. Information regarding the variables selected for this study is available. The selected firms are not banks, insurance firms, or investment firms. Ultimately, 140 firms were chosen as the final sample for the research. Data analysis was conducted using a mixed data method and panel data approach, utilizing Eviews 12 software and the standard error tool for testing hypotheses.

Regression model

$$TC_{it} = \beta_0 + \beta_1 AS_{it} + \beta_2\, SOX_{it} + \beta_3 AS \times SOX_{it} + \beta_4 ROA_{it} + \beta_5 Growth_{it} + \beta_6\, LEV_{it} + \beta_7\, Age_{it} + \beta_8\, Cash_{it} + \beta_9\, SIZE_{it} + \varepsilon_{it}$$

Operational Definitions of Research Variables

Research Dependent Variable: Business Credit (TC)

Commercial credit is calculated as the ratio of accounts payable (AP) to the cost of goods sold (COGS). Since COGS represents the average cost of purchases, this measure indicates the proportion of total purchases financed by commercial credit (Zhang, 2019). This metric has been widely used in previous literature (Garcia Appendini and Montrebro-Garriga) (Aflatooni, 2021).

Independent Variable: Quality of Audit (AS)

According to previous researchers such as Young et al. (2016), Dulabi (2019), and Osmani and Hosseini (2016), this variable is a binary artificial variable (0 and 1). In this context, if the audit is conducted by a major audit firm, the value is 1; if not, the value is 0. In this study, the audit organization is considered equivalent to a major audit firm. If the audit is performed by the audit organization (representing a major audit firm), the value is 1. If the audit is conducted by a different firm (representing a smaller audit firm), the value is 0.

Moderator Variable: Internal Controls (SOX)

It is a two-valued variable (0 and 1) used to measure the strength of internal control. Weaknesses in internal control are identified based on research conducted by Hajiha et al. (2017) and Abedini et al. (2019), focusing on important weaknesses obtained from independent auditors' reports. Since 2012, internal controls approved by the Securities and Exchange Organization have required firm auditors to review and disclose any non-compliance or lack of proper implementation of internal controls in their audit reports. This research focuses on the legal responsibilities outlined in audit reports of firms. If a firm has at least one weakness in its internal control system, a score of 1 is assigned, otherwise a score of 0 is given, with the inverse criterion used to measure internal control quality (Hajiha et al., 2017).

Control variables for research

Building on the research of previous scholars like Abedini et al. (2019) and others in this field, various control factors have been employed to manage potential adverse effects that could impact the pace of adjustment of corporate credit. These control factors include:

ROA: The ratio of net profit to total assets.

Growth: Sales revenue minus previous sales divided by previous period sales.

LEV: The ratio of total liabilities to total assets.

Age: The natural logarithm of the year of establishment of the firm from the desired year.

Cash: The ratio of operating cash at the end of the period to the total assets.

SIZE: Natural logarithm of total assets.

Research Findings

Table 1 displays the descriptive statistics for the research variables. Descriptive statistics provide insight into the dispersion of data, with the mean and standard deviation being key factors. From the table, we can see that the average leverage is 0.54 percent, indicating that most of the data is clustered around this value. The highest standard deviation was for firm size at 1.72, while liquidity had the lowest at 0.13.

According to the results obtained in Table 2, it is observed that the significance level of variables in the stability test was less than 5%, indicating the stability of the variables.

According to the results obtained in Table 3, it is observed that the F-Limer test with a significance level of less than 5% (0.0000) has confirmed the panel data pattern. This is further supported by observing the coefficient of the Hausman test, which also has a significance level below 5% (0.0000), confirming the presence of fixed effects in the model. Additionally,

statistical analysis of variance and serial autocorrelation showed significance levels of less than 5%.

In the model of variance and serial autocorrelation, the final estimate was adjusted using the standard error tool in Eviews software, eliminating the need for further measures (Platouni, 2018).

The results from Table 4 indicate that audit quality, with a positive coefficient of 3.42 and a significance level below 5% (0.001), has a direct and significant impact on the business credibility of firms. Therefore, the first hypothesis of the research is supported at a 5% error level. Additionally, the interaction between internal control and audit quality, with a positive coefficient of 0.18 and a significance level below 5% (0.001), also influences business credit. As a result, the second hypothesis is also supported at a 5% error level. Control variables such as liquidity, firm age, size, and sales growth impact the dependent variable at error levels of 5% and 10%. The coefficient of determination is 0.37, indicating that 37% of the dependent variable's variation is explained by the independent and control variables in the model. Watson's coefficient is 1.57, falling within the range of 1.50 to 2.50, suggesting no strong correlation in the autocorrelation model. Collinearity statistics show no strong correlation among the research variables. The test statistics (F) with a significance level below 5% suggest that the research model fits well.

Table 1, Descriptive statistics of research variables

Variable	Mean	Max	Min.	S. dev.
TC	0.35	3.77	0.0000	0.52
AS	0.10	1.00	0.000	0.30
SOX	0.68	1.00	0.000	0.16
SIZE	14.75	19.92	10.49	1.72
ROA	0.14	0.57	-0.22	0.15
LEV	0.54	0.98	0.10	0.20
growth	0.34	1.67	-0.47	0.44
CASH	0.12	0.49	-0.19	0.13
Age	3.60	4.24	2.30	0.37

Table 2. Stability Test of Research Variables

Variable	Test Statistics	Sig	Results
TC	-57.5835	0.0000	Stationary
AS	-21.2154	0.0000	Stationary
SOX	-20.4657	0.0000	Stationary
SIZE	-6.19341	0.0000	Stationary
ROA	-8.54376	0.0000	Stationary
LEV	-14.1411	0.0006	Stationary
growth	-4.51451	0.0000	Stationary
CASH	-3.58050	0.0000	Stationary
Age	-3.20723	0.0000	Stationary

Table 3, Classical Regression Assumption Tests

Test	Test Statistics	Sig
F-Limer Test	4.077	0.0000
Hausman Tests	266.8	0.0000
White	190.32	0.0000
Brush pagan	61.55	0.0000

Table 4, Test Results of Research Hypotheses

Variable	Coefficients	Standard Error	Statistic t	Sig	VIF
AS	3.42	1.05	3.26	0.001	1.00
SOX	0.013	0.004	2.64	0.008	1.11
AS × SOX	0.18	0.058	3.23	0.001	1.00
SIZE	0.002	0.0007	3.08	0.002	1.20
ROA	-0.019	0.033	-0.59	0.55	1.07
LEV	0.021	0.015	1.42	0.15	1.10
growth	0.20	0.015	1.77	0.076	1.33
CASH	-1.50	0.67	-2.22	0.026	1.07
Age	0.042	0.069	2.21	0.026	1.11
C	4.61	2.07	2.21	0.026	-
Coef determination			0.37		
Watson Durbin			1.57		
F			5.0164		
Sig			0.0000		

Discussion and conclusion of the research

Decision-making regarding the use of business credit is one of the most crucial tasks for managers of organizations and firms. Commercial credit is defined as a mutual agreement between the supplier and the requester in previous literature. Essentially, business credit is utilized when there is a delay in payment or receipt after a purchase or sale is made. In today's economic climate, with financing firms facing challenges such as high capital costs, foreign financing, and the risk of failing to meet obligations on time, business credit appears to be a more viable option than debt financing.

Given the difficulties in obtaining external financing and credit, firms should explore alternative fiscal policies, particularly in the short term. Business credit has gained widespread acceptance globally in recent years. To achieve an optimal level of business credit, firms must implement a series of actions and measures in conjunction with their primary operations.

Research and financial literature have highlighted the importance of financial statements in decision-making processes for capital market participants, including creditors. When financial statements are clear, understandable, and transparent, creditors are more likely to extend credit to the firm, facilitating access to financing. Internal controls play a significant role in achieving this ideal mode of disclosure and can enhance the quality of financial information.

The findings of studies like those conducted by Mahdavi et al. (2022) and Lu (2022) support the notion that improving the quality of financial services can reduce information asymmetry and maximize the use of information by users. Therefore, it is recommended that firm managers focus on enhancing the commercial validity of financial reports to benefit both the firm and its stakeholders.

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Design and implementation of the GABC model to calculate the cost of outsourcing services with an emphasis on sustainability concepts

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Abstract

Objectives: This research investigates the correlation between two approaches, aiming to propose a model for calculating the total cost of outsourced services using green activity-based costing with a sustainability perspective. Activity-based costing is a well-established accounting method that can easily trace direct and indirect costs of products based on activities and accurately track product costs resulting from different product combinations while also reducing environmental issues. The goal of this research is to propose a model for green activity-based costing in the gas industry to assist managers in addressing cost challenges and managing environmental issues in production decisions.

