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- Other research topics related to emerging technologies in accounting

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Investigating the Moderating Role of Time Budget Pressure in the Relationship Between Professional Commitment and Underreporting of Audit Time

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Abstract

Objectives: This study aims to examine the moderating role of time budget pressure in the relationship between professional commitment and underreporting of audit time.

Methodology/Design/Approach: The research employs a descriptive-correlational design and is classified as a cross-sectional survey. Data were collected via a questionnaire. The statistical population comprises all employed auditors, with a sample size of 243 individuals. Hypotheses were tested using regression analysis with SPSS software version 22.

Findings: The results reveal a significant negative relationship between professional commitment and underreporting of audit time. Additionally, time budget pressure moderates this relationship, influencing the extent to which professional commitment affects underreporting of misconduct.

Innovation: This study contributes to the auditing literature by highlighting the interactive effect of time budget pressure on the link between auditors' professional commitment and their reporting behavior. The findings provide practical insights for audit firms seeking to manage audit quality and ethical practices under budget constraints.

Keywords: Time Budget Pressure, Professional Commitment, Underreporting of Audit Time

1. Introduction

Underreporting of audit time has emerged as a common ethical dilemma among auditors, carrying significant consequences for audit firms (Pickerd et al., 2015). This behavior can influence audit fee negotiations with clients, distort future audit time budgets, and compromise transparent evaluations of audit effectiveness (Akers et al., 1998). Although most audit firms have formal policies prohibiting the misreporting of hours (Sweeney & Pierce, 2006), auditors may still be motivated to underreport time in pursuit of more favorable performance evaluations (Anderson-Gough et al., 2001). Consequently, time underreporting has become a visible and widespread phenomenon within auditing firms (Church, 2014; Pickerd et al., 2015). Given its detrimental effects on both audit firms and the profession as a whole, identifying the factors that influence auditors' acceptance of this behavior is of critical importance.

Prior research has yielded mixed findings on the presumed influence of auditors' professional commitment and experience on ethical judgments and decision-making, including underreporting. For instance, Otley and Pierce (1996) found no significant relationship between professional commitment and time underreporting among practicing auditors, whereas Elias (2006) reported that auditing students with higher professional commitment were more likely to view underreporting as unethical.

The literature suggests that environmental factors—such as time budget pressure—may offer meaningful insights into unethical auditor behavior (Andreas, 2016). In other words, auditors may resort to underreporting time when facing significant time pressure. However, auditors with higher levels of professional commitment and a stronger sense of responsibility toward their professional duties may be better equipped to manage audit procedures, thereby reducing their exposure to time pressure and their likelihood of engaging in unethical conduct like time underreporting.

Herda and Martin (2016) argue that examining individual factors influencing underreporting in isolation may lead to incomplete or inaccurate conclusions. From their perspective, professional commitment is an important factor that may affect underreporting behavior. Similarly, Andreas (2016) contends that time budget pressure may moderate the relationship between auditors' professional commitment and their tendency to underreport audit time, and therefore should be incorporated into analytical models.

In recent years, the auditing profession in Iran has experienced a decline in public credibility and trust. Several high-profile cases of embezzlement and financial fraud have resulted in widespread criticism and accusations against auditors, raising concerns about the increasing acceptance of unethical behavior among Iranian auditors. However, empirical evidence on this issue within Iran remains scarce, and the international literature presents inconsistent findings, as exemplified by the aforementioned studies. These circumstances give rise to a key research question: What factors influence auditors' acceptance of unethical behavior, such as underreporting of audit time, in Iran? More specifically, do auditors' professional commitment and perceived time budget pressure affect their acceptance of underreporting? Furthermore, does perceived time budget pressure moderate the relationship between professional commitment and the acceptance of time underreporting?

Literature Review

Underreporting of Time

Honest reporting of actual hours worked by auditors on audit engagements has become a growing concern for auditing firms (Rudd, 1978; Leichtner et al., 1983; Ackers et al., 1998; Pickard et al., 2015; Herda & Martin, 2016), as underreporting of audit time poses a serious threat to audit quality (Donnelly et al., 2003; Stefaniak & Robertson, 2010). Time underreporting is an inefficient and unethical practice that undermines the reliability of audit procedures. It involves recording fewer hours than were actually worked, often arising when auditors complete their tasks more

quickly than expected and seek to avoid or manipulate time budgets. Researchers have noted that underreporting audit time has become a relatively simple and frequently used strategy (e.g., Rudd, 1987; Otley & Pierce, 1996).

Ackers et al. (1998) argue that underreporting audit time results in various losses for both audit firms and auditors. These losses include:

- Audit firms use reported hours to prepare the time budgets for subsequent years; therefore, underreporting can lead to unrealistic benchmarks against which future auditor performance is evaluated or force further underreporting.
- Audit firms rely on reported times when negotiating fees with clients.
- Reported times are used to assess the effectiveness of auditing methods on current engagements.
- Time records inform resource allocation decisions within the firm.
- In certain cases, firms use reported times to justify additional billing to clients.

These consequences can harm not only audit firms but also the credibility of the auditing profession as a whole (Herda & Martin, 2016). In response, most auditing firms explicitly prohibit inaccurate time reporting through internal policies (Bouchet et al., 2003; Sweeney & Pierce, 2006; Smith & Houghton, 2011).

Sweeney and Pierce (2006), in their study of time underreporting, found that audit firm partners identified three primary causes of this behavior: lack of competence, pressure from performance evaluation and budgeting systems, and requests from management. Numerous studies have confirmed that auditors admit to engaging in time underreporting (e.g., Kelly & Margheim, 1987; McNeil, 1991; Otley & Pierce, 1996). Punman (1992) found that auditors with lower levels of ethical reasoning are more likely to take underreporting lightly. The reasoning underpinning Punman's study, along with similar research, is that underreporting is an unethical response to time budget pressure.

Furthermore, according to Herda and Martin (2016), professional commitment is another factor that may influence auditors' acceptance of unethical underreporting behavior. They emphasize the importance of including such factors in a comprehensive analytical model that accounts for the various roles they may play. Accordingly, the following sections present the theoretical foundations related to auditors' professional commitment and perceived time budget pressure as factors contributing to underreporting audit time.

Professional Commitment

One key factor that may influence auditors' acceptance of underreporting audit time is their level of professional commitment (Herda & Martin, 2016). Professional commitment refers to an individual's dedication to professional responsibilities, identification with the profession, and adherence to its goals and ethical standards (Sorensen & Sorensen, 1974). In the accounting literature, professional commitment is typically defined as belief in and acceptance of the profession's goals and values, willingness to make substantial efforts on behalf of the profession, and a desire to maintain membership in it (Aranya et al., 1981; Aranya & Ferris, 1984).

Professional commitment is believed to develop through the process of professional socialization that occurs as individuals enter and progress within the field (Aranya et al., 1982). Prior research has found evidence of a positive association between audit experience and professional commitment (Aranya & Ferris, 1984; Jeffrey & Weatherholt, 1996; Smith & Hall, 2008; Sodabi et al., 2009). As auditors gain experience and become more embedded in the culture of the profession, their level of professional commitment is likely to increase (Hall et al., 2005). Accordingly, auditors' experience is expected to be positively related to their level of professional commitment (Herda & Martin, 2016).

Aranya et al. (1981) suggest that individuals with stronger professional commitment exhibit greater sensitivity to ethical issues. Similarly, Lord and DeZoort (2001) argue that professional commitment encourages auditors to act in the public interest and avoid behaviors that could damage the profession. Conversely, auditors with lower levels of commitment may be more susceptible to unethical behavior. However, empirical research on the relationship between professional commitment and ethical evaluations has produced mixed findings (Elias, 2006). For example, Shaub et al. (1993) found no significant association between professional commitment and auditors' ability to identify ethical issues. In contrast, studies by Jeffrey and Weatherholt (1996), Jeffrey et al. (1996), and Taylor and Curtis (2010) reported a positive relationship between professional commitment and ethical behavior, including auditors' intention to report suspicious activities.

Research findings regarding the relationship between professional commitment and the acceptance of underreporting audit time are similarly inconsistent. Otley and Pierce (1996) found no significant association between professional commitment and underreporting behavior. However, Elias (2006), in a study of auditing students, found that those with higher professional commitment were less likely to accept underreporting audit time. Supporting this view, Herda and Martin (2016) found that stronger professional commitment was associated with a lower likelihood of accepting underreporting. These results are consistent with the theoretical perspectives of Aranya et al. (1981) and Lord and DeZoort (2001), who suggest that greater professional commitment enhances ethical awareness, thereby reducing the acceptance of unethical behaviors such as time underreporting.

Therefore, a negative relationship between professional commitment and the acceptance of underreporting audit time is anticipated. Based on this reasoning, the first hypothesis is proposed as follows:

Hypothesis 1: There is a significant relationship between auditors' professional commitment and their underreporting of audit time.

Time Budget Pressure

Recent auditing research has explored the impact of time budget pressure on auditors. Findings suggest that auditors respond to this pressure in various ways, including manipulating recorded hours, superficially reviewing client documentation, prematurely or inappropriately completing audit sections, and underreporting audit time. According to Ponemon (1992), underreporting audit time often creates ethical tension, as the behavior typically violates firm policies or established standards. Moreover, Ponemon observed that auditors expressed concern about violating professional norms upheld by their peers. Otley and Pierce (1996) similarly found that although audit firm policies formally disapprove of time underreporting, the practice is frequently tolerated—either implicitly or explicitly—by firm leadership.

Rudd (1978) reported that 55% of certified public accountants had engaged in underreporting audit time. Leightner et al. (1982) found an even higher rate of 67%. Additionally, Otley and Pierce (1996) revealed that 55% of respondents admitted to occasionally underreporting time. Ponemon (1992), in a training program setting, observed actual instances of underreporting and concluded that auditors are vulnerable to time budget pressure, often reporting fewer hours than were actually worked. Almer et al. (2005) argue that a distinctive feature of audit work is the inherent incentive to underreport time in order to meet strict time constraints.

Based on these findings, it is reasonable to expect a positive relationship between auditors' perceived time budget pressure and the tendency to underreport audit time. Auditors working under such pressure are more likely to engage in unethical behaviors, including time underreporting.

Furthermore, time budget pressure may influence the strength of professional commitment. Under high pressure, the effectiveness of professional commitment in deterring unethical behavior may be diminished. That is, when auditors experience intense time pressure, their level of professional commitment may have a weaker impact on reducing underreporting.

Accordingly, it is anticipated that time budget pressure moderates the relationship between professional commitment and underreporting audit time. Based on this reasoning, the second hypothesis is proposed:

Hypothesis 2: Time budget pressure, as perceived by the auditor, moderates the relationship between professional commitment and underreporting of audit time.

Research Methodology

This study adopts a quantitative research design, employing the scientific method for model development and empirical validation. It is structured around predetermined hypotheses and a formal research framework. This approach is appropriate when data are measured quantitatively and statistical techniques are applied to derive conclusions. Additionally, because data were collected via questionnaires, the study also qualifies as a survey-based investigation. In terms of purpose, it falls under the category of applied research.

The study variables and their respective measurement methods are described as follows:

- **Professional Commitment**: Measured using the validated questionnaire developed by Herda and Martin (2016).
- **Time Budget Pressure (from the Auditor's Perspective)**: Measured using a researcher-developed questionnaire tailored to the context of this study.
- **Underreporting of Audit Time**: Also measured using the questionnaire developed by Herda and Martin (2016).

To assess the reliability of the questionnaires, Cronbach's alpha was calculated. The results indicated that the alpha values for all instruments exceeded the threshold of 0.70, demonstrating acceptable internal consistency.

The statistical population of this study comprises all auditors employed by auditing firms in Iran, including those working within the Iranian Audit Organization. Since there were no specific criteria guiding the selection of sample members, a simple random sampling method was employed. Given the lack of precise data on the total population size, Cochran's formula for an unknown population was used to determine the appropriate sample size, which was calculated to be 384 respondents.

To enhance the statistical power of the study and minimize both Type I (false positives) and Type II (false negatives) errors, a total of 400 questionnaires were distributed across the target population. Through repeated follow-ups, 243 completed questionnaires were returned, representing a response rate of 61%.

For data analysis, inferential statistical methods were applied, including the Pearson correlation coefficient and both simple and multiple linear regression analyses, using SPSS software (version 22). To test the study's two hypotheses, Regression Models 1 and 2—as described in the following section—were employed.

$$UTB = \beta_0 + \beta_1(PC) + \varepsilon \quad (1)$$

$$UTB = \beta_0 + \beta_1(PC) + \beta_2(TBP) + \beta_3(PC*TBP) + \varepsilon \quad (2)$$

In the above models, UTB represents underreporting of audit time, PC represents professional commitment, and TBP represents time budget pressure.

Findings

The results from the descriptive analysis of the demographic questions in the questionnaire reveal that among the 243 respondents, 174 individuals (71.6%) were male, while the remaining were female. The age distribution of the respondents indicates that 46.9% were between 30 and 40 years old, 94.7% were under the age of 50, and only 5.3% were older than 50.

Regarding educational attainment, 78.6% of the respondents held either a bachelor's or a master's degree. In terms of work experience, 22.6% had less than 5 years, 44.9% had between 5 and 10 years, 28% had between 11 and 20 years, and only 4.5% had more than 20 years of experience in their respective roles.

Table 1 presents the descriptive statistics for the main research variables. Based on the data in the table, respondents predominantly selected response options indicating moderate agreement with the items

measuring professional commitment, underreporting of audit time, and perceived time budget pressure. These findings suggest that the overall level of professional commitment among respondents is above average, and that a notable perception of time budget pressure exists within the sample.