Design/methodology/approach:: This research is descriptive in nature. Descriptive statistics and histograms using SPSS 24 software will be utilized for statistical descriptions and frequencies of demographic and research variables. The research was conducted using a descriptive review method, with data gathered from reputable domestic and international sources such as books, articles, and websites. The research involves analyzing multiple criteria of activity-based costing, identifying environmental activities, and outlining the outsourcing of these activities using various tools.

Results: The research results indicate that the identification of activities, environmental activities, and outsourcing significantly impact financial and operational performance.

Innovation: To present the operating model and verify the research model, the structural equation method was used. The factor analysis method with PLS2 software was employed to assess the questionnaire's validity, followed by checking and analyzing the path coefficients and their significance.

Keywords: Activity-Based Costing, Cost Accounting, Strategy Management Accounting, Outsourcing

1. Introduction

Today, many companies specialize in specific expertise or skills and operate solely to provide services to external entities. Research shows that the benefits of outsourcing are significant for many companies, with the most important ones being time savings, cost efficiency, quality enhancement, and freeing up internal resources for optimal use. However, in our country, outsourcing in its broad sense has not received much attention and consideration from managers and officials due to various reasons. Therefore, researchers and industry managers must study and research the adoption of outsourcing and its dos and don'ts so that we know scientifically what to outsource, when, how, and to whom.

Within organizations, there is a growing motivation to understand costs and the factors that contribute to these costs. Although there is still confusion between understanding costs and cost measurement methods (such as activity-based costing, standard costing, project accounting, and goal-based costing), this has left managers and employees confused about identifying costs.

Upon closer examination, different costing methods are not necessarily competitive. While organizations strive for competitiveness in the business environment, they are searching for accurate and relevant information to improve their cost accounting needs. In the past, companies controlled operations with accounting information that inaccurately reflected production and service costs. The cost allocation system of many companies, through the widespread allocation of indirect costs on an average basis, provided misleading information to decision-makers, ultimately leading to wrong decisions by managers. In recent social and economic situations, efficiency and performance have become imperative, while management needs to create products and services with the same quality while reducing resource usage in projects and activities.

Activity-Based Costing (ABC) is the most famous innovation in management accounting in the last twenty years. This method originated in the production sector as a response to dissatisfaction with traditional management accounting techniques based on production volume for allocating overhead costs to productions.

Traditional methods have many errors in modern production conditions. Today, the majority of costs related to producing a product are not directly related to production volume. For example, engineering costs, order processing, planning, quality control with advanced technologies, custom production, or timely delivery all increase activity levels, and costs associated with these activities are considered and then allocated to the products or services produced through them.

The ABC system is a logical approach for organizational managers to describe and evaluate organizational performance processes and determine total costs. The idea behind activity-based costing is simple and logical; total costs and expenses do not automatically arise; expenses and costs arise in the midst of organizational activities. There are no total costs within the organization, only activities intended to serve customers exist, and against these, service fees are charged.

To address the limitations of traditional cost accounting systems, which often involve simplistic cost allocation and a lack of transparency for indirect costs, organizations have turned to activity-based costing (ABC) systems. These systems track both direct and indirect costs of organizations and attribute them to products, services, and customers responsible for those costs. It is important to note that economic enterprises, as vital components of economies and progress in countries, play a significant role in sustainability principles. The significance of this issue varies depending on the scope of activities and resources available. Governments also play a crucial role in supporting society to better implement these principles by establishing appropriate frameworks, developing rules and regulations, and providing incentives.

During the lean manufacturing movements of the early 1990s, optimization programs were implemented, focusing on intra-firm processes (Jones et al., 1997). One key reason for this was to reduce a company's contribution to a product's value by outsourcing up to 70% of it to external suppliers (McCarthy and Anagnostou, 2004). The increased outsourcing of functions has placed significant demands on coordinating activities within the supply chain. It is essential to align intercompany material and information flows to meet market demands, such as adapting to product functions, demand fluctuations, or new delivery service requirements. Coordination is defined as a method to effectively and efficiently combine various firm-specific competencies related to different aspects (information, actions, decisions, goals, etc.) (Simatupang et al., 2002). This has led to a discussion on supply chain integration (see, e.g., the review by Van der Vaart and van Donk, 2008). Low total costs are often a primary operational goal for supply chain management, necessitating the use of cost management tools as key components (Mouritsen et al., 2001; Israelsen and Jorgensen, 2011). These tools are seen as objective criteria for evaluating the profitability of strategic or operational actions. Such information is typically available at an intercompany level and can be generated by intra-firm cost accounting tools (Askarany and Yazdifar, 2011). Effective and efficient coordination of the value chain in a supply chain requires an inter-firm accounting tool (LaLonde and Pohlen, 1996), whether for introducing a new supply chain strategy or optimizing specific processes (Seuring, 2009).

According to the theory of resource optimization, companies must reduce costs and optimize resource utilization to thrive in a competitive market (Plenert 1993; Wernerfelt 1984). Research indicates that the main reasons for enterprise failure include lack of planning, knowledge, skills, management expertise, and key competencies (Dyer and Ross 2008). This raises the question: how can companies overcome these shortcomings? One approach is through outsourcing, where companies engage external service providers to acquire the knowledge and skills they lack. This is particularly crucial for micro, small, and medium enterprises as it allows them to enhance their capabilities, enabling them to compete and succeed in the modern market (Anderson and McKenzie, 2022).

The outsourcing process begins with companies deciding to outsource to obtain the knowledge, skills, and competencies they lack in the market at a lower cost than developing those services in-house (Espino-Rodríguez et al. 2006). The theory of transaction cost economics (TCE) is founded on this principle.

Problem Statement

Stakeholders are urging organizations to be more ecologically conscientious regarding their products and operations for various reasons, including compliance with regulations, sustainable consumption, public perception, and potential competitive benefits (Hsieh et al., 2020). Many facility owners and managers are exploring the use of aqueous degreasers and powder coatings as alternatives to traditional cleaning solvents and paints to reduce harmful air emissions and manage the costs associated with treating contaminated effluent (Nikkeh et al., 2022). Initiatives are being taken to eliminate pollution during production by transitioning to greener processes (Ali et al., 2023). However, a barrier to Green Manufacturing System (GMS) adoption is the lack of compelling reasoning for green manufacturing practices (Al-khoury et al., 2022). Recent studies have examined the tangible and intangible benefits enabled by activity-based costing (ABC) methods. Based on the findings of these analyses, it is evident that identifying intangible benefits is a crucial aspect of the Sustainable Development of cutting-edge manufacturing technology (Al-Mawali, 2021).

The adoption and implementation of green management strategies and environmental management in corporate policies have increased in recent years (Flayyih & Khiari, 2023). As businesses expand globally, the economy has shifted from a conventional financial and economic system to a modern capacity-based economic system with ties to

green management and green economics (Raqeeb Omar, 2020).

As industries grow, the focus on environmental issues also grows. Companies are increasingly seeking better cost management through activity-based costing in response to competitive pressures and legal requirements. Aligning activity-based costing with environmental accounting provides more accurate information to companies for more effective decision-making. This research aims to propose an effective approach for activity-based costing systems and environmental accounting to calculate the fully allocated cost of outsourced services by the Fars Gas Company.

This analysis not only helps managers better understand financial information related to fully allocated costs, activities, and environmental costs allocated to services but also assists in making more concrete and precise decisions. Today, large and modern companies in both production and service sectors face outsourcing issues. Accurately determining fully allocated costs has become a strategic goal. Recent developments in activity-based costing have helped companies accurately determine fully allocated costs, as green competition is a fundamental factor for the sustainable development of companies.

Given the current conditions where stakeholders pay significant attention to companies' environmental activities, environmental accounting becomes a valuable tool for management. Most companies emphasize environmental fully allocated cost systems because the impact of fully allocated costs on environmental laws has increased.

Environmental fully allocated costs play a crucial role in international competition. In response to this pressure, most companies have taken steps to improve efficiency and reduce environmental impact, making activity-based costing and environmental accounting integral to unified goals for sustainable competitive advantage development. This research investigates how these two methods correlate, aiming to propose a model for calculating the fully allocated cost of outsourced services using green activity-based costing with a sustainable approach.

Outsourcing, like other scientific subjects, has different definitions from various perspectives. Outsourcing, in its initial concept, means delegating some of a company's activities outside and essentially withdrawing from the process, which is carried out by employees of the service-providing activities. This concept of outsourcing is known as traditional outsourcing, while in new outsourcing, employees do not move, and a new service is used by a company within the business processes of the same company. However, to provide a more comprehensive definition, all aspects of outsourcing and various classifications must be included.

Gas, like other essential commodities, is an economic commodity, and its supply, like other activities, is an economic activity. Therefore, one of the most important effective issues in the oil and gas economy is determining the correct fully allocated cost and its constituent elements. Thus, with the vital importance of gas to public life, health, and the environment, provincial gas companies have been established with new management as financially independent entities by the government.