Table 1. Descriptive statistics of the research variables

	Min	Max	Mean	S.D.
Professional Commitment	2.818	6.545	5.116	0.843
Underreporting Audit Time	2.500	7	4.545	0.924
Time Budget Pressure	2	6.800	5.037	1.078

Table 2 presents the correlation matrix among the research variables, obtained through Pearson's correlation coefficient. The results indicate a significant negative correlation between underreporting audit time and both professional commitment and time budget pressure at the 95% confidence level. Additionally, a significant positive correlation is observed between professional commitment and time budget pressure at the same confidence level.

Table 2. Summary of correlation coefficients

	Professional Commitment	Underreporting Audit Time	Time Budget Pressure
Professional Commitment	1		
Underreporting Audit Time	-0.313 (0.000)	1	
Time Budget Pressure	0.468 (0.000)	-0.478 (0.000)	1

Table 3 presents the results of testing the first hypothesis. The F-statistic for the regression model is 183.26, indicating that the model is statistically significant at the 95% confidence level. The Durbin-Watson statistic of 2.030 suggests there is no evidence of serial autocorrelation in the residuals. The adjusted R^2 value of 0.094 implies that approximately 9.4% of the variance in the dependent variable is explained by the independent variable. Additionally, the Kolmogorov-Smirnov test confirms that the residuals of the regression model are normally distributed, supporting the validity of the model assumptions.

Table 3. Regression results for testing the first hypothesis

Var.	β	Standard error	t-stat	P value
Constant	2.758	0.348	7.926	0.000
professional commitment	-0.343	0.067	-5.117	0.000
R^2	R^2_{adj}	D-W stat	F stat	Sig.
0.098	0.094	2.030	26.183	0.000
	Z stat	0.854	Sig.	0.302

Table 3 presents the regression coefficients for the model testing the first hypothesis, along with their corresponding significance levels. The results indicate a significant negative relationship between professional commitment and underreporting audit time at the 95% confidence level.

Table 4 summarizes the results for the second hypothesis. The overall model significance is supported by the F-statistic of 26.493 ($p < 0.05$), indicating that the regression model is statistically significant at the 95% confidence level. The Durbin-Watson statistic of 1.915 suggests the absence of serial autocorrelation in the regression residuals. Furthermore, the adjusted R^2 value of 0.240 indicates that approximately 24% of the variance in underreporting audit time is explained by the independent variables included in the model. The Kolmogorov-Smirnov test confirms that the residuals of the regression model are normally distributed, supporting the validity of the regression assumptions.

Table 4 presents the regression coefficients for the model testing the second hypothesis, along with their corresponding significance levels. According to the data, the coefficient for professional commitment is not statistically significant at the 95% confidence level, indicating no direct significant relationship between professional commitment and underreporting audit time. Similarly, the relationship between time

budget pressure and underreporting audit time is also not significant at the 95% confidence level. However, the interaction term between professional commitment and time budget pressure shows a negative coefficient that is statistically significant at the 90% confidence level. This finding suggests that time budget pressure moderates the relationship between professional commitment and underreporting audit time, weakening the effect of professional commitment under increased time pressure.

Table 4. Regression Results for Testing the Second Hypothesis

Var.	β	Standard error	t-stat	P value
Constant	4.762	1.517	3.139	0.002
professional commitment (1)	0.441	0.315	1.398	0.163
Time Budget Pressure (2)	0.187	0.304	0.614	0.540
(1) * (2)	-0.113	0.061	-1.840	0.067
R^2	**R^2_{adj}**	**D-W stat**	**F stat**	**Sig.**
0.250	0.240	1.915	26.493	0.000
Z stat		1.307	**Sig.**	0.066

Discussion and Conclusion

The analysis of the demographic data obtained from the general section of the questionnaire indicates that 85.2% of the respondents hold at least a bachelor's degree, and 71.6% are male. Moreover, 77.4% have more than five years of work experience in their current roles. These findings provide a robust empirical foundation for examining the relationship between professional commitment and underreporting of audit time, particularly with respect to the moderating role of perceived time budget pressure.

The results of testing the first hypothesis revealed a significant negative relationship between professional commitment and underreporting of audit time. Specifically, as auditors' professional commitment increases, their tendency to underreport audit hours decreases. Therefore, the first hypothesis is supported with a statistically acceptable level of confidence. This finding is consistent with the results of Andreas (2016). The theoretical justification aligns with prior literature: auditors with higher levels of professional commitment feel a greater sense of responsibility toward accurate reporting of audit hours and are thus less likely to engage in time underreporting.

Analysis related to the second hypothesis demonstrated that time budget pressure, as perceived by auditors, moderates the relationship between professional commitment and underreporting of audit time. Thus, the second hypothesis is also supported. More specifically, time budget pressure significantly weakens the negative relationship between professional commitment and underreporting. In other words, even auditors with strong professional commitment are more likely to underreport audit time when they experience high levels of time pressure. This result is also in line with the findings of Andreas (2016). The underlying reason is that, under time pressure, auditors may feel compelled to appear compliant with time budgets, and therefore resort to underreporting, despite their commitment to professional standards.

Based on the findings of the first hypothesis, it is recommended that audit firm managers and regulatory bodies—such as the Iranian Association of Certified Public Accountants—take steps to strengthen professional commitment among auditors. One effective strategy could involve offering training programs focused on professional identity and ethical responsibilities. These initiatives may help mitigate tendencies toward underreporting. Furthermore, curriculum designers in accounting education are encouraged to place greater emphasis on professional ethics and commitment in academic syllabi, enabling future auditors to develop a strong sense of professional responsibility during their studies.

In light of the second hypothesis, it is recommended that audit firm managers avoid assigning unrealistic time budgets that impose excessive pressure on auditors. Doing so may reduce the likelihood of underreporting and promote more ethical behavior among auditing professionals.

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The Impact of Sustainability Reporting Disclosure on the Information Content of Earnings Considering the Role of Competition in the Market

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Abstract

Objectives: This study aims to examine the effect of sustainability reporting disclosure on the information content of earnings, with a focus on the moderating role of market competition.

Methodology/Design/Approach: A sample of 146 firms listed on the Tehran Stock Exchange from 2014 to 2023 was selected using the systematic elimination method. The study employed a multiple linear regression model based on panel data to test the research hypotheses. The information content of earnings was assessed, and a disclosure checklist was used to evaluate the extent of sustainability reporting.

Findings: The results indicate a direct and significant relationship between sustainability reporting disclosure and the information content of earnings. Additionally, market competition significantly influences this relationship, enhancing the impact of sustainability disclosure on earnings informativeness.

Innovation: This study contributes to the literature by providing empirical evidence on how sustainability disclosure and market competition jointly shape the quality and informativeness of financial reports. The findings highlight the growing importance of sustainability performance in enhancing the transparency and credibility of earnings, especially in competitive markets. The results emphasize that improved disclosure practices, supported by a competitive environment, can enhance the value relevance of accounting information for stakeholders.

Keywords: Sustainability Reporting Disclosure, Earnings Information Content, Market Competition..

1. Introduction

Members of the capital market are exposed daily to numerous information signals, such as dividend announcements, which require careful evaluation of their quality. When investors face uncertainty about the future prospects of and the overall economy, or lack sufficient information regarding future cash flows, processing these signals becomes challenging (Rostami et al., 2023). Under such uncertainty, receiving information signals like accounting earnings announcements can lead investors to revise their prior beliefs about the future state of firms and the market. Consequently, the information content of financial statements plays a crucial role in reducing this uncertainty (Arab Salehi et al., 2018).

The ultimate goal of accounting operations is to provide accurate and reliable information to investors and other users. Among the key components of financial reports, net profit holds significant influence over users' future decisions. However, a critical question arises: does the information content of reported profits fully convey all relevant facts to users? Addressing this question necessitates investigating factors that affect the quality of corporate information disclosure, including the extent of sustainability reporting (Maloline, 2019; Al-Shaer, 2020).

Sustainability reporting encompasses the environmental, social, and economic achievements of a firm and demonstrates how a business incorporates these considerations into its development plans. One important aspect of such reporting is the product lifecycle assessment. Sustainability reports assure shareholders and stakeholders that non-financial risks and opportunities related to the sector's activities are acknowledged and managed. Organizations are expected to identify and address these diverse dimensions according to systematic frameworks (Das et al., 2024). Guided by international standards, sustainability reporting has gained prominence to the extent that it is mandated by legislation in several countries.

The concept of sustainability has emerged over the past century as a critical theme in corporate activities, highlighting businesses' obligations to undertake fundamental reforms aimed at creating a fair world—one that ensures prosperity and well-being for all while preserving the environment and cultural heritage for future generations (Trol et al., 2020). Firms that demonstrate greater willingness and commitment to disclosing comprehensive sustainability performance are likely to exhibit higher commitment to transparent and high-quality information disclosure (Maloline, 2019; Al-Shaer, 2020). This commitment can influence the quality of information received by investors. Accordingly, the present study aims to examine whether sustainability reporting disclosure affects the information content of a firm's earnings.

Competitiveness is defined as a firm's economic capability to maintain or expand its market share in domestic and international markets. According to Porter (1990), product market competition influences managerial decisions and represents a significant determinant of corporate profitability. The competitive literature suggests that intense competition motivates managers to improve efficiency, as competitive forces quickly eliminate underperforming managers. Furthermore, product market competition functions as an external corporate governance mechanism, supervising management and mitigating agency costs (Demouri & Izadi, 2019). Competition among firms encourages firms to enhance their services and information quality to attract and retain investors, thereby potentially increasing the informational content of earnings when combined with sustainability disclosure (Rahman et al., 2024). Hence, the second objective of this study is to investigate whether the interaction between market competition and sustainability disclosure affects the informational content of firms' earnings.

In recent years, the management and transparency of corporate performance reports have gained increasing importance. Sustainability reports, which reflect a firm's economic, social, and environmental performance, serve as tools for building stakeholder trust. The quality of sustainability reporting is therefore critical for organizations seeking to highlight

their commitment to sustainable development. Beyond enhancing sustainability performance, these reports can improve a firm's reputation, facilitating higher rankings in international markets and integration into global transactions (Hekmat et al., 2025). Such improvements may increase the informational content of earnings available to users.

Earnings information content refers to the extent to which earnings data is utilized by financial information users in their decision-making processes. It reflects whether accounting earnings provide meaningful and useful insights to investors and other stakeholders. Given that earnings are a key indicator of corporate performance and a basis for financial decisions, their presentation must be clear and informative. The informational content of earnings assists investors in assessing past performance and forecasting future results. Stable and predictable earnings reduce investment risk, highlighting the value of focusing on earnings information content to enhance financial reporting quality. This attention promotes transparency, accountability, and improved decision-making by investors, underscoring its importance.

Given the inconclusive evidence both domestically and internationally regarding the impact of sustainability reporting on earnings information content, this study addresses an existing research gap by integrating these themes in a novel way. The structure of the study proceeds as follows: first, the theoretical framework and hypotheses are developed; next, the research methodology and operational definitions of variables are presented; finally, the empirical findings and conclusions are discussed.

Theoretical Foundations and Research Background

In conditions of uncertainty, the future prospects of firms, institutions, and capital markets are unclear. In such environments, the arrival of information signals from corporate reports helps reduce these ambiguities, thereby influencing investors' beliefs and decisions. Pastor and Veronesi (2009) emphasize that uncertainty is an inherent characteristic of financial and investment markets. Generally, positive information transforms potential opportunities into realized gains (Arab Salehi et al., 2018). Earnings, as a fundamental element of financial statements, contain informational content when they influence investors' decisions, particularly regarding the prediction of stock returns. The informational content of earnings is often assessed by examining the relationship between earnings and stock returns; the greater the extent to which earnings explain stock prices or returns, the higher their informational value and relevance. This approach traces back to the seminal study by Ball and Brown (1968).

The informational content of an accounting variable pertains to its usefulness and extent of application in financial decision-making processes. Owlson and Feltham (1995) argue that reported earnings often lack strong explanatory power due to their low information content and limited reliability. Transparency is a critical attribute of financial statements that confers information content; such transparency involves qualities like availability, reliability, comprehensiveness, relevance, and timeliness (Banimahd et al., 2016). Hendricksen and Breda (1992) define information content as data capable of exerting a significant impact, emphasizing that information should reduce uncertainty and convey a message valuable enough to justify its cost of acquisition. Furthermore, information must have the potential to influence decision-making; a message qualifies as containing information only if it causes the recipient to revise decisions (Namazi & Zare, 2004). Specifically, the informational content of reported net profit can be measured by changes in stock price or abnormal returns occurring around the announcement date of net profit (Scott, 2007).

Corporate sustainability represents a holistic business approach where organizations aim to create long-term value for all stakeholders. This approach extends beyond environmentally friendly strategies to include social, cultural, and economic dimensions alongside environmental considerations. Corporate

sustainability comprises all strategies and activities that satisfy present stakeholders' needs while preserving the resources required by future generations. It is a broader concept than corporate social responsibility (CSR), encompassing elements of CSR, corporate citizenship, and corporate governance. According to this approach, firms of all sizes and operational scales are urged to incorporate social and environmental impacts into their activities, thereby removing long-term economic constraints through innovative solutions. A sustainable economy demands businesses to operate differently from today by generating more value with fewer resources. Consequently, organizations pursue extensive reporting to meet the diverse interests of stakeholders, whose social, environmental, and economic concerns define organizational success (Feng, Hassan, & Alamer, 2020).