Since gas production and gas supply services, in general, have social value, and governments govern social matters, the pricing of goods and services in the oil and gas industry is determined by the government based on supportive policies for various segments of society. This policy results in these companies deviating from their primary and ultimate goal, which is maximizing profit.

The independence of provincial gas companies is essential due to the financial independence of each of these companies. This allows the activities of the company to be outsourced, as predetermined prices cause provincial gas companies to focus on internal activities and processes, hoping to be profitable by reducing and controlling costs or at least minimizing losses. Therefore, examining how outsourcing affects the fully allocated cost of services is essential. This means that large commercial companies, government

agencies, hospitals, and major universities no longer need to transform into organizations that employ numerous people.

This issue is even more important due to recent policies aimed at rationalizing subsidies, especially in the energy sector, and receiving fully allocated costs from subscribers.

Corporate sustainability is a different approach to business that, based on this approach, organizations create "long-term value" for all stakeholders. In this approach, not only green and environmentally friendly strategies are considered, but all functional dimensions of the business, including social, cultural, economic, and environmental dimensions, are taken into account.

In this research, given the existing challenges and the importance of sustainable development discussions, we investigate the potential side effects of sustainable development on the value of accounting information, which is one of the most important concerns of companies and other stakeholders. Specifically, we explore whether companies that disclose their EGSEE development performance have any impact on the value of accounting information.

Main Objectives of the Research

The primary objective of this research is to analyze the distribution of constituent elements in the fully loaded cost of services before and after outsourcing the activities of Fars Gas Company to the private sector. The aim is to reduce costs and provide managers with valuable insights to determine the feasibility of outsourcing. By achieving this objective, we can enhance cost recovery and ensure accurate cost calculations for Fars Gas Company. The ultimate goal of this research is to precisely determine the fully loaded cost of services for Fars Gas Company through the implementation of Activity-Based Costing (ABC) with an environmentally friendly approach. This will aid Fars Gas Company in making informed decisions regarding the implementation of outsourcing.

The specific goal of this research is:

- To determine whether outsourcing should be carried out or not
- To calculate the fully loaded cost of services based on Activity-Based Costing
- To control and monitor sustainability indicators in the outsourcing process

The practical goal of this research is:

To calculate the fully loaded cost of outsourced services of Fars Gas Company and provide the results to the company's managers to use in decision-making processes related to outsourcing.

Importance and Necessity of the Research

Due to changes and developments in outsourcing, the literature utilizes various scientific theories to explain the phenomenon. However, research notes that as outsourcing evolves, the expectations of businesses and the factors driving outsourcing also change. Initially, outsourcing was seen as a way to reduce costs (a tactical objective). Over time, organizations, both in manufacturing and service sectors, have expanded their outsourced activities, making outsourcing a strategic and transformative practice. Consequently, the theoretical foundations also change accordingly. Marshall et al. (2007) point out a paradox in the outsourcing literature due to differences in the underlying theories used in various studies.

Decisions regarding outsourcing and make-or-buy choices are strategic considerations for organizations when introducing new products/services or outsourcing existing ones. In outsourcing decisions, the goal is to determine which activities should be done internally or externally, which resources should be owned internally, and which should be leased externally.

Research shows that many senior managers, financial managers, and accounting department heads lack sufficient information about Activity-Based Costing (ABC) because it is a relatively new cost accounting system that has not been widely adopted and has few tangible aspects. Consequently, companies may rely on inaccurate information from an unsuitable cost accounting system for financial proposals, operational leadership, policy alignment, and product pricing.

The evolution of sustainable development processes requires collaboration among governments, legislative bodies, and public and private organizations to preserve and coordinate the three main elements of sustainable development: society, economy, and the environment.

Research Hypotheses and Their Theoretical Basis

- Testing the first hypothesis: there is a significant relationship between identifying activities and activities without added value.
- Testing the second hypothesis: there is a significant relationship between the identification of activities and the calculation of the cost price.
- Testing the third hypothesis: there is a relationship between the identification of environmental activities and the cost price.
- Testing the fourth hypothesis: there is a significant relationship between the identification of environmental activities and activities without added value.
- Testing the fifth hypothesis: there is a significant relationship between identifying activities without added value and financial performance.
- Testing the sixth hypothesis: there is a significant relationship between the identification of activities without added value and organizational performance.
- Seventh hypothesis test: There is a relationship between cost calculation and financial performance.
- Eighth hypothesis test: There is a relationship between cost calculation and organizational performance.
- Testing the ninth hypothesis: there is a relationship between outsourcing activities and identifying activities without added value.
- Testing the 10th hypothesis: there is a relationship between the outsourcing of activities and the calculation of the cost price.

Table 1. Costing Model

Description	Costing model
Traditional Costing	Traditional
Activity-based Costing	ABC
Time-Driven Activity-Based Costing	TDABC
Performance-Focused Activity-Based Costing	PFABC
Green Activity-Based Costing	GABC

Main Question:

1) Is the fully loaded cost of services based on Green Activity-Based Costing (GABC) lower after outsourcing than before outsourcing activities?

Subsidiary Questions:

1) Does the proportion of activity in meter reading and billing to the total fully loaded cost of services change after outsourcing?
2) Does the proportion of activity in the distribution network and connections to the total fully loaded cost of services change after outsourcing?
3) Does the proportion of activity in sampling and testing to the total fully loaded cost of services change after outsourcing?
4) Does the proportion of activity in gas supply facilities and pipeline networks to the total fully loaded cost of services change after outsourcing?
5) Does the proportion of activity in security and maintenance to the total fully loaded cost of services change after outsourcing?

Research Methodology

This study utilizes the Wilcoxon signed-rank test, which compares the means of a group of data before and after an intervention. The Wilcoxon test is a non-parametric test used to evaluate the similarity of two dependent samples. Similar to the Mann-Whitney test, it is suitable for designs involving pre- and post-implementation or two samples from the same population. This test not only indicates which part of a

pair is larger than the other but also ranks the absolute differences. Therefore, the Wilcoxon test assesses not only the direction but also the magnitude of differences between groups.(Azar and Momeni, 1998)

In this research, given the hypotheses, the Wilcoxon signed-rank test for comparing means with two dependent samples has been employed because it compares the means of a group of data before and after an intervention. The Wilcoxon test is a non-parametric test used to evaluate the similarity of two dependent samples. Under the assumptions of equal distributions between the two populations, it is expected that about half of the positive pairwise differences and half of the negative differences are present. Moreover, the sizes of positive and negative differences are expected to be equal. Therefore, if we rank the differences from small to large and ignore zero differences, it is expected that the sum of positive and negative ranks will be approximately equal. This test not only assesses direction but also evaluates the magnitude of differences between groups. Therefore, the Wilcoxon test answers which part of a pair is larger than the other and also ranks the absolute differences (Azar and Momeni, 1998).

For computations, the Wilcoxon test should have about 95% of the power of the t-test. Therefore, its mathematical form is similar to the t-test, with only different parameters used in the calculation. The general form of the test is as follows, which is used by SPSS[1] software.

a) Data Collection

The data for this study has been collected from various sources, including books, theses, Persian and English articles, and the necessary information from the financial statements of Fars Gas Company. Both library research and field data processing have been used to gather the required information.

b) Data Collection Tools

Since the financial statements of Fars Gas Company are prepared annually and approved by the shareholders' general assembly each year, the data for this study is based on the published financial statements of the company for the fiscal year 1399.

c) Sustainability Development Reporting

Sustainability, as a descriptive aspect of development, is a state in which desirability and available resources do not diminish over time. Sustainable development means meeting the current needs of societies without compromising the ability of future generations to meet their needs and seizing opportunities to illuminate a new era of transformative change towards global transformation. Business entities, like citizens, are obliged to comply with many social regulations, such as respecting human rights, prohibiting child labor, ensuring gender equality, adhering to greenhouse gas and environmental regulations, and controlling environmental pollution. Therefore, sustainability development reporting aims to demonstrate the extent of each of these impacts to its users through specific reports.

d) Indicators of Sustainable Development Reporting

Indicators aligned with the 4G framework are part of the Global Reporting Initiative (GRI)[2] guidelines, introduce indicators for reporting sustainable development in various sectors (EGSEE).

e) Value Relevance of Accounting Information

One of the important areas of accounting research is examining the content of accounting information data. The purpose of this type of research is to investigate whether specific types of accounting data, such as accounting profits and non-financial reports, add informational value to the available data for investors and guide them toward better decision-making.

f) Company Value

The company's value is derived from the ratio of the market value of shareholders' equity to the book value of shareholders' equity at the end of the fiscal year. The market value of shareholders' equity is calculated by multiplying the number of outstanding shares by the share price at the end of the fiscal year, and the book value of shareholders' equity is determined. Due

[1] Statistical Package for the Social Sciences

[2] Global Reporting Initiative

to the non-linearity and skewness of this variable, its natural logarithm is often used in models.

a. Novelty and Innovation Aspects in Research

The current research investigates the design and implementation of the Green Activity-Based Costing (GABC) model and the status of sustainability development reporting based on the latest indicators specified by the Global Reporting Initiative (GRI) within the scope of the Fars Gas Company. By studying the costs associated with activities and existing reports, we calculate the total cost based on the activity-based costing model and analyze the level of disclosure of specified sustainability indicators. Additionally, we examine the impact of sustainability development reporting on the total costs of outsourced services and subject them to testing.

b. Statistical Population, Sampling Method, and Sample Size

In conducting any research, specifying the statistical population is essential, as it allows the researcher to understand their domain so they can gather the necessary information and data for analysis.