The disclosure of sustainability reporting is underpinned by several foundational theories that provide its conceptual basis, notably stakeholder theory and legitimacy theory. Stakeholder theory asserts that firms must account for the interests and impacts of their activities on various stakeholder groups in their decision-making processes, thereby demonstrating commitment to these groups. Legitimacy theory posits that organizations must maintain social legitimacy by aligning their operations with societal values and expectations. Social and environmental reporting, therefore, functions as a mechanism through which firms exhibit conformity with social norms and ethical standards, reinforcing their broader responsibilities beyond financial performance (Vahiuni et al., 2024). These theories collectively underscore transparency and accountability as pillars of contemporary corporate governance, establishing social and environmental accounting as integral to corporate sustainability strategies.

Signaling theory further enhances understanding of social and environmental accounting by explaining how firms utilize sustainability reporting to signal commitment to responsible practices. Through these disclosures, firms aim to influence public perception and strengthen their credibility as sustainable entities (Epstein, 2018). Accordingly, the disclosure of sustainability reporting impacts the information content of accounting reports, especially corporate earnings. Based on this rationale, the first hypothesis of this research is formulated as follows:

H1: Disclosure of sustainability reporting affects the information content of firms' earnings.

A market is both a place and a situation where buyers and sellers engage in the exchange of goods and services. Among the various factors influencing market dynamics, competition plays a significant role in shaping corporate policies. Market power refers to a firm's ability to control the price and production level of its products. Based on the review of prior studies, it is evident that competition affects corporate policies differently according to three main theories: consequence, substitution, and hunting theories.

Strategic management literature emphasizes that in today's highly competitive environment, firms must secure competitive advantages to survive and thrive. This competitive advantage essentially reflects a firm's market power. Product market power is defined as a firm's capacity to set prices for its products rather than being a price taker. Furthermore, market competitiveness fosters greater effectiveness and cultivates a culture of good governance. This is achieved through enhancing managerial efficiency, promoting transparency in decision-making, elevating managerial accountability, reducing risks stemming from poor investment decisions, and ensuring market prices reflect true economic values (Mohaghegh Kia, 2021).

Competition within markets can establish a structured order among firms. Firms operating in highly competitive markets tend to provide higher quality information to attract investors and demonstrate their commitment to safeguarding stakeholders' interests. This increased transparency and information quality can positively influence the quality of financial reporting (Amjad Iqbal et al.,

2017). Accordingly, the following hypothesis is proposed:

H2: Competition in the market affects the relationship between the disclosure of sustainability performance and the information content of earnings.

Literature Review

Numerous recent studies have explored the relationship between sustainability reporting, financial disclosure quality, and corporate financial performance, highlighting various mechanisms and contextual factors that influence this interplay.

Hekmat et al. (2025) examined the impact of sustainability reporting disclosure and the comparability of accounting information on earnings continuity. Their study emphasized that sustainability reporting aids firms in identifying sustainability risks and managing earnings, while also improving their international rankings and interactions. Additionally, comparability in accounting information facilitates stakeholders' ability to discern similarities and differences in financial data, thus supporting more informed decision-making and contributing to the continuity of earnings.

Ferdows et al. (2025) found a positive relationship between Environmental, Social, and Governance (ESG) performance and financial disclosure quality (FSDQ). Their analysis highlighted that managerial competence and a strong organizational culture strengthen this relationship. Furthermore, they identified that firms with high-quality accounting practices exhibit better financial report readability, whereas complexity in reporting diminishes this effect. The robustness of these findings was confirmed through advanced econometric techniques including Heckman's two-step estimation.

Ali et al. (2024) explored the complex relationship between sustainability disclosure and earnings management. Their findings underscore the significance of internal factors such as ownership structure and corporate governance, as well as external factors including information asymmetry and corporate credibility. This study extends stakeholder and institutional theories by providing a comprehensive framework that integrates sustainability and financial practices, offering practical insights for researchers and practitioners.

Zhou et al. (2024) investigated sustainability disclosure in the energy sector across Belt and Road Initiative countries, with a focus on the moderating role of ownership concentration. Their results revealed positive associations between environmental and social disclosures and financial performance, while corporate governance disclosure showed no significant effect. Ownership concentration was found to positively moderate the relationships involving environmental and social disclosures, suggesting that firms in developing countries should prioritize these areas to sustain financial performance.

Yousefizadeh and Fakhari (2024) identified twenty corporate characteristics influencing sustainability reporting through confirmatory factor analysis. They categorized sustainability reporting into eight dimensions—including firm size, board composition, ownership, regulatory and governance structures, industry strategy, profitability, and leverage—and noted a reciprocal relationship between sustainability disclosure and return on equity.

In the Iranian capital market context, Pourgholami Dafchahi et al. (2023) reported a positive and significant relationship between sustainability disclosure quality and sustainability performance. However, they noted that the overall quality of sustainability disclosure remains low, limiting its effectiveness.

Rostami et al. (2023) analyzed the effect of auditor conservatism on the information content of earnings, finding that higher conservatism reduces the sensitivity of returns to reported profits. Importantly, they showed that comparability of accounting information amplifies this negative relationship.

Khalifeh Soltani and Alishahi (2022) focused on the relationship between sustainability disclosure and risk, revealing a significant negative association between sustainability disclosure and systematic risk. Their findings suggest that sustainability reporting

enhances brand transparency and credibility, thereby mitigating systematic risk.

Onsiview et al. (2020) emphasized that integrating corporate social reporting into financial performance assessment transforms sustainability into tangible value for stakeholders, suggesting that non-financial disclosures can have financial significance once controlling for other financial factors.

Jafari Jam et al. (2019) employed Resource-Based Perspective and Stakeholder Relationship Expectation theories to demonstrate a positive impact of sustainability information disclosure on financial performance and corporate value, highlighting stakeholder compliance as a key driver.

Kashanipour et al. (2018) investigated the relationship between sustainability information disclosure and financial reporting quality, revealing that firms engaging in earnings management use sustainability reporting to compensate for lower financial report quality. They also found positive associations between conservatism, accrual quality, and sustainability disclosure.

Lastly, Hannon et al. (2018), drawing on stakeholder, legitimacy, signaling, and political economy theories, found that environmental performance and disclosure significantly improve financial performance. Their study controlled for firm size and growth, and focused on manufacturing firms in Indonesia.

Research Methodology

The present study is applied in nature and employs a causal-correlational research design. The statistical population consists of all firms listed on the Tehran Stock Exchange (TSE) over the period from 2014 to 2023. The sampling criteria were established to ensure comparability of financial information at the fiscal year-end in March. Specifically, the sample includes firms that have maintained a consistent financial reporting period throughout the entire 10-year study timeframe and have complete data available for the selected variables. Firms classified within the banking, insurance, and investment sectors were excluded due to their distinct regulatory and financial reporting frameworks. Following these criteria, a final sample of 146 firms was selected.

For data analysis, the study utilized panel data techniques, employing the combined data method to leverage both cross-sectional and time-series dimensions. Statistical tests and hypothesis evaluations were conducted using EViews 12 software, with robust standard errors applied to address potential heteroscedasticity and autocorrelation in the panel data models.

Operational Definitions of Research Variables

Dependent Variable: Profit Information Content

The dependent variable of the research is the information content of earnings. According to the studies by Setayesh and Ebrahimi (2012), Mehr Azin et al. (2012), Firth et al. (2007), Varfield et al. (1995), and Rostami et al. (2023), the earnings response coefficient (the relationship between earnings and returns) is used to measure it. The difference between the profit of the current period and the previous period, divided by the deflator (total assets of the first period), has been used.

Abnormal returns (AR):

$$AR_{i,t} = R_{i,t} - R_{m,t}$$

Actual stock return ($R_{i,t}$): The difference between the stock price at the beginning of the period and the stock price at the end of the period, with the effects of cash dividends and capital increase.

Market Return ($R_{m,t}$): The market return is equal to the index of the whole period minus the index of the whole of the previous period divided by the index of the whole of the previous period.

Abnormal Profit (Profit Variations) (ΔNI): Profit for the period minus the profit of the previous period divided by the total assets.

Independent Variable: Sustainability Reporting Disclosure (RS)

Following the research of Hekmat et al. (2025), to evaluate the quality of sustainability reporting disclosure, the research checklist of Rahmani and Mahmoudkhani (2021) was used with the necessary adjustments. Based on this checklist, thirteen main components of sustainability reporting were identified, which include generalities, organizational health and accountability, leadership structure, sustainable investment, information technology, compliance management, education and development, diversity, social inclusion and fair opportunities, employees, customers, corporate citizen activities, and the dimension of life, environment, and climate change. Inspired by the research of Khong et al. (2022), specific mathematical relationships were used to measure each of the mentioned components.

RS_Economic = $\sum(X_i / ni)$

RS_Environment= $\sum(X_i / ni)$

RS_Social= $\sum(X_i / ni)$

RS = RS_Economic + RS_Environment + RS_Social

In order to measure the amount of disclosure of information related to economic, environmental, and social dimensions, a binary variable (Xi) was defined. If the firm under study disclosed the criteria proposed in each of the mentioned dimensions, the value of the binary variable (Xi) was considered equal to one and otherwise equal to zero (Hekmat et al., 2025).

Moderating Variable: Market Competition (HHI)

Market competition in industries can be calculated by the Herfindahl-Hirschmann index. The Herfindahl-Hirschmann index measures the level of competitiveness in various industries so that if the value obtained from the median in the sample is higher, the number will be 1, and if not, the number will be zero.

$HHI = \sum^{n}_{i=1} (Si/S)^2$

Where:

HHI: Herfindahl-Hirschmann Index

SI: Firm Sales Revenue

S: Total sales revenue of firms in the firm's industry

n: The number of firms in the industry (Tariverdi et al., 2017).

Research Control Variables

SIZE: The natural logarithm of total assets.

boardind: The ratio of non-obligated members of the board of directors to the total members.

Liquidity: The ratio of cash to total assets.

LEV: Total debt divided by total assets.

Growth: The sales of the period, minus the sales of the previous period, divided by the sales of the previous period.

Age: The natural logarithm of the year the firm was established from the year in question.

Research Regression Models

Regression Model to Test the First Hypothesis

$$AR_{it} = \beta_0 + \beta_1 \Delta NI_{it} + \beta_2 \Delta NI_{it} \times RS + \beta_3 \Delta NI \times SIZE_{it} + \beta_4 \Delta NI \times Board\ Ind_{it} + \beta_5 \Delta NI \times Cash_{it} + \beta_6 \Delta NI \times LEV_{it} + \beta_7 \Delta NI \times growth_{it} + \beta_8 \Delta NI \times Age_{it} + \varepsilon_{it}$$

Regression Model to Test the Second Hypothesis

$$AR_{it} = \beta_0 + \beta_1 \Delta NI_{it} + \beta_2 \Delta NI_{it} \times RS + \beta_3 \Delta NI_{it} \times HHI + \beta_4 (\Delta NI_{it} \times RS \times \Delta NI_{it} \times HHI) + \beta_5 \Delta NI \times SIZE_{it} + \beta_6 \Delta NI \times Board\ Ind_{it} + \beta_7 \Delta NI \times Cash_{it} + \beta_8 \Delta NI \times LEV_{it} + \beta_9 \Delta NI \times growth_{it} + \beta_{10} \Delta NI \times Age_{it} + \varepsilon_{it}$$

Research Findings

The findings of the research include descriptive and inferential statistics, which are first presented in Table 1 of descriptive statistics.

Table 1 shows the descriptive statistics of the research variables. As can be seen, the average financial leverage of the firm is 0.53, which shows that most of the data is around this point. The highest standard deviation is related to the disclosure of sustainability reporting (2.62), and the lowest is related to the firm's liquidity (0.044). The maximum and minimum amounts are also shown in the data.

According to the results obtained in Table 2, it can be seen that the significance level of the variables in the durability test is less than 5%, indicating that the variables are manufacturable.

The results in Table (3) show that the significance level of the variance test in the two research models is less than 5%, indicating the presence of heteroscedasticity in the disturbance terms. Additionally, the significance level of the serial autocorrelation test in the research model is less than 5%, indicating the existence of serial autocorrelation in the model. In the final estimation of the model, the GLS command was used in Eviews software with the standard error correction tool. The significance level of the F-Limer test, being less than 5%, confirms the panel data model. Moreover, the Hausman test, with a significance level higher than 5%, confirms the appropriateness of the common effects model.

Table (1). Descriptive statistics of research variables

Variable	Mean	Max	Min	Std.v
AR	0.26	4.46	-1.38	1.14
ΔNI	0.041	0.45	-0.35	0.12
Rs	6.51	22.00	3.00	2.62
HHI	0.49	1.00	0.0000	0.50
SIZE	15.25	19.81	11.63	1.75
Board ind	0.62	0.80	0.0000	0.18
CASH	0.044	0.19	0.001	0.044
LEV	0.53	0.99	0.099	0.20
growth	0.38	1.60	-0.38	0.45
AGE	3.67	4.20	2.77	0.35

Table 2: Reliability Test of Quantitative Research Variables

Variable	Test Statistics	Sig	Results
AR	-23.8817	0.0000	Stationary
ΔNI	-12.5445	0.0000	Stationary
Rs	-9.84307	0.0000	Stationary
HHI	-4.68783	0.0000	Stationary
SIZE	-11.0301	0.0000	Stationary
Board ind	-2.24191	0.0000	Stationary
CASH	-14.2589	0.0000	Stationary
LEV	-10.3993	0.0000	Stationary
growth	-6.93472	0.0000	Stationary
AGE	-95.2573	0.0000	Stationary

Table (3): Results of Classical Regression Presupposition Tests

Test Model	Test Statistics	Sig
White(Model 1)	91.05	0.0000
Breusch-Godfrey(Model 1)	147.8	0.0000
F-Limer (Model 1)	118.77	0.0000
HausmanTest (Model 1)	10.83	0.21
White(Model 2)	110.94	0.0001
Breusch-Godfrey(Model 2)	144.85	0.0000
F-Limer (Model 2)	72.70	0.0000
HausmanTest (Model 2)	11.65	0.20

Table 4, Testing the first hypothesis of the research

$$AR_{it} = \beta_0 + \beta_1 \Delta NI_{it} + \beta_2 \Delta NI_{it} \times RS + \beta_3 \Delta NI \times SIZE_{it} + \beta_4 \ \Delta NI \times Board\ Ind_{it} + \beta_5 \Delta NI \times Cash_{it} + \beta_6 \ \Delta NI \times LEV_{it} + \beta_7 \ \Delta NI \times growth_{it} + \beta_8 \ \Delta NI \times Age_{it} + \varepsilon_{it}$$

Variables	Coef	Std. ev	T statistic	Sig	VIF
ΔNI	0.83	0.046	17.8	0.0000	1.03
RS×ΔNI	0.43	0.035	11.9	0.0000	1.06
SIZE×ΔNI	-0.067	0.058	-1.14	0.25	1.05
Board ind×ΔNI	-0.71	0.69	-1.03	0.30	1.06
CASH×ΔNI	5.58	2.52	2.21	0.027	1.04
LEV×ΔNI	1.47	0.50	2.90	0.003	1.12
growth×ΔNI	0.61	0.26	2.33	0.019	1.02
Age×ΔNI	-0.43	0.22	-1.93	0.053	1.03
C	-0.011	0.014	-0.81	0.41	-
RES(-1)	-0.091	0.020	-4.35	0.0000	-
Coef determination	0.48				
Watson Durbin	2.07				
F	136.23				
Sig	0.0000				

Table (4) The results of the test of the first hypothesis of the research show that the disclosure of sustainability reporting, with a positive coefficient (0.43) and a significance level of less than 5% (0.0000), has a direct relationship with the informational content of earnings. Therefore, the first hypothesis of the research is not rejected at the 5% significance level. Also, the control variables of liquidity, financial leverage, firm age, and sales growth affect the dependent variable. The coefficient of determination of the model is 0.48, which shows that the independent and control variables in the model explain 48% of the variation in the dependent variable. Additionally, the value of the Durbin-Watson statistic is 2.07, and since it falls between 1.50 and 2.50, it indicates that there is no strong autocorrelation among the residuals of the model. The collinearity statistic is less than 5, which shows there is no strong correlation between the research variables. The F-test statistic, with a significance level of less than 5%, indicates that the research model has a good fit.

Table 5, Testing the Second Research Hypothesis

$$AR_{it} = \beta_0 + \beta_1 \Delta NI_{it} + \beta_2 \Delta NI_{it} \times RS + \beta_3 \Delta NI_{it} \times HHI + \beta_4 (\Delta NI_{it} \times RS \times \Delta NI_{it} \times HHI) + \beta_5 \Delta NI \times SIZE_{it} + \beta_6 \Delta NI \times Board\ Ind_{it} + \beta_7 \Delta NI \times Cash_{it} + \beta_8 \Delta NI \times LEV_{it} + \beta_9 \Delta NI \times growth_{it} + \beta_{10} \Delta NI \times Age_{it} + \varepsilon_{it}$$

Variables	Coef	Std.ev	T statistic	Sig	VIF
ΔNI	0.81	0.046	17.5	0.0000	1.04
RS×ΔNI	0.44	0.036	12.09	0.0000	1.08
HHI×ΔNI	0.43	0.29	1.46	0.14	1.02
RS ×ΔNI× HHI × ΔNI	0.28	0.11	2.50	0.012	1.08
SIZE×ΔNI	-0.073	0.059	-1.23	0.21	1.08
Board ind×ΔNI	-0.73	0.71	-1.02	0.30	1.08
CASH×ΔNI	6.30	2.52	2.94	0.012	1.05
LEV×ΔNI	1.28	0.51	2.49	0.012	1.13
growth×ΔNI	0.87	0.27	3.15	0.001	1.03
Age×ΔNI	-0.37	0.23	-1.58	0.11	1.04
C	-0.004	0.014	-0.31	0.75	-
RES(-1)	-0.090	0.021	-4.31	0.0000	-
Coef determination	0.49				
Watson Durbin	2.06				
F	116.20				
Sig	0.0000				

Table (4) The results of the test of the second hypothesis of the research show that the interaction of market competition and disclosure of sustainability reporting, with a positive coefficient (0.28) and a significance level of less than 5% (0.012), affects the informational content of earnings. Therefore, the second hypothesis of the research is not rejected at the 5% significance level. Also, the control variables of liquidity, financial leverage, and sales growth affect the dependent variable. The coefficient of determination of the model is 0.49, which indicates that the independent and control variables in the model explain 49% of the variation in the dependent variable. Additionally, the value of the Durbin-Watson statistic is 2.06, and since it is between 1.50 and 2.50, it shows there is no strong autocorrelation among the residuals of the model. The collinearity statistic is less than 5, indicating no strong correlation among the research variables. The F-test statistic, with a significance level of less than 5%, shows that the research model has a good fit.

Discussion & Conclusion

The present study seeks to trace the effect of sustainability reporting disclosure on the information content of earnings by considering the role of market competition. Financial statements are information tools used by beneficiaries and users in the capital market, and the quality level of information is of great importance for receiving accurate and complete data. This information provides value to users, which increases with improvements in the quality of these reports. One important factor influencing the enhancement of information quality in financial reports over the last decade has been firms' commitment to various aspects of corporate sustainability performance. The disclosure of sustainability reports can compel firms to provide higher-quality information and also reflect the firm's commitment to providing accurate information to stakeholders. As seen in the statistical results, the disclosure of sustainability reporting can increase the information content of earnings.

A sustainability report is a document published by a firm or organization detailing the economic, environmental, and social impacts caused by its daily activities. The report also communicates the organization's values, governance model, and the relationship between its strategies and commitment to a sustainable global economy. An increasing number of firms and organizations aim to make their operations sustainable and contribute to sustainable development. Sustainability reporting helps organizations measure and communicate their economic, environmental, social, and governance performance. Sustainability—the ability to sustain something over a long time or indefinitely—depends on performance in these four key areas. Systematic sustainability reporting enables organizations to measure the impacts they create or experience, set goals, and manage change. It is a key platform for informing stakeholders about performance and its impacts, both positive and negative.

To generate a sustainability report, organizations create a reporting cycle—a program of data collection, outreach, and responses. Their sustainability performance is continuously monitored, and data can be regularly provided to senior decision-makers to shape strategy, policies, and improve performance. Hence, sustainability reporting is a vital resource for managing change toward a sustainable global economy, combining long-term profitability with ethical behavior, social justice, and environmental care. The provision of transparent information across various aspects demonstrates the extent of the firm's commitment to stakeholder interests and thus improves the information content of reported earnings.

In a competitive market, firms strive to attract more customers and gain a larger market share by offering better and more differentiated products and services than their competitors. This competition benefits consumers, as firms seek to satisfy them, resulting in higher quality products at more affordable prices. Competition encourages firms to continuously improve and innovate their products and services to stay ahead of competitors. Ultimately, competition motivates firms to provide more information about their products and services, helping consumers make more informed decisions.

As the results of statistical tests show, the interaction between market competition and sustainability reporting factors affects the information content of firms' earnings. When firms face healthy competition, they attempt to attract investor oversight by providing accurate information to outperform competitors. Alongside sustainability reporting disclosure, this affects the informational content that firm profits convey to stakeholders. These results align with research by Hekmat et al. (2025) and Ferdows et al. (2025).

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Family Firms and Working Capital Management

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Abstract

Objectives: This research aims to investigate the relationship between family firms and working capital management. Working capital management involves the management of current assets and liabilities to achieve a balance that maximizes shareholder returns on investments.

Methodology/Design/Approach: This applied study employs a causal correlational methodology. The statistical population consists of all firms listed on the Tehran Stock Exchange. Using systematic elimination sampling, 136 firms were selected as the research sample and analyzed over ten years from 2014 to 2023.

Findings: The results indicate an inverse relationship between family firms and the cash conversion cycle. Additionally, there is a direct relationship between family firms and the period for collecting receivables. Furthermore, a direct relationship exists between family firms and the inventory turnover period, while an inverse relationship is observed between family firms and the period for debt repayment.

Innovation: This research contributes to the existing literature by providing insights into how family ownership influences working capital management practices. It highlights the unique dynamics of family firms in managing their operating cycles compared to non-family firms, offering practical implications for stakeholders in understanding how ownership structure can affect financial performance.

Keywords: Working Capital Management, Family Firms, Receivables Collection Period, Debt Payment Period, Inventory Turnover Period.

1. Introduction

In today's challenging economic conditions, along with increasing environmental pressures and limited external resources, the current assets and liabilities (working capital) of organizations and firms have gained great importance. Under these circumstances, working capital management is considered a competitive advantage for firms on the one hand, and on the other hand, it affects firms' financial performance, profitability, and liquidity (Le, 2019). Working capital management refers to the short-term capital required to finance investment activities and represents a significant part of a firm's balance sheet across various industries. Better working capital management leads to higher firm performance (Nastiti et al., 2019).

According to Jensen and McKling's (1976) theory, working capital metrics are correlated with the measurement of the firm's operating cycle (liquidity conversion cycle) and align with each other. The interval between the cost of purchasing materials and the receipt of payments from goods sold constitutes the liquidity conversion cycle in a firm. More investment in working capital is necessary; however, excessive investment may cause the firm to suffer from inappropriate liquidity. On the other hand, the liquidity conversion cycle can lead to greater profitability by increasing sales (Barros et al., 2021). However, if the benefits of maintaining inventory are less than the cost of investing in working capital, prolonging the liquidity conversion cycle will decrease the firm's profitability (Barney et al., 2021). Firms that allocate more funds to working capital—funds that are unavailable for other investments—may incur higher financing costs, whereas profitability tends to increase in firms with less working capital. Therefore, investigating the factors affecting working capital management is highly important (Nabavi Chasehmi et al., 2021).

One factor that can shape working capital management is family ownership (Bianco et al., 2013). Firms controlled by their founders, founding families, or heirs are often referred to as family firms (Adikari & Sutton, 2016). Most private firms are family-owned, but this ownership structure is also common among large publicly traded firms. Family firms hold great economic importance as they are the main drivers of most economies (Sah et al., 2022). Family businesses not only exist but also achieve financial success. What remains unclear is how family businesses succeed despite unconventional fiscal and non-fiscal policies and some unique characteristics.

Therefore, based on the above, the main purpose of the present study is to answer whether family ownership affects working capital management in firms. Family ownership is increasing worldwide, and due to the importance of working capital management—which includes a 's operating capital throughout the operational cycle, from purchasing necessities, production, stockpiling, selling goods, to returning to the new production cycle—the necessity of investigating how working capital is managed in family firms is of great importance. Given the lack of definitive findings and the research gap in the country, this study aims to reveal the hidden aspects of working capital management in family-owned firms.

The structure of the research continues as follows: first, the expansion of the theoretical foundations, hypotheses, and empirical literature of the study will be presented; then, the research methodology and operational definitions of the variables will be introduced; and finally, the research findings and conclusions will be discussed.

Theoretical and empirical foundations and research hypotheses

Working capital management refers to the management of current assets and liabilities and aims to balance them so that shareholders can achieve the maximum return on investment in assets through effective management of working capital (Adikari, 2021). Efficient working capital management is crucial for a firm's survival and demonstrates how short-term capital is utilized; it is also used as an indicator of the firm's liquidity (Badavarnahdi & Taghizadeh Khanqah, 2016). Nabavi Chasehmi et al. (2021), in a study titled *Investigating the Relationship between Managers' Ability and Working Capital Management*, reported that managerial ability increases the firm's cash conversion cycle. From another perspective, working capital management is the short-term capital required to finance investment activities and represents a significant part of a firm's balance sheet across various industries (Nastiti et al., 2019). Better working capital management leads to higher firm performance (Nobaneh & Haddad, 2014).

Working capital management corresponds to the liquidity conversion cycle in firms. Mazaheri and

Shokrizadeh (2021), in their study *Investigating the Effect of Working Capital Management on Stock Liquidity*, noted that working capital management is a key concept within corporate finance, with several applications, one of which is its role in the liquidity of firms' stocks.

As highlighted in previous literature, the liquidity conversion cycle, receivables collection period, inventory conversion period, and timely payments can affect a firm's performance and profitability (Aktas et al., 2015). The cash conversion cycle is defined as the time interval between the collection of revenue from the sale of finished goods or services and payment to suppliers for the purchase of raw materials. Failure to manage working capital effectively can expose the firm to bankruptcy and higher risk (Kichnik et al., 2013).

Ghodrati Zavaram et al. (2022), in their study *Investigating the Relationship between Working Capital Management in Boom and Recession Periods*, stated that managers tend to adopt conservative policies during economic recessions and bolder working capital management policies during inflationary periods. Sepasi et al. (2017), in their study *Working Capital Management, Financial Performance, and Financing Constraints*, found a negative and significant relationship between the net business cycle and firm performance. Family firms, therefore, tend to have more conservative working capital management policies because they are risk-averse and rely less on external financing, resulting in higher working capital and a longer cash conversion cycle (Sah et al., 2022).

Family firms tend to maintain higher inventory levels to protect their reputation by ensuring that customer needs can be met at any time, given the belief that customers might switch brands in the absence of a product (Zellweger et al., 2013). Amore et al. (2022), in their study *The Performance of Family Firms during the COVID-19 Era*, found that family firms exhibited higher market performance and operating profits than other firms during the pandemic. Additionally, delays in debt repayment can be costly due to missed discounts and increased risk of default and bankruptcy. Consequently, family firms tend to pay their debts on time to avoid financial crises and bankruptcy, which aligns with their risk aversion and concern for reputation. Sah et al. (2022) noted that multiple studies indicate family firms avoid risky financial policies and prioritize survival and reputation over short-term financial gains. Their research showed that family firms with higher investment adopt conservative short-term investment policies in working capital.