In this research, the statistical population is the Fars Gas Company, which includes 88 subsidiary cities. The research was conducted during the fiscal year 1399, which marked a turning point in outsourcing. This choice was made after interviewing and consulting with senior and executive managers.

c. Research Hypotheses and Their Theoretical Basis

In general, this research is summarized in three main sections:

- **Activity-Based Costing and Activity Identification Phase**
  - Identification of all different activities at various levels within the Fars Gas Company.
  - Feasibility assessment of implementing these activities in an activity-based costing system.
- **Identification of Environmentally Related Activities as Green Activity-Based Costing towards Sustainable Development**
  - Identification of environmentally related activities towards sustainable development.
  - Calculating the costs of these activities (green activity-based costing) to assess their impact on sustainability.
- **Outsourcing**
  - Examining, identifying, and comparing the costs of outsourcing activities with a special focus on green activities.

To achieve this, in the **first step**, all activities at various levels within the National Gas Company were identified. This was based on data available in accounting software and discussions with senior and middle managers of the National Gas Company.

In the **second step**, all activities related to the environment and sustainable development were identified again based on the opinions of managers and employees. The contribution of these activities to the overall activities was determined based on cost calculations.

In the **third step**, after discussions and opinions from various employees and managers, and by the available data, the costs were calculated before and after outsourcing. The impacts on the environment in line with cost accounting based on green activities were examined.

Finally, the following hypotheses were examined to evaluate all the above stages:

1) There is a significant relationship between activity identification and non-value-added activities.
2) There is a significant relationship between activity identification and total cost calculation.
3) There is a significant relationship between environmentally related activities identification and total cost calculation.
4) There is a significant relationship between environmentally related activities identification and non-value-added activities.

5) There is a significant relationship between non-value-added activities identification and financial performance.
6) There is a significant relationship between non-value-added activities identification and organizational performance.
7) There is a significant relationship between total cost calculation and financial performance.
8) There is a significant relationship between total cost calculation and organizational performance. Total costs have a higher performance value, leading to organizational growth.
9) There is a significant relationship between outsourcing activities and non-value-added activities.
10) There is a significant relationship between outsourcing activities and total cost calculations.

Research Method

a. Research Method Based on Objective, Data Type, and Execution Method

This test compares the average of a group of data before and after an intervention. The Wilcoxon signed-rank test is a non-parametric test used to evaluate the similarity of two dependent samples. Similar to the McNemar test, it is suitable for pre-post designs or comparing two samples from the same population. This test not only determines significance but also measures the size of the differences between groups. Therefore, the Wilcoxon signed-rank test indicates which part of a pair is greater than the other and ranks the absolute differences.

b. Variables Under Investigation

Phase 1: Traditional Volume-Based Costing

In traditional volume-based costing systems, the total cost of a product is determined by adding direct material costs, direct labor costs, and allocated overhead costs, typically using a specific cost driver like direct labor. However, this method often results in inaccuracies in the allocation of overhead costs to specific products. Overhead costs encompass a wide range of expenses that may not correlate directly with the chosen basis for calculating the absorption rate of overhead. Consequently, each product's share of overhead costs is calculated uniformly based on this specific basis, leading to inaccurate cost allocation for each product.

In many industries, particularly service companies, the use of traditional cost accounting principles no longer provides an accurate reflection of actual product costs. The discrepancies between actual costs and calculated costs are growing over time.

If this inconsistency is not addressed, the risk of making inappropriate decisions will naturally increase.

In recent decades, there has been a significant rise in technology, engineering, support costs, and other expenses classified as overhead costs in traditional cost accounting methods. As a result, cost structures must evolve to accommodate these changes and aid organization managers in making informed decisions. Ultimately, the goal is to minimize costs as much as possible to remain competitive in the global market.

Phase 2: Activity-Based Costing (ABC)

Activity-Based Costing involves a two-stage process for allocating overhead costs to products or services produced. In the first stage, major activities are identified, and overhead costs are allocated to these activities based on the resources consumed in each activity. The overhead cost allocated to each activity is termed an activity cost pool. Subsequently, in the second stage, appropriate cost drivers related to each activity are identified. Then, the allocated overhead costs for each activity are assigned to production lines based on the usage of cost drivers in these lines.

Phase 3: Green Activity-Based Costing (Emphasizing Sustainability Concepts)

Green Activity-Based Costing not only considers greenhouse gas emissions but also factors in costs and time. This approach provides a comprehensive view of management-related dimensions for decision-making,

focusing on reducing time-related costs in activity scheduling and other business goals.

One activity driver is defined as "measuring the frequency and intensity of contracted demand activities," which can be used to allocate costs to the activities used (according to Raffish et al.). Another resource driver is defined as "measuring the amount or quantity consumed by an activity." Thus, the costing system is multi-stage, as cost tracing is done in three ways:

- Direct allocation: Resources are directly linked to activities and related cost components.
- Allocation: Costs are apportioned somewhat arbitrarily, such as production planning costs based on the number of units produced.
- Cause-and-effect allocation using resource and activity drivers: A feature of a cost driver is a measure of consumption amount.

ABC provides a systematic method for cost recovery accounting. First, it identifies activities within an organization. Then, based on resource consumption, it allocates resource costs for each activity to products or services. For instance, in manufacturing, costs are analyzed and transformed into three main categories: direct materials, direct labor, and factory overhead. Each activity has different levels of resource consumption, so activities are categorized based on their resource usage levels, such as unit-level activities, batch-level activities, production line activities, and facility/customer support activities (Walther, 2010).

Phase 4: Cost-Effectiveness Calculation of Outsourcing Activities Based on Phases 1, 2, and 3

In many organizations, aside from the challenge of understanding the concepts and foundations of outsourcing, the execution of outsourcing has often been carried out through trial and error without adopting a scientific and systematic approach. However, an organization intending to effectively benefit from outsourcing requires the necessary strategies, infrastructure, and a scientific approach for outsourcing implementation. Below are the major infrastructure factors and implementation stages mentioned:

Production Network Structuring: The basis of outsourcing is the networking or process structuring of production. Before outsourcing, the company must understand the activities it performs to decide which activities to outsource and which ones to keep in-house. In this phase, activity descriptions and profiles are clearly defined and standardized. Technical standards are translated into legal and contractual language, and delivery indicators are specified.

Selection of Outsourcing Activities (Outsourcing Methodology): The challenge senior managers face is not the use of outsourcing but determining which activities should be outsourced. It is crucial to understand how outsourcing each activity contributes to the organization's goals in this phase. What are the opportunities and threats, and what are the impacts (outsourcing) on human resources, processes, costs, etc.? Developing a logical framework, conceptual model, and systematic system where influential variables in outsourcing decision-making are defined is better. This results in the selection of activities suitable for outsourcing. Management consultants play a key role in executing outsourcing projects correctly based on a scientific approach. With a scientific approach, an organization can outsource its core activity while still maintaining control mechanisms over it. Identifying business risks such as cultural differences between organizations, risks of delayed or subpar service delivery, and restrictions in choosing alternative contractors are crucial factors in evaluating activities for outsourcing.

Outsourcing Accounting: The most significant motivation at negotiation tables is pricing. If the full cost price is ambiguous, both parties suffer losses. The negotiated price should be a win-win situation for both parties. In a competitive situation, supplier selection is based on price. Determining such a price requires a cost accounting system for each activity. Evaluating the efficiency of outsourced activities in achieving financial goals such as cost reduction or capital return

speed can also be possible with this accounting system.

Service Provider Selection: Holding a tender and identifying and selecting the activity provider is the next step. In this phase, preparing suitable bid conditions and requests for information from contractors, accessing professional and experienced (qualified) service providers, and their initial evaluation are critical for appropriate outsourcing. It is suggested to form an evaluation team for proposed projects with activity profiles and service descriptions.