Regarding working capital components, family ownership is associated with a shorter receivables collection period than non-family firms; however, family firms tend to have a longer inventory period to ensure adequate stock levels for fulfilling orders (Hassan & Block, 2020). A study titled *The Effect of Family Ownership on Corporate Performance* (et al., 2022) reported that increasing family ownership improves financial performance. Family firms also tend to pay and settle debts faster than non-family firms. Bassi et al. (2018), in their study *The Effect of Family Ownership Dispersion on the Level of Debt in Private Firms*, found an inverse relationship between debt levels and ownership dispersion within the family. Murro and Perozzi (2019), in *Family Firms and Access to Credit: Is Family Ownership Beneficial?*, indicated that family firms, particularly small ones, are more likely to face credit restrictions, although this effect diminishes with closer lending relationships. Caprio et al. (2020) also found that family firms with concentrated ownership are more likely to obtain bank credit.

Overall, due to their conservative nature and long-term vision focused on legacy and survival, family firms tend to hold more inventory and promptly repay creditors (Sah et al., 2022).

Based on the above discussion, the hypotheses of the present study are formulated as follows:

H1: Family-owned firms have a shorter liquidity conversion cycle.

H2: Family-owned firms have a shorter receivables collection period.

H3: Family-owned firms have a longer inventory turnover period.

H4: Family-owned firms have a shorter average debt repayment period.

Research Methodology

The present study is applied in nature and employs a causal correlation (post-event) research design. The statistical population consists of all firms listed on the Tehran Stock Exchange (TSE) over the period from 2014 to 2023. The sample includes firms that meet the following criteria: their fiscal year ends in March; they have maintained a consistent financial reporting period throughout the 10-year study interval; relevant data for

the selected variables are available; and they are not classified as banks, insurance firms, or investment firms. Based on these criteria, a total of 136 firms were selected as the final sample for analysis.
Data analysis was conducted using panel data methodology with combined (pooled) data techniques. The econometric software EViews 12 was employed as the primary tool for hypothesis testing and model estimation.

Operational Definitions of Research Variables

Dependent Variable: Working Capital Management

According to the studies by Eskandar Nejad et al. (2020) and Badavarnahdi and Taghizadeh Khanqah (2016), the main components of working capital—namely accounts receivable, inventory (production), accounts payable, and efficient cash utilization for firm operations—are considered as dependent variables in examining working capital management. Consequently, the cash conversion cycle (CCC) and its constituent components have been used as the dependent variables in this research to represent the management of working capital. The variables constituting the CCC include the average collection period of receivables (ARP), the inventory holding period or production cycle (INVP), and the accounts payable period (APP). These variables respectively capture the average duration between payment for production inputs, maintenance of inventory, and receipt of funds from sales. Each component of the cash conversion cycle is comprehensively defined through the following relationships and is separately utilized as a dependent variable in the hypotheses (Bolo et al., 2012).

$$CCC = \left(\frac{\frac{AR_t + AR_{t-1}}{2}}{\frac{Sales}{365}}\right) + \left(\frac{\frac{INV_t + INV_{t-1}}{2}}{\frac{COGS}{365}}\right) - \left(\frac{\frac{AP_t + AP_{t-1}}{2}}{\frac{Purchases}{365}}\right)$$

$$ARP = \left(\frac{\frac{AR_t + AR_{t-1}}{2}}{\frac{Sales}{365}}\right)$$

$$INVP = \left(\frac{\frac{INV_t + INV_{t-1}}{2}}{\frac{COGS}{365}}\right)$$

$$APP = \left(\frac{\frac{AP_t + AP_{t-1}}{2}}{\frac{Purchases}{365}}\right)$$

In the above relationships:
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The first dependent variable: Receivables Collection Period (ARP): (Average accounts receivable/ sales/365)

The second dependent variable is the firm's production cycle (INVP): (average inventory/cost of goods sold/365).

The third dependent variable is firm debt Payment Period (APP): (Average accounts payable / cost of the goods sold plus the inventory of the goods at the end of the period minus the first item of the period/365).

Fourth dependent variable: Liquidity conversion cycle (CCC): (receivables collection period plus production cycle minus debt payment period).
In the above relationships:

CCC: Cash Conversion Cycle
Sale: Net Selling
COGS: Cost of Goods Sold

Purchases: The cost of the goods sold plus the inventory at the end of the period minus the first item of the period.

AR: Accounts Receivable
INV: Inventory
AP: Accounts Payable

Independent Variable: Family Ownership

The percentage of family ownership is used to identify family enterprises. In this study, family property has been considered according to the following conditions: The real shareholder owns at least 20% of the ordinary shares of the firm, or one of the members of the board of directors alone owns at least 5% of the ordinary shares, or the total shares of the real member of the board of directors and his family members, at least 5% of the total ordinary shares of the firm. Accordingly, if a firm has family ownership conditions, it will be considered a family firm and code one, and firms that do not meet these conditions will be considered non-family firms and code zero (Mehrazin et al., 2013).

Research Control Variables

According to the research of Sah et al. (2022), the following determinants have been used for control variables:

SIZE: It is obtained by calculating the natural logarithm of total assets.

LEV: It is calculated by dividing the total value of the debt by the total assets.

MTB: It is calculated by dividing the market value of the firm by the book value of the assets.

CUR: Obtained by dividing current assets by current liabilities.

Age: The natural logarithm of the difference between the date of establishment of the firm and the year in question.

Research Regression Models

Following the research of Sah et al. (2022), the following models have been designed to test the research hypotheses.

The first hypothesis test model

$$CCC_{i,t}=\beta0+\beta1Familyfirm_{i,t}+\beta2MTB_{i,t}+\beta3SIZE_{i,t}+\beta4CUR_{i,t}+\beta5LEV_{i,t}+\beta6AGE_{i,t}+\varepsilon_{it}$$

The second hypothesis test model

$$ARP_{i,t}=\beta0+\beta1Familyfirm_{i,t}+\beta2MTB_{i,t}+\beta3SIZE_{i,t}+\beta4CUR_{i,t}+\beta5LEV_{i,t}+\beta6AGE_{i,t}+\varepsilon_{it}$$

The third hypothesis of the research hypothesis test model

$$INVP_{i,t}=\beta0+\beta1Familyfirm_{i,t}+\beta2MTB_{i,t}+\beta3SIZE_{i,t}+\beta4CUR_{i,t}+\beta5LEV_{i,t}+\beta6AGE_{i,t}+\varepsilon_{it}$$

Testing Model of the Fourth Research Hypothesis

$$APP_{i,t}=\beta0+\beta1Familyfirm_{i,t}+\beta2MTB_{i,t}+\beta3SIZE_{i,t}+\beta4CUR_{i,t}+\beta5LEV_{i,t}+\beta6AGE_{i,t}+\varepsilon_{it}$$

Research Findings

The main central index is the average, which represents the equilibrium point and the center of gravity of the distribution, and it is a good indicator to show the centrality of data. For example, the average value for the leverage variable is equal to (0.55) hundredths, which indicates that most of the data is concentrated on this point. In general, dispersion parameters are a criterion for determining the amount of dispersion from each other or the amount of dispersion relative to the average. One of the most important parameters of dispersion is the standard deviation. The value of this parameter is 163.5 for the cash conversion cycle and 0.21 for leverage, which shows that these two variables have the highest and lowest standard deviations, respectively. The minimum and maximum also show the lowest and highest in each variable.

As can be seen in Table (2), the total number of year-firms under study is equal to 1360 cases, of which 188 year-firms (13.82%) are family firms and 1172 year-firms (86.16%) are non-family firms.

Table (1): Descriptive statistics of the variables

Variable	Mean	S. dev.	Min.	Max.
CCC	196.48	706.88	6.46	163.57
ARP	136.36	658.42	9.24	130.73
INVP	151.20	736.60	18.01	120.63
APP	92.56	608.18	7.16	100.80
SIZE	14.73	21.3	10.53	1.65
LEV	0.55	1.26	0.10	0.21
MTB	4.31	15.8	1.00	3.89
CUR	1.60	4.44	0.55	0.85
AGE	3.62	4.24	2.30	0.38

Table (2): Frequency Distribution of Qualitative Variables

Variable	Value	Frequency	Percent Frequency
Family Firms	1	188	13.82
Non-Family Firms	0	1172	86.18
Total	-	1360	100

Table (3): Results of the Variance Test

Test Model	Test Statistics	Significance level
Hypothesis 1	109.04	0.0000
Hypothesis 2	131.83	0.0000
Hypothesis 3	206.70	0.0000
Hypothesis 4	79.113	0.0000

The results in Table (3) show that the significance level of the test in the research models is less than 5% and indicates the existence of heterogeneity of variance in the disturbance sentences, which has been solved in the final estimation of the models by running the GLS command and also using the facilities of the standard powerful tool in Eviews 10 software.

According to the results of Table (4), the significance level of the serial autocorrelation test in the research models is less than 5%, indicating the presence of serial autocorrelation. This issue has been addressed and corrected in the final model (Platouni, 2018).

According to the results obtained in Table (5), it can be seen that the significance level of the variables in the durability test is less than 5% and indicates that the variables are permanent.

According to the results obtained in Table (6), it can be seen that the significance level of the Chow test for the research hypothesis test models is less than 5%, indicating the acceptance of the panel data model, which requires the presentation of the Hausman test to ensure its appropriateness. The Hausman test is presented below (Aflatoni, 2018).

According to the results presented in Table 7, the significance level of the test in the research models is less than 5%, indicating that the fixed effects model is accepted.

Table (4): serial autocorrelation test results

Test Model	Test Statistics	Significance level
Hypothesis 1	777.05	0.0000
Hypothesis 2	793.26	0.0000
Hypothesis 3	686.14	0.0000
Hypothesis 4	560.08	0.0000

Table (5): Stability Test Quantity Variables

Variable	Test Statistics	Sig	Results
Ccc	-21.4757	0.0000	Stationary
Arp	-16.7793	0.0000	Stationary
INVP	-26.3076	0.0000	Stationary
App	-3.59660	0.0000	Stationary
SIZE	-12.9462	0.0000	Stationary
LEV	-14.4339	0.0000	Stationary
MTB	-12.3176	0.0000	Stationary
CUR	-15.6027	0.0000	Stationary
Age	-21.4757	0.0000	Stationary

Table 7, F-Limmer test results

Test Model	Test Statistics	Sig
Hypothesis 1	8.59	0.0000
Hypothesis 2	9.24	0.0000
Hypothesis 3	9.65	0.0000
Hypothesis 4	15.74	0.0000

Table 7, Hausman test results

Test Model	Test Statistics	Sig
Hypothesis 1	17.79	0.006
Hypothesis 2	81.11	0.0000
Hypothesis 3	82.59	0.0000
Hypothesis 4	70.37	0.0000

Table (8): Hypothesis 1 Test result

Variables	Coef	Std	Statistic t	Sig	VIF
Family firm	-62.4	7.68	-8.12	0.0000	1.06
MTB	0.083	0.91	0.091	0.92	1.01
SIZE	0.72	1.89	0.37	0.70	1.03
CUR	65.7	4.16	15.7	0.0000	2.17
LEV	96.8	17.2	5.60	0.0000	2.16
Age	36.04	7.20	5.00	0.0000	1.02
Res(1)	0.84	0.016	50.5	0.0000	-
C	-115.6	43.2	-2.67	0.007	-
Coefficient of determination	0.72				
Watson Durbin	2.20				
F	212.54				
Sig	0.0000				

The results presented in Table 8 indicate that family firms have a negative coefficient of -62.4, which is statistically significant at the 1% level (p = 0.0000), demonstrating an inverse and significant relationship with the firm's cash conversion cycle. Therefore, the first hypothesis of the research is accepted at the 5% significance level. Among the control variables, all except firm growth and firm size, with significance levels below 5%, show significant relationships with the dependent variable. The coefficient of determination (R^2) is 0.72, indicating that 72% of the variance in the cash conversion cycle is explained by the independent and control variables included in the model. Additionally, the Durbin-Watson statistic is 2.20, suggesting no evidence of autocorrelation in the residuals. The overall test statistic confirms that the model fits well at the 5% significance level. Furthermore, the variance inflation factor (VIF) values are below 5, indicating no multicollinearity issues among the research variables.

The results of Table (9) show that the variable of family The results indicate that the family firm variable has a positive coefficient of 27.4 and is statistically significant at the 1% level (p = 0.0000), demonstrating a direct and significant relationship with the accounts receivable collection period. Consequently, the second hypothesis of the research is accepted at the 5% significance level. All control variables with significance levels below 5% also show significant relationships with the dependent variable. The coefficient of determination (R^2) is 0.76, indicating that 76% of the variance in the accounts

receivable collection period is explained by the independent and control variables in the model. Furthermore, the Durbin-Watson statistic is 1.97, suggesting no evidence of severe autocorrelation in the residuals. The overall test statistic confirms that the model has a good fit at the 5% significance level. Additionally, variance inflation factors are below 5, indicating no significant multicollinearity among the research variables.

The results presented in Table 10 indicate that the family firm variable has a positive coefficient of 54.8 and is statistically significant at the 1% level (p = 0.0000). This reveals a direct and significant relationship between family ownership and the firm's inventory turnover, thus supporting the third hypothesis of the study at a 5% significance level. Among the control variables, all except firm growth and financial leverage show a significant relationship with the dependent variable at the 5% level. The model's coefficient of determination (R^2) is 0.72, indicating that 72% of the variation in inventory turnover is explained by the independent and control variables included in the model. Moreover, the Durbin-Watson statistic is 2.11, suggesting no evidence of strong autocorrelation in the residuals. The overall significance test confirms that the model fits the data well at the 5% significance level. Additionally, the variance inflation factors (VIF) are all below 5, indicating no problematic multicollinearity among the explanatory variables.

The results presented in Table 11 indicate that the family firm variable has a negative coefficient of -11.5 and is statistically significant at the 5% level (p = 0.016). This demonstrates an inverse and significant relationship between family ownership and the debt payment period of firms, thereby confirming the fourth hypothesis of the study at a 5% significance level. Among the control variables, all except the current ratio and firm age show a significant relationship with the dependent variable at the 5% significance threshold. The model's coefficient of determination (R^2) is 0.63, indicating that 63% of the variation in the debt payment period is explained by the independent and control variables included in the model. Furthermore, the Durbin-Watson statistic is 2.01, suggesting the absence of strong autocorrelation among the residuals. The overall significance test of the model confirms that the model fits the data well at the 5% significance level. Additionally, variance inflation factors (VIF) are all below 5, indicating that multicollinearity is not a concern among the explanatory variables in the model.

Table (9): Hypothesis 2 Test result

Variables	Coef	Std	Statistic t	Sig	VIF
Family firm	27.4	5.23	5.24	0.0000	1.06
MTB	-1.81	0.64	-2.83	0.004	1.01
SIZE	7.22	1.28	5.63	0.0000	1.03
CUR	32.6	2.96	10.9	0.0000	2.17
LEV	154.6	12.1	12.6	0.0000	2.16
Age	10.08	4.77	2.11	0.034	1.02
Res(1)	0.84	0.015	55.2	0.0000	-
C	-138.08	29.35	-4.70	0.0000	-
Coefficient of determination	0.76				
Watson Durbin	1.97				
F	257.20				
Sig	0.0000				

Table (10): Hypothesis 3 Test result

Variables	Coef	Std	Statistic t	Sig	VIF
Family firm	54.8	5.55	9.86	0.0000	1.06
MTB	0.60	0.71	0.84	0.39	1.01
SIZE	-7.20	1.38	-5.21	0.0000	1.03

Variables	Coef	Std	Statistic t	Sig	VIF
CUR	23.50	3.08	7.61	0.0000	2.17
LEV	7.42	12.95	0.57	0.56	2.16
Age	22.4	5.29	5.24	0.0000	1.02
Res(1)	0.82	0.015	53.96	0.0000	-
C	123.68	31.5	3.91	0.0000	-
Coefficient of determination	0.72				
Watson Durbin	2.11				
F	209.23				
Sig	0.0000				

Table (11): Hypothesis 4 Test result

Variables	Coef	Std	Statistic t	Sig	VIF
Family firm	-11.5	4.78	-2.41	0.0160	1.06
MTB	-1.89-	0.61	-3.09	0.002	1.01
SIZE	3.93	1.16	3.37	0.0008	1.03
CUR	-5.11-	2.76	-1.85	0.064	2.17
LEV	65.5	11.04	5.93	0.0000	2.16
Age	-5.88-	4.27	-1.37	0.16	1.02
Res(1)	0.71	0.019	37.2	0.0000	-
C	39.6	26.6	1.49	0.13	-
Coefficient of determination	0.63				
Watson Durbin	2.01				
F	142.23				
Sig	0.0000				

Research Results

The main objective of this study is to examine the impact of family ownership on the working capital management of firms. As discussed earlier, the cash conversion cycle (CCC) refers to the duration required to convert cash through production, sales, and receivables collection. It encompasses all operational stages from the commencement of production to the collection of cash from product sales. A shorter cash conversion cycle logically enables a firm to generate profits and return capital to shareholders more quickly. Several factors influence this cycle, including managerial decisions, the interplay between major ownership and managerial choices, and the firm's business strategy. These factors can result in a shorter or longer operational cycle compared to other firms under normal economic conditions.

Among different ownership types, family-owned firms are noteworthy. As indicated in the theoretical background, family firms tend to prioritize long-term sustainability over immediate profit maximization. Since ownership and management roles are often concentrated within the family, decisions typically reflect the consensus among family members. However, the absence of professional expertise in some management positions may occasionally present challenges. The findings of this research suggest that family firms exhibit a shorter cash conversion cycle, primarily because family members serve as final decision-makers, facilitating more streamlined operational processes. This result aligns partially with the findings of Sah et al. (2022).

The estimated coefficient of the family ownership variable is positive and statistically significant at the 5% level, indicating an inverse and meaningful relationship between family ownership and the cash conversion cycle. Notably, in family firms, the receivables collection period is not shorter, which

implies effective management of accounts receivable. Given that decision-makers in family firms belong to the same group, this aspect tends to be managed more successfully. The receivables collection period serves as a key metric for evaluating the efficiency of a profit-oriented entity in collecting cash from credit sales. The extended collection period observed in family firms may be attributed to stable relationships and a strong emphasis on preserving the 's reputation, occasionally leading to longer collection durations. These results resonate with Sah et al. (2022), who reported a reduction in receivables collection periods within family firms.

Regarding inventory management, the positive and statistically significant coefficient associated with family ownership indicates a longer inventory holding period in family firms. Constraints related to financing and working capital compel firms to carefully control inventory levels. Optimal inventory management reduces both the cost of investment in inventories and the associated holding costs. Timely supply and delivery to customers, alongside minimizing inventory costs, remain critical managerial challenges. Family firms, motivated by corporate reputation and long-term sustainability, tend to maintain higher inventory levels to meet customer demand promptly, which can explain the extended inventory turnover period. This finding is consistent with Sah et al. (2022), who observed increased production cycles in family firms.

The fourth hypothesis, concerning the accounts payable period, is confirmed by a significant and negative coefficient for family ownership, indicating that family firms tend to have shorter debt repayment periods. Delays in settling debts can be costly due to potential loss of early payment discounts and increased risks of default or bankruptcy. Family firms, characterized by a lower risk appetite and heightened concern for reputation, are more inclined to pay their obligations promptly to avoid financial distress. This outcome aligns with the findings of Sah et al. (2022), who reported shorter debt repayment cycles in family businesses.

Overall, a shorter cash conversion cycle is generally favored by investors and capital market analysts. Family firms appear capable of achieving this through balanced operational cycles. By implementing principled and codified strategic plans, family firms can reduce the liquidity conversion cycle, thereby optimizing profitability and working capital management. Additionally, by extending the production cycle to ensure product availability, family firms enhance customer satisfaction and retention, positioning themselves as attractive options for future buyers.

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Investigating the Effect of Financial Risk Reporting on Stock Returns with the Moderating Role of Competition in the Product Market

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Abstract

Objectives: This study aims to examine the effect of financial risk reporting on stock returns, considering the moderating role of product market competition among firms listed on the Tehran Stock Exchange. It is grounded in the notion that competition encourages firms to voluntarily disclose more information, thereby improving market assessments and enhancing the credibility of financial reporting through governance mechanisms like independent directors.

Methodology/Design/Approach: To test the proposed hypotheses, data from listed firms on the Tehran Stock Exchange during the period 2015–2019 were analyzed. A sample of 120 firms was selected using the systematic elimination method. The study employed quantitative methods to assess the relationships between financial risk reporting, stock returns, and product market competition.

Findings: The results indicate that product market competition significantly influences the extent of financial risk disclosure. Furthermore, financial risk reporting has a significant impact on stock returns. Importantly, product market competition also plays a moderating role in the relationship between financial risk reporting and stock returns.

Innovation: This research contributes to the literature by empirically demonstrating the dual role of financial risk disclosure and market competition in shaping stock performance. It underscores the importance of transparent reporting practices and competitive dynamics in enhancing investor confidence and firm valuation in emerging markets.

Keywords: financial risk reporting, stock returns, product market competition.

1. Introduction

In recent years, risk information disclosure has been among the essential factors to reduce information asymmetry about a firm's risks. This information helps investors to make a more accurate assessment of a firm's risk (Kitzmuller & Licetti, 2012). Publishing risk information can bring benefits such as improving stock liquidity, reducing capital costs, and increasing firm valuation. In addition to these advantages, it can lead to an increase in investors' perception of the risks facing the firm, and regulatory organizations can have a more transparent report of risk information (Kamarudin et al., 2020).

Financial risk reporting disclosure is considered an important issue of concern to the global business community and has attracted the ample attention of stakeholders because it is the main tool for clarifying risk information in the firm's annual report, and it is necessary to improve the risk management of a firm (Bravo, 2017; Ibrahim et al., 2019). Moreover, scandals in large firms (i.e., Enron in 2001 and WorldCom in 2002) as well as financial crises such as the "1997 Asian Financial Crisis" and the "2007-2008 Global Financial Crisis" have caused instability in financial markets and have led to increased interest in risk reporting (Khalif & Hussainey, 2016). According to Acharya and Richardson (2009), financial crises are caused by insufficient transparency in financial reporting. Therefore, risk disclosure is a vital tool to improve stock returns.

Proprietary cost assumes that market competition limits the firm's incentives to report information to maintain its competitive market position and prevents competitors from benefiting from its reported information (Ali et al., 2014). According to the specific cost hypothesis, corporate managers may be reluctant to report risk information because the disclosure of it may draw the market's attention to their risk-taking (Elshandidy et al., 2013) or encourage investors to increase their risk premium as compensation for high costs and risk exposure (Campbell et al., 2014). In this case, proprietary costs prevent firms from providing comprehensive disclosure, and subsequently, they may avoid or reduce risk information reporting because it is detrimental to their competitive position. Nevertheless, managers may disclose proprietary information to improve their firm's reputation, demonstrate strengths in risk management (Oliveira et al., 2011), and maintain legitimacy and increase shareholder trust (Shivaani & Agarwal, 2020). Empirically, there is no single conclusion about the effect of proprietary costs on managers' decisions to report risk information (Huang et al., 2017; Shivaani & Agarwal, 2020). Therefore, according to what was mentioned, the main problem of the present research is whether competition in the product market has a significant effect on the relationship between financial risk reporting and stock returns.

Research Background

Financial Risk Reporting

One of the critical responsibilities of firm managers is the management of risks related to the organization. Through the disclosure of risk information, managers provide stakeholders with insights into the risks faced by the firm and the strategies employed to manage them. Generally, effective risk management leads to the maximization of profitability and the minimization of the likelihood of financial crises, thereby contributing to the maximization of shareholder wealth. Given the importance of accounting information for evaluation and management purposes, the disclosure of firms' risk information facilitates more accurate assessments and serves as a valuable tool for evaluating managerial performance. Conversely, information asymmetry regarding risk information may result in several challenges, such as increased transaction costs, reduced liquidity, and unprofitable investment decisions by retail investors (Khalif & Hussainey, 2016).

Risk reporting serves as an important source of information for decision-making models. When a decision-making model comprises a set of actions, conditions, and outcomes, the uncertainty of the decision's results is contingent on the probabilities of

these conditions and outcomes. Consequently, the information provided in risk reports enables the prediction of the likelihood of these conditions occurring as well as the potential outcomes. Empirical evidence suggests that risk disclosure is valuable to investors, as it can reduce the cost of capital, mitigate information asymmetry, and enhance the effectiveness of risk management practices, thereby improving stewardship (Makhlouf et al., 2020). Overall, risk reporting contributes to creating a stable environment conducive to investor confidence and capital accumulation.

Currently, the process of reviewing and revising risk reports is gradual and is conceptualized as a moderating perspective. This perspective particularly emphasizes market risk, which itself is influenced by various other factors. Risk disclosure is defined as the communication of information about the firm's strategies, characteristics, operations, and external factors that potentially impact expected outcomes. The scope of risk disclosure in annual reports should be appropriately limited, encompassing information about strategies, actions, performance, and data that explicitly focus on risks. Disclosures may include information on opportunities, prospects, risks, damages, threats, and other factors that currently affect or may affect the firm in the future. Additionally, such disclosures may inform management about these elements. This definition extends beyond merely describing opportunities, prospects, threats, and concerns by also addressing how the firm confronts them, thus providing a more comprehensive view (Ibrahim et al., 2019).

Competition in the Product Market

The concept of a competitive product market refers to a market environment where multiple firms engage in close competition in the production and sale of goods, and no single firm's products hold significant superiority over others. If this were not the case, the market would tend toward monopoly or oligopoly. Therefore, market competitiveness is typically considered the opposite of product market exclusivity. A firm that succeeds in producing higher-quality goods or offering goods at lower prices by optimizing production methods can approach a monopolistic position (Baggs & De Bettignies, 2007).

In highly competitive markets, firms' strong disclosure practices often trigger retaliatory responses from competitors. Under such circumstances, firms tend to adopt more active disclosure policies to attract the attention of potential investors and the broader public. Thus, in competitive market environments, firms generally prefer to pursue more proactive disclosure strategies (Balakrishnan & Cohen, 2013; Markarian & Santalo, 2014).

Theoretical frameworks relating competition to disclosure suggest that the nature of competition affects disclosure and financial reporting in different ways. Firms typically face two dimensions of product market competition: first, the threat posed by potential new entrants, which can diminish firms' profitability. The decision to enter the market depends on the costs associated with entry and the expected future benefits. Second, existing firms compete with one another, threatening each other's market position. Because market entry involves costs, firms' strategic decisions are influenced by anticipated future benefits within the competitive landscape (Li, 2010).