Monitoring Performance and Unified Control Systems - IT Approach: The initiation of outsourcing activities creates an interaction network among them. This network and production chain ultimately lead to achieving goals such as cost reduction, product quality improvement, skill enhancement, or production time reduction. After the contract, monitoring and controlling organizational operations play a vital role, necessitating a comprehensive and cohesive communication, monitoring, and evaluation program based on delivery indicators, agreements made, and the mentioned goals.

Data Collection Method

Data collection tools are instruments that researchers use to gather, record, and quantify necessary information (Talei, 2010: 102). In any study, collected data are analyzed against hypotheses. There are various tools and methods available for data collection. The tool utilized in this study is a questionnaire, and the method of data collection is field-based. The questionnaire comprises purposeful questions designed to assess the opinions and viewpoints of respondents using various scales.

For this study, a standardized questionnaire based on Tiago's 2013 research is employed to gather information for hypothesis testing. This questionnaire includes 23 questions, with questions 1 to 4 focusing on structural capital, questions 5 to 8 on relational capital, questions 9 to 11 on cognitive capital, questions 12 to 14 on knowledge sharing, questions 15 to 17 on knowledge transfer, and questions 18 to 23 on organizational performance.

In this research, a questionnaire has been prepared and formatted for hypothesis testing. A Likert 5-point scale (strongly agree, agree, neutral, disagree, strongly disagree) is used to provide respondents with more options than just yes or no in case they cannot express their opinions. Since measurements on this scale are qualitative, scores ranging from 0 to 4 are assigned to each option in order of importance. The importance coefficient is included in the frequency distribution coefficients to use the results for statistical analysis purposes.

One of the most fundamental parts of research is the method of data collection and processing, which depends on the nature of the research, the type of required information, and the research facilities and limitations.

Table 2. Distribution of Question Numbers in the Questionnaire

Number of questions	Questionnaire questions	Dimensions under consideration
Activity Identification	1-4	4
Environmental Activities Identification	5-8	4
Outsourcing Activities	9-11	3
Comparison of Outsourced and Non-Outsourced Costs	12-14	3
Valueless Activities	15-17	3
Organizational Performance	18-20	3
Financial Performance	21-23	3

The present study will also be conducted using some of these data collection methods, as outlined below:
Additionally, necessary information has been collected from two sources for implementing the activity-based costing system in Zanjan Gas Company:

1) Accounting documents and records available in this sphere, such as balance sheets, income statements, expenses, etc.
2) Acquiring information about activities through observation and examination of service delivery methods and individuals involved, or those who have sufficient information about performing tasks and related organizational resources, cost drivers, and performance evaluation criteria. Some of this information can be seen in process maps, company operations descriptions, and job descriptions.

Data collection is one of the fundamental stages of research and must be defined and specified accurately due to its importance. The data collection stage initiates a process during which the researcher gathers field and library findings, then proceeds to summarize the findings through classification and subsequently analyzes them, evaluates formulated hypotheses, and finally draws conclusions and finds solutions to the research problem based on them. In other words, relying on collected data, the researcher discovers the truth as it is. Therefore, the credibility of collected data is crucial because unreliable data hinder the discovery of truth, and the research problem or unknown remains unclear or presents a distorted and incorrect image of it. To maintain the credibility of collected data, the researcher must carefully collect accurate data.

In this study, a library method has been used for data and information collection. In the library section, theoretical foundations of research are gathered from Persian and Latin specialized books and journals. Based on the definitions of research variables and how to measure them, the required data for this research includes some accounting items extracted from audited financial statements of companies. Accordingly, the required research data has been collected through gathering information resources, data, documents, and materials of sample companies and referring to their annual reports, financial statements, explanatory notes, weekly reports, monthly stock exchange reports, library, Tehran Stock Exchange company website, and also using Rahavard comprehensive statistics software.

Reliability of the Questionnaire:

An essential aspect of evaluating the quality of a research instrument, such as a questionnaire, is its reliability and validity. The main focus here is on reliability and validity as crucial characteristics of the questionnaire. The essence of reliability lies in how accurately and consistently the instrument measures the variables under study. There are three types of validity: 1) Content Validity (part of content reliability), 2) Criterion-related Validity, and 3) Structural Validity (convergent and divergent validity). In this study, content and face validity were assessed by experts. Thirty questionnaires were distributed among experts to confirm that the research questions were appropriately measured.

To evaluate convergent validity, the Average Variance Extracted (AVE) was utilized, with a criterion value greater than 0.50 for each variable. Furthermore, construct validity and discriminant validity were assessed using the Fornell-Larcker matrix.

Reliability is measured through various methods, including 1- Test-Retest method, 2- Parallel Forms method, 3- Split-Half method, 4- Internal Consistency method, and 5- Cronbach's Alpha method. In this research, both Cronbach's Alpha and Composite Reliability methods were used, with values exceeding 0.70, indicating good reliability of the questionnaire.

Data were analyzed using SPSS 23 software, with a calculated Cronbach's Alpha value of 0.70 for the entire questionnaire, indicating good reliability. Table 3 presents the computed Cronbach's Alpha values for each research variable.

Table 3. Computation of Reliability for Questionnaire Items

Variables	AVE	Composite Reliability	Cronbach's Alpha value
Activity Identification	0.534	0.824	0.792
Environmental Activities Identification	0.615	0.879	0.794
Outsourcing Activities	0.723	0.888	0.739
Comparison of Outsourced and Non-Outsourced Costs	0.543	0.835	0.741
Valueless Activities	0.679	0.859	0.765
Organizational Performance	0.676	0.864	0.777
Financial Performance	0.742	0.903	0.811

For assessing convergent validity, the Average Variance Extracted (AVE) criterion was used, and all variables had AVE values above 0.50, indicating acceptable convergent validity. Discriminant validity was assessed using the Fornell-Larcker method, and having the matrix's diagonal larger than the off-diagonal elements is considered acceptable. Furthermore, reliability was assessed using the Composite Reliability (CR) and Cronbach's Alpha methods, and all variables demonstrated the required reliability.

Statistical analysis is a crucial step in research, as the results heavily depend on it. Once the theoretical framework is outlined, the sample size is determined, data is collected, and data analysis methods are chosen, the focus shifts to data analysis and hypothesis testing. During this phase, the collected data is analyzed to evaluate the validity of the hypotheses.

In this chapter, the collected data is described using descriptive statistics, such as tables and charts, to provide an overall view of the characteristics of the sampled population. Hypothesis testing is carried out using statistical analysis techniques, with data input into SPSS 23 software for hypothesis testing. Finally, the research's conceptual model is addressed using modeling methods and the PLS model.

6. Research Results and Analysis

6.1. Descriptive Statistics

This section focuses on examining the distribution of the sample concerning demographic variables such as gender, age, education level, academic degree, employment type, and work experience. Both independent and dependent variable dimensions are analyzed.

6.2. Demographic Variables

- **Gender**

Based on the provided figures and charts, it's observed that out of the 150 selected samples, 77 individuals (51.3%) were female, and 73 individuals (48.7%) were male. Therefore, the frequency indicates an equal representation of males and females in this study, with the percentage of each gender specified in the table below :

Table 4.

Gender	Frequency	Frequency Percentage
Male	77	51.3
Female	73	48.7
Total	**150**	**100**

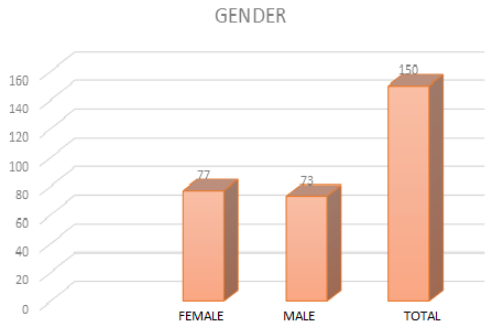

Chart 1. Gender Frequency Chart

- **Educational Background**

Based on the presented figures and charts, out of the 150 selected samples, 25 individuals had a bachelor's degree, 61 had a master's degree, and 50 had a doctorate. The percentage of each category is specified in the table below :

Table 5.

Educational Background	Frequency	Frequency Percentage
Diploma	5	3.3
Associate Degree	9	6.0
Bachelor's degree	25	16.7
Master's degree	561	40.7
P.H.D	5	33.3

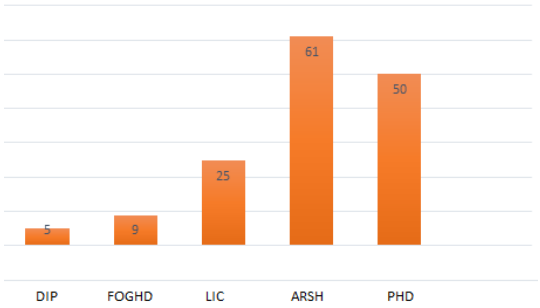

Chart 2. Frequency Chart of Education

- **Work Experience**

Based on the provided figures and charts, out of the 150 selected samples, 34 individuals had less than 10 years of experience, 44 individuals had 10–15 years of experience, 42 individuals had 15–20 years of experience, and 19 individuals had more than 20 years of experience. The percentage of each category is specified in the table below :

Table 6.