Empirical Background

Ahmed et al. (2023) examined the dynamic relationship between product market competition, labor mobility, and cross-sectional stock returns. Employing double-sorted portfolios and cross-sectional regressions, their empirical analysis revealed that labor mobility predicts stock returns primarily in firms operating within highly competitive industries, supporting theoretical models linking competition with enhanced productivity.

Hassanein (2022) investigated the effect of market competition on corporate risk-reporting behavior among 350 firms listed on the London Stock Exchange. The study found a positive association between market competitiveness and the extent of risk disclosure, particularly noting that firms facing greater

competition tend to disclose more negative risk news. Conversely, in less competitive markets, the volume of risk disclosures significantly impacts stock returns. The research also indicated that firms strategically structure their risk reports to mitigate proprietary costs.

Kamarudin et al. (2020) explored the interplay between product market competition intensity, institutional environments, and accrual quality. Their findings suggested that increased competition correlates with lower accrual quality. However, this negative effect diminishes in countries with stronger institutional environments characterized by robust investor protections, judicial independence, enforcement of minority shareholder and property rights, and stringent auditing and reporting standards.

Lee (2019) analyzed the effects of profitability and product market competition on stock returns through zero-cost investment strategies over the 1973–2017 period. The results showed that significant positive returns from these strategies were predominantly observed in the most competitive industry segments, with moderate returns in the second most competitive groups. Notably, concentrated industries failed to generate significant returns. Among portfolios sorted by competition and gross profit, the least profitable firms in moderately competitive sectors, such as pharmaceuticals and oil, exhibited the highest returns.

Namazi and Ebrahimi Meymand (2021) developed a comprehensive framework for corporate risk disclosure, emphasizing the importance of addressing the informational needs of diverse stakeholders—including investors, financial analysts, creditors, regulators, managers, non-financial resource suppliers, and customers. Their survey-based study highlighted that transparent risk disclosure, particularly of financial risks, is essential to improve stakeholders' decision-making processes.

Khoshkholq and Talebnia (2021) assessed the impact of financial reporting quality on the level of risk disclosure among 120 firms listed on the Tehran Stock Exchange. Using proxies such as corporate governance, audit quality, and corporate social responsibility (CSR) disclosures, their results confirmed that corporate governance and audit quality positively and significantly influence risk disclosure, whereas CSR disclosure showed no significant effect.

Ahmadi et al. (2021) proposed a novel quantitative model to calculate a firm's Risk Disclosure Index through a multi-criteria decision-making approach, offering a new metric to evaluate the extent of risk information disclosed by firms.

Kana'ani et al. (2021) studied the relationship between product market competition and information asymmetry by utilizing the Herfindahl-Hirschman Index (HHI) to measure competition. Information asymmetry was proxied by bid-ask spreads, firm size, earnings forecast errors, and growth opportunities. The findings demonstrated that higher product market competition significantly reduces information asymmetry.

Kalantarifar et al. (2019) explored the moderating role of institutional ownership in the relationship between product market competition and earnings management. Their findings revealed a significant inverse relationship between product market competition and both accrual-based and real earnings management, with institutional ownership further reinforcing the negative relationship concerning accrual earnings management.

Research Hypotheses

H_1: Competition in the product market has a significant effect on financial reporting risk.

H_2: Financial risk reporting has a significant effect on abnormal stock returns.

H_3: Competition in the product market has a significant effect on the relationship between financial risk reporting and abnormal stock returns.

Research Methodology

The current research is applied in terms of the purpose, and in terms of method, it is considered descriptive research. Among descriptive research, it is of the correlation type since it examines the relationship between independent and dependent variables. The collected data are calculated using Excel software and

analyzed with Eviews version 10 software. To check the stationary of variables, Levin's test, autocorrelation of independent variables, Lee and Chu's test, selection of the method of using mixed data, and Hausman's test were used.

Population and Statistical Sample

The statistical population of this study comprises all firms listed on the Tehran Stock Exchange. The sample includes firms that were admitted to the stock exchange prior to 2016 and remained continuously listed through the end of 2021. Moreover, selected firms must not have experienced any trading suspensions exceeding one month during this period. Firms operating in the sectors of banking and credit institutions, other monetary institutions, financial intermediation, financial investment, holding firms, insurance, and leasing have been excluded from the sample. Applying these criteria results in a final sample of 120 firms, yielding a total of 600 firm-year observations. The table below outlines the procedure used to arrive at the final sample.

Table 1- Research sample

Description	Number of firms
All firms in the stock market	522
Investment firms, banks, and insurance	124
Firms that have more than 3 months of trading break	186
Firms that have been admitted to the stock market since 2016	58
The end of their fiscal year is not March	34
Screened sample	120

Research Model and Variables

The research models have been selected as follows to test the research hypotheses. To investigate the first hypothesis, model (1) was used, which is taken from the research of Hassanein et al. (2022):

The first hypothesis model

$$\beta_2 BS_{i,t} + \beta_3 BM_{i,t} + + \beta_1 HHI_{i,t} Risk_{i,t} = \alpha_0 + \beta_4 IND_{i,t} + \beta_5 DUALITY_{i,t} + \beta_6 AC_{i,t} + \beta_7 FS_{i,t} + \beta_8 EPS_{i,t} + \beta_9 CR_{i,t} + \beta_{10} DE_{i,t} + \beta_{11} DY + e_t \quad (1)$$

To check the second and third hypotheses, model (2) has been applied:

Second and Third Hypothesis Model

$$+ \beta_2 HHI_{i,t} Ab\ Return_{it} = \alpha_0 + \beta_1 Risk_{i,t} + + \beta_4 BS_{i,t} + \beta_5 BM_{i,t} + \beta_6 \beta_3 (Risk_{i,t} \times HHI_{i,t}) IND_{i,t} + \beta_7 DUALITY_{i,t} + \beta_8 AC_{i,t} + \beta_9 FS_{i,t} + \beta_{10} EPS_{i,t} + \beta_{11} CR_{i,t} + \beta_{12} DE_{i,t} + \beta_{13} DY_{i,t} + e_t \quad (2)$$

Research Variables

The Dependent Variables

Financial Risk Reporting: *Financial risk reporting is measured by calculating the logarithm of the frequency of words related to three categories of risk—financial, operational, and strategic non-financial—appearing in firm reports such as the Board of Directors' reports, acfirming notes, and audit reports. This approach follows the methodology proposed by Makhlouf et al. (2020) to quantify risk disclosure.*

Abnormal Return (Ab Return): *Abnormal return represents the difference between the actual return of a target firm's stock and the overall market return. The market return can be computed using either the total market index or the price index combined with cash dividends of the Tehran Stock Exchange, as provided by Rahavard Novin software. In this study, both the price index and cash dividend yield are employed to calculate market return.*

$$Ab\ Return_{it} = r_{it} + r_{mt} \quad (3)$$

In this equation:

$$r_{it} = \frac{(P_1 - P_0) + DPS + ((P_1 - 1000) * a) + (P_1 * b}{P_0} \quad (4)$$

$r_{mt} = \frac{I_{mt} - I_{m0}}{I_{m0}}$	(5)

What we have in these relationships:

Ab Return$_{it}$: Abnormal return of stock i in month t

r_{it}: the stock return of firm i in month t

r_{mt}: return of stock price index and stock exchange cash return in period t

P_1: stock price at the end of the period

P_0: stock price at the beginning of the period

D_{PS}: Gross cash earnings per share

a: Percentage of capital increase from receivables and cash receipts (revenues)

b: Capital increase from accumulated profit

I_{mt}: total stock market index in the first-period t

I_{m0}: total stock market index at the end of period t

Independent variables:

In the first model, the competition variable in the product market is considered as an independent variable. In the second model, the financial disclosure risk variable is considered as an independent variable.

Moderating variable

In the second model, the competition variable in the product market (HHI) is considered as a moderating variable. To measure the level of competition in the product market, the Herfindahl Hirschman Index (HHI) is used (Chen et al., 2012). This index measures the degree of concentration in a particular industry. The higher this index is, it indicates more concentration and less competition in the market (Ghauory Moghadam et al., 2013).

$HHI_{jt} = \sum_{i=1}^{N_j} \left[\frac{Sales_{ijt}}{\sum_{i=1}^{N_j} Sales_{ijt}} \right]^2$	(6)

In this equation:

HHI_{jt}: Herfindahl-Hirschmann index for industry j at time t

$Sales_{ijt}$: the number of sales of the firm i in industry j at time t

N_j: number of active firms in industry j

Control Variables

The number of board members (BS): the logarithm of the total number of board members in the current year

Number of Board Meetings (BM): Logarithm of the number of board meetings at the end of the current year

Board Independence (IND): The number of non-executive members divided by the total number of board members in the current year

CEO duality (DUALITY): is a dummy variable that takes 1 if the firm's CEO was the chairman of the board of directors, and 0 otherwise.

The number of members of the audit committee (AC): the logarithm of the number of members of the audit committee at the end of the current year

Firm market value (FS): The natural logarithm of a firm's market value at the end of the current year

Earnings per share (EPS): The logarithm of the firm's earnings per share at the end of the current year

Current Ratio (CR): Current assets divided by current liabilities

Leverage ratio (DE): dividing the firm's total debt by its equity at the end of the current year

Yield ratio (DY): dividing the dividend paid per share by its share price at the end of the current year

Research Findings

Descriptive Statistics

Table (2) presents the descriptive statistics of research variables. The number of 600 observations (year-firm) for 5 years has been compiled based on the data of 120 firms admitted to the Tehran Stock Exchange for the period 2015-2019.

Table 2. Descriptive Statistics of Research Variables

Variable	Symbol	Mean	Median	Maximum	Minimum	Standard Deviation
Stock returns	Ab Return	0.305	0.33	1/06	-0.87	0.331
Risk Disclosure	Risk	0.483	0.48	0.95	0	0.253
Competition in the product market	PMC	0.024	0.01	0.13	0	0.035
Total number of board members	BS	0.672	0.70	0.78	0.60	0.053
Number of board meetings	BM	1.094	1.08	1.15	1.08	0.024
Independence of the board of directors	IND	0.595	0.60	1.00	0.20	0.194
The dual role of the CEO	DUALITY	0.29	0	1.00	0	0.454
The number of audit committee members	AC	0.568	0.60	0.70	0.48	0.080
The market value of the firm	FS	29.907	30.05	34.65	25.68	1.705
Earnings per share	EPS	2.504	2.76	4.21	0.40	0.932
current ratio	CR	1.678	1.40	5.07	0.26	0.892
leverage ratio	DE	1.087	0.97	3.01	0.09	0.661
yield ratio	DY	0.071	0.01	0.53	0	0.136

According to Table 2, among the 600 observations, the market value of the firm exhibits the highest average value at 29.90, while competition in the product market shows the lowest average at 0.02. Examination of the skewness coefficients reveals that most research variables are positively skewed, indicating a right-skewed distribution, except for stock returns, risk disclosure, the total number of board members, and earnings per share, which display more symmetrical distributions. This suggests that the distributions tend to have longer tails towards higher values.

Kurtosis, which measures the "peakedness" or height of the distribution curve at its maximum, provides additional insight. For a normal distribution, the kurtosis value is equal to 3. In this study, all variables exhibit positive kurtosis (leptokurtic), implying sharper peaks compared to the normal distribution. A positive kurtosis indicates a distribution with heavier tails and a higher likelihood of extreme values, whereas a negative kurtosis (platykurtic) would indicate a flatter peak. Therefore, the research variables demonstrate distributions that are generally more peaked than the normal distribution.

Examining Research Variables and Models

Before testing the assumptions of the research models, it is essential to examine the stationarity of the variables. Stationarity implies that the mean, variance, and autocorrelation structure of the variables remain constant over time. If these conditions hold, the variables are said to possess the property of a constant mean. To assess this, the Levin, Lin, and Chu (LLC) unit root test is employed. The results of this test are presented in Table 3.

Table 3. The results of examining the significance of the variables

Variable	Symbol	statistics	probability value
Stock returns	Ab Return	-28.889	0.000
Risk Disclosure	Risk	-15.604	0.000
Competition in the product market	PMC	-8.253-	0.000
Total number of board members	BS	-12.858	0.000
Number of board meetings	BM	-16.562	0.000
Independence of the board of directors	IND	-20.875	0.000
The dual role of the CEO	DUALITY	-13.751	0.000
The number of audit committee members	AC	-24.303	0.000
The market value of the firm	FS	-16.075	0.000
Earnings per share	EPS	-14.454	0.000
current ratio	CR	-50.616	0.000
leverage ratio	DE	32.551	0.000
yield ratio	DY	-108.723	0.000

The results of Levin, Lin, and Chu tests show that all the variables used in this research are static at the 95% level. Considering that research variables are at the level of static variables; consequently, there is no need to perform a coaccumulation test.

Chow and Hausman tests were performed to identify the type of regression model. The results of Table 4 show that the mixed data regression model with fixed effects is suitable.

The Results of the Research Hypotheses Test

H_1: Competition in the product market has a significant effect on financial reporting risk.

One of the key assumptions in regression analysis is the independence of the error terms—that is, the differences between the observed values and those predicted by the regression model should not be correlated with each other. If this assumption is violated and the errors exhibit autocorrelation, the reliability of the regression results is compromised. To test for independence of errors, the Durbin-Watson statistic is commonly used. A Durbin-Watson value between 1.5 and 2.5 indicates no significant autocorrelation, while values outside this range suggest the presence of autocorrelation. According to the results presented in the table above, the Durbin-Watson statistic is 2.334, which falls within the acceptable range, confirming the absence of autocorrelation among the errors.

Additionally, the coefficient of determination (R^2) for the fitted model is 0.31, indicating that 31% of the variability in the dependent variable is explained by the independent variables included in the model. Moreover, the F-statistic value of 2.982 with a significance level of less than 0.01 confirms the overall statistical significance of the regression model.