Work Experience	Frequency	Frequency Percentage
Under 10 years	34	22.7
10–15 years	44	29.3
15–20 years	42	28
Over 20 years	19	12.7
Total	**150**	**100**

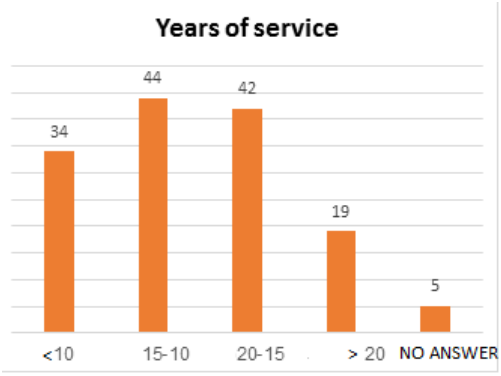

Chart 3. Frequency Chart Based on Service Record

6.3. Inferential Statistics

➢ **Activities Identification Variable Description**

For the activity's identification variable, the minimum score was 1.00, the maximum score was 5.00, the mean score was 3.0668, the standard deviation was 0.57848, and the variance was 0.335. The mean score indicates that respondents are at a good level. The histogram and statistical description of the structural capital variable are also presented in the table below.

Table 7. Activities Identification Variable Description

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Activities Identification	150	1.00	5.00	3.0668	0.57848	0.335

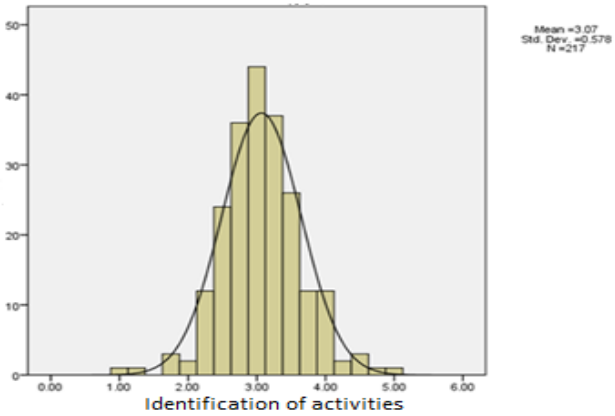

Chart 4. Variable Chart of Activity Identification

- **Environmental Activities Identification Variable Description**

For the environmental activities identification variable, the minimum score was 1.25, the maximum score was 5.00, the mean score was 3.726, the standard deviation was 0.54025, and the variance was 0.292. The mean score indicates that respondents are at a good level. The histogram and statistical description of the relational capital variable are also presented in the table below.

Table 8. Environmental Activities Identification Variable Description

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Environmental Activities Identification	150	1.25	5.00	3.5726	0.54025	0.292

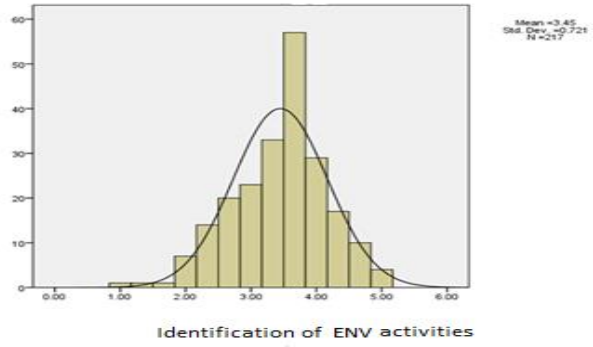

Chart 5. Variable Chart of Environmental Activities Identification

➢ **Outsourcing Activities Variable Description**

For the outsourcing variable, the minimum score was 1.00, the maximum score was 5.00, the mean score was 3.4485, the standard deviation was 0.72118, and the variance was 0.520. The mean score indicates that respondents are at a good level. The histogram and statistical description of the outsourcing variable are also presented in the table below.

Table 9. Outsourcing Activities Variable Description

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Outsourcing Activities	150	1.00	5.00	3.4485	0.72118	0.520

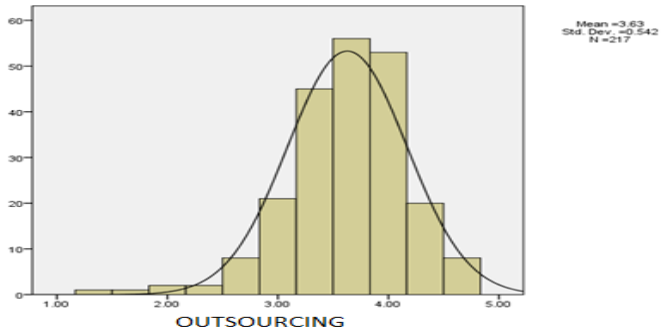

Chart 6. Variable Chart of Outsourcing Activities

➢ **Valueless Activities Variable Description**

For the valueless activities variable, the minimum score was 1.33, the maximum score was 4.67, the mean score was 3.6283, the standard deviation was 0.54155, and the variance was 0.293. The mean score indicates that respondents are at a good level. The histogram and statistical description of the valueless activities variable are also presented in the table below.

Table 10. Valueless Activities Variable Description

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Valueless Activities	150	1.33	4.67	3.6283	0.54155	0.293

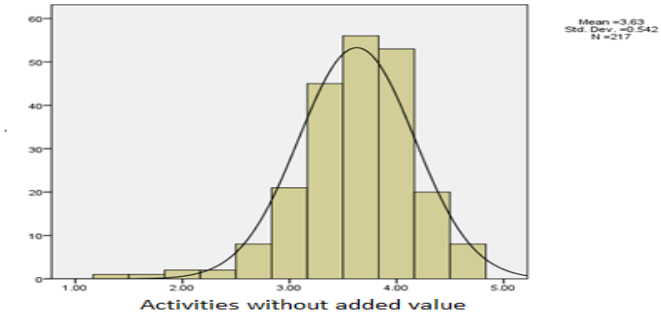

Chart 7. Variable Chart of Activities without Added Value

➢ **Organizational Performance Variable Description**

For the organizational performance variable, the minimum score was 1.00, the maximum score was 5.00, the mean score was 3.4992, the standard deviation was 0.60274, and the variance was 0.363. The mean score indicates that respondents are at a good level. The histogram and statistical description of the organizational performance variable are also presented in the table below.

Table 11. Organizational Performance Variable Description

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Organizational Performance	150	1.00	5.00	3.4992	0.60274	0.363

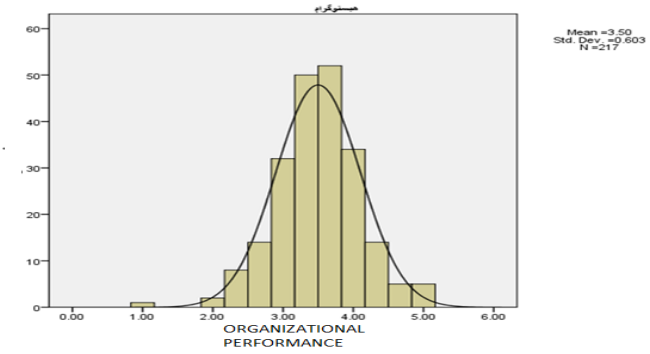

Chart 8. Variable Chart of Organizational Performance

➢ **Financial Performance Variable Description**

For the financial performance variable, the minimum score was 2.00, the maximum score was 4.83, the mean score was 3.3257, the standard deviation was 0.48506, and the variance was 0.235. The mean score indicates that respondents are at a good level. The histogram and statistical description of the financial performance variable are also presented in the table below.

Table 12. Financial Performance Variable Description

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Financial Performance	150	2.00	4.83	3.3257	0.48506	0.235

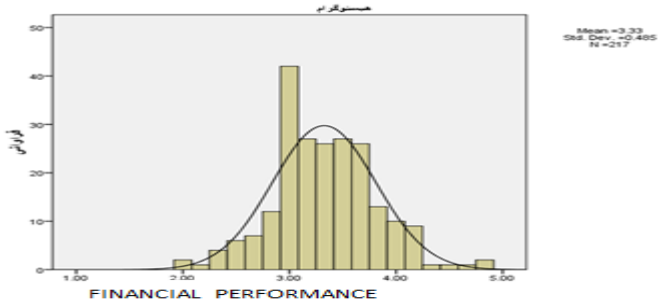

Chart 8. Variable Chart of Financial Performance

➢ **Selection of Suitable SEM Approach for Data Analysis**

A researcher intending to use Structural Equation Modeling (SEM) for data analysis in their study must understand which generation of SEM they should use. In the first generation, introduced with software such as AMOS, Lisrel, and EQS, there was a need for a large sample size (over 200), normal distribution of data, and at least three indicators for each question. However, in the second-generation approach, known for the Partial Least Squares (PLS) method and popularized with software like Smart PLS, there is no need for a large sample size or normal distribution. Considering that this study has a sample size of 150 and the data fail the normality assumption based on the Kolmogorov-Smirnov test, and considering the complexity of the research model, the data analysis approach based on Partial Least Squares (PLS) has been chosen, and data analysis is performed using Smart PLS2 software.

- **Main Model**

In the PLS method, two models are tested: the outer model equivalent to the measurement model and the inner model similar to the structural model in SEM. The outer model indicates the factor loadings of observed variables. PLS simultaneously investigates two models: the outer model (measurement model) that examines the relationships between manifest variables and latent variables, and the inner model (structural model) that measures the relationships between latent variables. (ون وو، ۲۰۱۰)

- **Outer Model Fit (Measurement Model)**

Factor Loadings

In the methodology of structural equation modeling, it is necessary to validate the constructs under study to ensure that the selected items for measuring the variables of interest are sufficiently accurate. Confirmatory Factor Analysis (CFA) is used for this purpose, where the factor loading of each item with its variable should have a t-value higher than 1.96. If this condition is met, the item is considered to have the necessary accuracy for measuring that construct or latent variable. The factor loading values for the questions of each latent variable are provided in Table (13).

Table 13. Confirmatory Factor Analysis (CFA) of Research Variables

Variables	Item	Factor Loading	t-value
Activities Identification	Q1	0.705	10.781
	Q2	0.779	15.405
	Q3	0.707	9.567
	Q4	0.751	12.486
Environmental Activities Identification	Q5	0.885	38.281
	Q6	0.843	26.871
	Q7	0.838	19.237
Outsourcing Activities	Q8	0.775	14.821
	Q9	0.787	19.930
	Q10	0.828	32.382
	Q11	0.865	32.382
Comparison of Outsourced and Non-Outsourced Costs	Q12	0.809	16.320
	Q13	0.801	12.892
	Q14	0.776	24.149
Valueless Activities	Q15	0.728	26.710
	Q16	0.863	20.547
	Q17	0.874	45.141
Organizational Performance	Q18	0.843	47.433

Variables	Item	Factor Loading	t-value
	Q19	0.815	48.246
	Q20	0.777	38.885
Financial Performance	Q21	0.893	38.885
	Q22	0.861	38.885
	Q23	0.851	38.885

The results of the conceptual model test in terms of significance and path coefficients (main and sub-model of the research) are shown in charts (9) and (10).

As depicted in Chart (10), the factor loading values of the manifest variables for all variables were above 0.4, and no items were deleted. Therefore, all items had factor loadings above 0.4 and t-values greater than 1.96, and the analysis continued with these items, proceeding to examine the model.

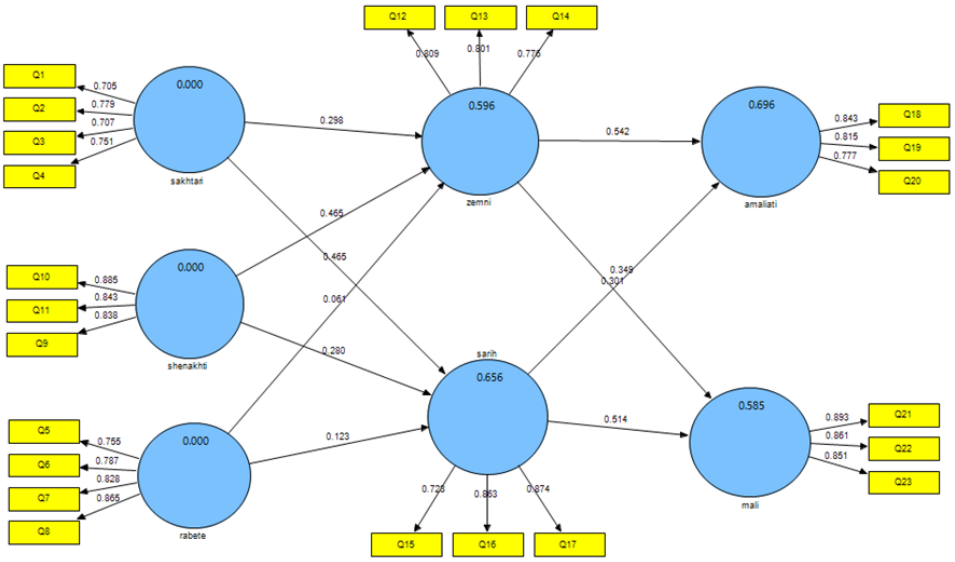

Chart 9. Path Coefficients of the Research Conceptual Main Model

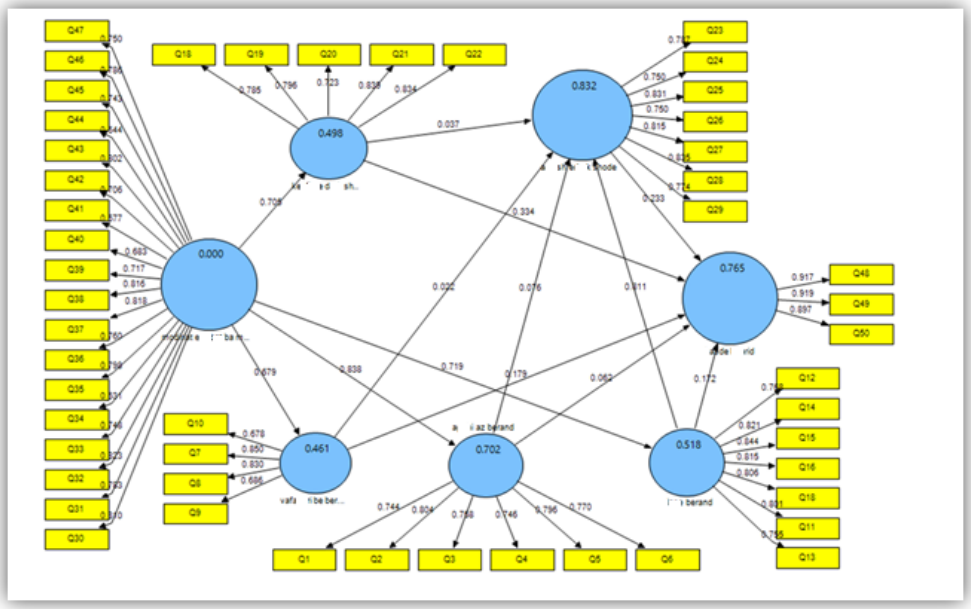

Chart 10. Path Coefficients of the Research Conceptual Sub-Model

Reliability

Convergent Validity

In structural equation modeling, besides construct validity being used to assess the importance of selected items for measuring variables, discriminant validity is also crucial. Discriminant validity ensures that the items of each variable provide adequate discrimination from other variables in the model. In simpler terms, each item should measure only its respective variable, and their combination should effectively distinguish all variables from each other. This process is evaluated using the extracted Average Variance Extracted (AVE) indicator. AVE coefficients reveal the percentage of variance in the structural or model variables explained by an individual item. For the model variables, AVE has been manually calculated. The structures or model variables with Average Variance Extracted (AVE) coefficients higher than the threshold of 0.5, as introduced by Fornell and Larcker (1981), are considered acceptable. This indicates that the items can adequately explain the variance of the research model variables.

In the measurement model, internal consistency, or the degree of reliability, is assessed by calculating composite reliability. The reliability coefficients are displayed in Table 14. In all model structures, the composite reliability is high and exceeds the threshold of 0.7, as introduced by Nunnally (1978) (Wen and Wu, 2010). Composite reliability signifies high internal consistency of the research data. Additionally, a Cronbach's alpha value above 0.7 indicates acceptable reliability, with the results presented in Table 14.

Based on the results in the above table, the comparison of Cronbach's alpha values and composite reliability as well as convergent validity (AVE values) obtained from this study with their standard values indicates that all measurement models in this study are confirmed.

Table 14. Computation of Composite Reliability for Questionnaire Items

Variables	AVE	Composite Reliability	Cronbach's Alpha value
Activities Identification	0.541	0.825	0.892
Environmental Activities Identification	0.655	0.883	0.894
Outsourcing Activities	0.731	0.891	0.869
Comparison of Outsourced and Non-Outsourced Costs	0.632	0.837	0.841
Valueless Activities	0.659	0.853	0.865
Organizational Performance	0.676	0.861	0.877
Financial Performance	0.754	0.902	0.911

Divergent Validity

Divergent validity is assessed through two methods. One is the cross-loading method, which compares the correlation between indicators of one construct with their correlations with other constructs. The other method is the Fornell and Larcker criterion, which has been used in this study, and its results are presented in Table (15).

As shown in the above table, the square root of AVE for the latent variables in the current study, placed in the main diagonal cells of the matrix, is higher than the correlation values between them, arranged in the lower left-hand side cells of the main diagonal. Therefore, it can be stated that in this study, the research variables in the model have a higher interaction with each other, meaning that the convergent validity of the model is at an appropriate level.

Table 15. Divergent validity according to Fornell and Larcker

Variables	Activity Identification	Environmental Activities Identification	Outsourcing Activities	Comparison of Outsourced and Non-Outsourced Costs	Valueless Activities	Organizational Performance	Financial Performance
Activities Identification							0.76
Environmental Activities Identification						0.77	0.73
Outsourcing Activities					0.83	0.19	0.72
Comparison of Outsourced and Non-Outsourced Costs				0.75	0.52	0.48	0.13
Valueless Activities			0.87	0.62	0.21	0.39	0.24
Organizational Performance		0.84	0.63	0.38	0.45	0.71	0.55
Financial Performance	0.81	0.28	0.16	0.47	0.48	0.21	0.41

Hypothesis Testing Results

Each hypothesis is tested by examining the sign, size, and statistical significance of the path coefficient (beta) between each independent variable and the dependent variable. The higher the magnitude of this path coefficient, the greater the predictive effect of the independent variable on the dependent variable. By considering the results of examining the relationships between independent and dependent variables using the relevant coefficients, we can investigate the meaningfulness of the effects among the research variables. To test the significance of the path coefficient or beta, the significance of the t-value for each path coefficient must be considered. For this

reason, bootstrapping is employed, and the results are reliable.(Azar and Momeni ,1998)

Hypothesis 1

There is a significant relationship between activity identification and valueless activities.

The path coefficient between activity identification and valueless activities is 29%, with a t-value higher than 1.96, indicating a positive and significant influence of activity identification on identifying valueless activities. This suggests that employees who have higher performance in terms of activity identification are likely to identify more valueless activities.

Table 16. Relationship between Activities Identification and Valueless Activities

Variables	Path coefficient	t-value	Result
Activities Identification and Valueless Activities	0.298	2.401	accept

Hypothesis 2

There is a significant relationship between activity identification and full costing.

The path coefficient between activity identification and full costing is 46%, with a t-value higher than 3.624, indicating a positive and significant influence of activity identification on full costing. This indicates that employees with higher cognitive performance will also take full costing more seriously.

Table 17. Relationship between Activities Identification and Full Costing

Variables	Path coefficient	t-value	Result
Activities Identification and Full Costing	0.465	3.624	accept

Hypothesis 3

There is a relationship between environmental activity identification and full costing.

The path coefficient between environmental activity identification and full costing is 0.6%, with a t-value lower than 1.96, indicating no positive and significant influence of environmental activity identification on full costing.

Table 18. Relationship between Environmental Activities Identification and Full Costing

Variables	Path coefficient	t-value	Result
Environmental Activities Identification and Full Costing	0.061	0.383	reject

Hypothesis 4

There is a significant relationship between environmental activity identification and valueless activities.

The path coefficient between environmental activity identification and valueless activities is 12%, with a t-value lower than 1.96, indicating no positive and significant influence of environmental activity identification on valueless activities.

Table 19. Relationship between Environmental Activities Identification and Valueless Activities

Variables	Path coefficient	t-value	Result
Environmental Activities Identification and Valueless Activities	0.123	0.866	reject

Hypothesis 5

There is a significant relationship between identifying valueless activities and financial performance.

The path coefficient between identifying valueless activities and financial performance is 29%, with a t-value higher than 1.96, indicating a positive and significant influence of identifying valueless activities on financial performance. This suggests that employees with higher performance in identifying activities will achieve higher financial performance.

Table 20. Relationship between Valueless Activities and Financial Performance

Variables	Path coefficient	t-value	Result
Valueless Activities and Financial Performance	0.298	2.401	accept

Hypothesis 6

There is a significant relationship between identifying valueless activities and organizational performance.

The path coefficient between identifying valueless activities and organizational performance is 45%, with a t-value higher than 1.96, indicating a positive and significant influence of identifying valueless activities on organizational performance.

Table 21. Relationship between Valueless Activities and Organizational Performance

Variables	Path coefficient	t-value	Result
Valueless Activities and Organizational Performance	0.465	3.624	accept

Hypothesis 7

There is a significant relationship between full costing and financial performance.

The path coefficient between full costing and financial performance is 54%, with a t-value higher than 1.96, indicating a positive and significant influence of full costing on financial performance.

Table 22. Relationship between Full Costing and Financial Performance

Variables	Path coefficient	t-value	Result
Full Costing and Financial Performance	0.542	6.977	accept

Hypothesis 8

There is a significant relationship between full costing and organizational performance.

The path coefficient between full costing and organizational performance is 30%, with a t-value higher than 1.96, indicating a positive and significant influence of full costing on organizational performance.

Table 23. Relationship between Full Costing and Organizational Performance

Variables	Path coefficient	t-value	Result
Full Costing and Organizational Performance	0.301	3.630	accept

Hypothesis 9

There is a significant relationship between outsourcing activities and identifying valueless activities.

The path coefficient between outsourcing activities and identifying valueless activities is 34%, with a t-value higher than 1.96, indicating a positive and significant influence of outsourcing activities on identifying valueless activities.

Table 24. Relationship between Outsourcing Activities and Valueless Activities

Variables	Path coefficient	t-value	Result
Outsourcing Activities and Valueless Activities	0.349	4.172	accept

Hypothesis 10

There is a significant relationship between outsourcing activities and full costing.

The path coefficient between outsourcing activities and full costing is 51%, with a t-value higher than 1.96, indicating a positive and significant influence of outsourcing activities on full costing.

The t-values indicate the significance levels of the relationships tested. Based on the results in Table (26), the t-values for two paths related to environmental activity identification and both valueless activities and full costing are insignificant, but all other paths are significant.

Table 25. Relationship between Outsourcing Activities and Full Costing

Variables	Path coefficient	t-value	Result
Outsourcing Activities and Full Costing	0.514	7.299	accept

Table 26. Direct Linear Effect of the Role of Research Variables in the Model

Direction	Beta	t-value	Result
ID Activity I see			
Identification of activities → Activities without added value	0.465	4.365	the reception
Identification of activities → Accurate calculation of the total price	0.280	2.323	the reception
Identification of E nvironmental Activities			
Environmental Activities → Activities without Added Value	0.061	0.383	Rejection
Environmental Activities → Accurate Calculation of the Total Price	0.123	0.855	Rejection
then leave Sapar Y Activity I see			
Outsourcing of Activities → Activities without Added Value	0.298	2.401	the reception
Outsourcing of Activities → Accurate Calculation of the Total Price	0.465	3.624	the reception
The active dimension of T Yes Lacking Value added			
Activity Yes Lacking Value Added → Financial Performance	0.542	6.977	the reception
Activities without added value → Organizational Performance	0.301	3.630	the reception
Calculation dimension: The exact time, The price of the entire thing done			
Computing the exact time the price of the entire done → Financial Performance	0.349	4.172	the reception
Computing the exact time the price of the entire done → Organizational Performance	0.514	7.299	the reception

Conclusion

The case and calculation model presented above offer several insights into the applicability of ABC costing for evaluating outsourcing decisions. Firstly, ABC costing must be based on a clear definition of the scope of analysis, followed by process identification. It is indisputable that no two organizations are alike, except for industries. Certain patterns and terminology, while useful, should only serve as frameworks to initiate discussions. A set of activities, known as VAS,

may be categorized as belonging to manufacturing, marketing, sales, etc., depending on the approach and goal of the analysis. However, in the discussed case, it was evident that they had to be treated as part of the logistic operation.

The second issue pertains to cost drivers. They serve a dual role. Primarily, they act as pivots through which costs are allocated to different objects (activities, customers, etc.). Secondly, they are often seen as reflecting cost determinants. Some authors differentiate between cost drivers and activity drivers, but such differentiation is rare. Scientists emphasize the importance of carefully identifying cost drivers, with a focus on balancing information value and measurement cost. However, practical experience, as demonstrated in the case under discussion, shows that interpreting their meaning correctly and using them appropriately for decision-making is far more crucial.

This brings us to the issue of idle capacity and orphan costs. One could envision allocating storage capacity on a daily basis, but it would require an ideally elastic warehouse with all costs being equally elastic (or the presence of another user with precisely matching needs). In cases of underutilization, orphaned costs must be distributed among active targets.

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