H_2: Financial risk reporting has a significant effect on abnormal stock returns.

According to the values presented in the above table, the Durbin-Watson statistic is 2.34, which falls within the acceptable range of 1.5 to 2.5. This indicates that there is no significant autocorrelation among the residuals, and the assumption of independence of errors is satisfied. Additionally, the coefficient of determination (R^2) of the fitted model is 0.49, suggesting that 49% of the variation in the dependent variable is explained by the independent variables included in the model. Furthermore, the F-statistic value of 2.243, with a significance level of 0.000, confirms the overall significance of the regression model.

Table 4. Identification of the Type of Regression Model

	model (1)	model (2)
Chow test statistic	1.518	1.708
The significance level	0.0001	0.000
Chow test result	Mixed or panel	Mixed or panel
Hausman test	12.725	41.173
The significance level	0.011	0.011
The result of the Hausman test	Fixed effects	Fixed effects
Regression type	Mixed regression with fixed effects	Mixed regression with fixed effects

Table 5. Test results of the First Model

$$Risk_{i,t} = \alpha_0 + \beta_1 HHI_{i,t} + \beta_2 BS_{i,t} + \beta_3 BM_{i,t} + \beta_4 IND_{i,t} + \beta_5 DUALITY_{i,t} + \beta_6 AC_{i,t} + \beta_7 FS_{i,t} + \beta_8 EPS_{i,t} + \beta_9 CR_{i,t} + \beta_{10} DE_{i,t} + \beta_{11} DY + e_t$$

Variable	symbol	Coefficient	Coefficient	t statistic	Significance level
Competition in the product market	HHI	0.334	0.334	4.909	0.0011
Total number of board members	BS	0.173	0.173	3.937	0.0002
Number of board meetings	BM	0.131	0.131	2.470	0.0000
Independence of the board of directors	IND	0.065	0.065	1.017	0.3097
The dual role of the CEO	DUALITY	0.020	0.020	0.777	0.4378
The number of audit committee members	AC	0.089	0.089	0.604	0.5464
The market value of the firm	FS	0.005	0.005	0.448	0.6540
Earnings per share	EPS	0.071	0.071	3.533	0.0005
current ratio	CR	-0.018	-0.018	-0.885	0.3764
leverage ratio	DE	0.017	0/017	-0.684	0.4943
Yield ration	DY	0.008	0.008	0.061	0.9515
Constant	C	0.322	0.322	8.980	0.0000
	Adjusted coefficient of determination	F-statistic	F probability		Durbin-Watson Test
0.314	0.204	2.982	0.000		2.334

Table 6. Test Results of the Second Model

$$Ab\ Return_{it} = \alpha_0 + \beta_1 Risk_{i,t} + \beta_2 HHI_{i,t} + \beta_3(Risk_{i,t} \times HHI_{i,t}) + \beta_4 BS_{i,t} + \beta_5 BM_{i,t} + \beta_6 IND_{i,t} + \beta_7 DUALITY_{i,t} + \beta_8 AC_{i,t} + \beta_9 FS_{i,t} + \beta_{10} EPS_{i,t} + \beta_{11} CR_{i,t} + \beta_{12} DE_{i,t} + \beta_{13} DY_{i,t} + e_t$$

Variable	symbol	Coefficients	standard deviation	t statistic	Significance level
The disclosed risk of financial reporting	RISK	0.218	0.063	3.488	0.0000
Competition in the product market	HHI	0.250	0.042	5.962	0.0000
Product market competition × exposed risk	RISK*HHI	0.409	0.081	5.049	0.0000
Total number of board members	BS	0.225	0.082	2.730	0.0024
Number of board meetings	BM	0.819	0.585	1.400	0.1622
Independence of the board of directors	IND	0.169	0.074	2.276	0.0233
The dual role of the CEO	DUALITY	-0.037	0.030	1.249	0.2123
The number of audit committee members	AC	0.154	0.172	0.897	0.3699
The market value of the firm	FS	-0.006	0.013	-0.530	0.5966
Earnings per share	EPS	-0/010	0.023	0.424	0.6720
current ratio	CR	0.008	0.023	-0.328	0.7436
leverage ratio	DE	0.036	0.029	1.273	0.2035
yield ratio	DY	0.399	0.148	2.691	0.0074
Constant	C	0.248	0.065	3.784	0.0001
The coefficient of determination	Adjusted coefficient of determination	F-statistic	F probability		Durbin-Watson Test
0.488	0.315	2.243	0.000		2.334

H_3: Competition in the product market has a significant effect on the relationship between financial risk reporting and stock returns.

According to the results presented in Table 6 and based on the calculated significance level, the interaction term **(product market competition × financial risk reporting)** is statistically significant at the 5% level ($p < 0.05$). This indicates that, at a 95% confidence level, product market competition has a significant moderating effect on the relationship between financial risk reporting and stock returns. The estimated coefficient and corresponding *t*-statistic for this interaction term further confirm the strength and direction of this effect, supporting the hypothesis that higher levels of competition amplify the impact of risk disclosures on stock performance.

Conclusions and Suggestions

Firm managers may disclose proprietary information to enhance their firm's reputation. Additionally, firms with competitive advantages tend to provide more extensive disclosures to highlight their strengths in risk management, thereby maintaining legitimacy and increasing shareholder trust (Oliveira et al., 2011; Shivaani & Agarwal, 2020). Abraham and Shrives (2014) further contend that managers should strategically shape their reporting to minimize proprietary costs, often opting to disclose sensitive information privately in meetings with investors. Market competition motivates firms to voluntarily increase disclosure. Supporting this, Birt et al. (2006) found that firms willingly share information with competitors when they perceive minimal harm to their

competitive position. This evidence aligns with the findings of Hassanein (2022).

It can therefore be concluded that investors' responses to risk disclosures are influenced by a firm's disclosure practices. Some firms limit risk reporting to balance the benefits of transparency against the costs of revealing potentially damaging information (Abraham & Shrives, 2014). Investors often interpret such cautious disclosure as indicative of weak risk management. A lack of transparency diminishes the perceived credibility of risk reporting, which can lead to lower stock returns. Conversely, increased risk disclosure enhances credibility, thereby positively affecting stock returns. These results are consistent with the studies by Hassanein (2022) and Ahmed et al. (2023).

The results of this hypothesis can be explained by prior literature, which demonstrates that product market competition encourages firms to voluntarily disclose more information. Research indicates that firms facing high competition are more willing to release information that facilitates accurate firm evaluations. Supporting this, Birt et al. (2006) found that firms are willing to share information with their competitors when they perceive such disclosure as less detrimental to their competitive position (Hassanein, 2022). In contemporary capital markets, investors place considerable emphasis on reliable financial information. High-quality financial reporting enables investors to better estimate risks and make improved investment decisions. Consequently, enhancing a firm's risk disclosure by increasing the perceived credibility of risk reports positively affects its stock returns. Based on this reasoning, it can be concluded that product market competition significantly influences the relationship between financial risk reporting and stock returns. This finding is consistent with the studies of Hassanein (2022).

Based on the first research hypothesis, it is suggested that product market competition positively and significantly affects the level of reported risk information. Therefore, investors are advised to focus on firms operating in highly competitive markets, as these firms tend to provide more comprehensive risk disclosures, enabling more informed investment decisions. Additionally, investors should consider the degree of product market competition when selecting stocks. Banks and lenders should also take this factor into account when granting credit, and financial analysts should incorporate product market competition into their evaluations based on financial statements. For a more accurate assessment of risk reporting, the role of product market competition should be recognized as an influential factor.

According to the second research hypothesis, financial risk reporting has a positive and significant impact on stock returns. Accordingly, it is recommended that the stock exchange organization enhance investors and other external stakeholders' ability to utilize disclosed financial information—especially risk-related data—through expanded training programs. Furthermore, the stock exchange and other regulatory bodies could classify firms based on their level of risk disclosure. Firm managers are also encouraged to review the types of information disclosed in financial reports related to major firm risks and to disclose as much relevant financial and non-financial information as possible, thereby improving the firm's overall efficiency.

Based on the results of the third research hypothesis, it can be concluded that product market competition has a positive and significant moderating effect on the relationship between financial risk reporting and stock returns. Accordingly, it is recommended that the stock exchange classify firms according to their level of competitiveness in the product market. Such classification would assist investors in assessing the competitiveness of firms, thereby enabling more informed and favorable investment decisions.

Generally, users of financial statements—including investors—are advised to examine the historical competitiveness of a firm's product market before making investment decisions. Preference should be given to firms exhibiting higher competitive intensity relative to the market. Moreover, investors

should also consider the firm's financial risk reporting and the factors influencing it when making investment choices across all firms.

Based on the findings of the present study, the following avenues for future research are proposed: conducting a comparative analysis of the effect of financial risk reporting on stock returns, with a focus on the role of product market competition in the Tehran Stock Exchange before and during the COVID-19 pandemic. Given that investors have asymmetric information about firms and that increased risk reporting may contribute to reducing information asymmetry, it is further suggested to investigate how financial risk reporting influences stock returns through the lens of information asymmetry.

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The Impact of Defensive and Offensive Business Strategies on the Relationship Between Working Capital Management and Profitability

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Abstract

Objectives: This research aims to investigate the impact of working capital management on the profitability of firms, emphasizing the moderating role of defensive and offensive business strategies. Effective management of working capital is essential for the survival of firms, as it reflects the efficient use of short-term capital and serves as a crucial measure of liquidity.

Methodology/Design/Approach: This applied study employs a causal correlational methodology (post-event). The statistical population comprises all firms listed on the Tehran Stock Exchange. Due to specific constraints, a total of 135 firms were selected through systematic elimination sampling and analyzed over ten years from 2014 to 2023.

Finding: The results indicate that aggressive business strategies significantly moderate the relationship between working capital management and firm profitability, whereas defensive strategies do not exhibit a notable effect on this relationship.

Innovation: This research contributes to the understanding of how business strategies influence the relationship between working capital management and profitability. It provides actionable recommendations for firms to adopt aggressive strategies to enhance overall performance. Furthermore, given the unstable economic environment in the country, it is suggested that firms develop strategic plans to improve their responsiveness to threats and capitalize on emerging opportunities.

Keywords: Working Capital Management, Profitability, Defensive and Offensive Business Strategy.

1. Introduction

Profitability is closely related to profits but differs in a key aspect: while profit represents an absolute value, profitability is a relative measure. This criterion assesses the extent of a company's profits relative to its size (Eskandarnejad et al., 2020). Profitability serves as an indicator of productivity and ultimately reflects the success or failure of a business. A more precise definition of profitability is the company's ability to generate financial returns based on its available resources compared to alternative investment opportunities. However, this does not necessarily imply that the company is profitable in practice (Sajadi et al., 2007).

Profit is one of the most significant components of financial statements, and users of such statements typically attach great importance to it. In accounting literature, the concept of profit has been widely debated, and there is no universally accepted, comprehensive definition due to differing expert perspectives.

Working capital management involves the administration of current assets and current liabilities. It aims to strike a balance between them, enabling shareholders to maximize returns on assets through the effective use of working capital. Efficient working capital management is crucial for the survival of companies, as it reflects the firm's ability to manage short-term capital and liquidity. Liquidity, in turn, is vital for ensuring the firm can meet its short-term obligations, as inadequate liquidity may lead to bankruptcy.

Effective management of working capital requires a balance between liquidity and profitability to maximize firm value. For example, maintaining larger inventories can help prevent disruptions in production or the procurement of expensive raw materials (Eskandarnejad et al., 2020). Additionally, extending credit to customers can stimulate sales and allow them to assess product quality before payment. However, such practices also reduce the available cash for investment, implying that achieving an optimal level of working capital can be a complex challenge for managers.

In Iranian companies, working capital management is particularly significant due to constraints in accessing long-term capital markets. These companies often rely on internal financial sources such as short-term bank loans, credit sales, inventory investment, cash holdings, and accounts receivable. Given such financial limitations, effective working capital management offers a practical strategy for Iranian firms (Badavarnahdi & Taghizadeh Khanqah, 2016).

Profit generation remains the fundamental goal of firms and commercial enterprises. In order to retain investor and stakeholder satisfaction, it is essential to enhance their wealth through sustained profitability. Consequently, studying the factors that influence corporate profitability is of considerable importance.

Working capital—defined as the short-term capital required in a company's operating cycle from raw material procurement to product sales and revenue collection—plays a crucial role. Inadequate working capital can disrupt the operating cycle and reduce profitability, while excess working capital may tie up resources and potentially create future financial problems.

Working capital management has been recognized in prior studies as a significant factor in influencing profitability. The current research places additional emphasis on how a firm's business strategy—defensive or aggressive—moderates this relationship. When a company adopts an aggressive strategy and enters a highly competitive environment, it must have stronger operational support. A faster operating cycle is typically required for such strategic moves, necessitating adjustments in working capital management, which in turn may affect profitability.

Conversely, companies with defensive strategies, such as those in the real estate sector that aim for stability, may face less risk related to working capital. Therefore, due to inconclusive prior findings and the identified research gap in domestic studies, examining the moderating role of defensive and offensive strategies in the relationship between working capital

management and profitability is both relevant and necessary. Accordingly, the purpose of this study is to investigate how different business strategies influence the relationship between working capital management and profitability.

Theoretical Foundations of Research

Working Capital Management and Profitability

Profitability refers to a company's ability to generate income and sustain profits. Net income, or net profit, serves as a key indicator of this profitability. Investors and creditors are highly interested in assessing both the current and future profitability of firms, as consistent profitability is essential for providing satisfactory returns and securing the capital necessary for growth. Companies that fail to generate sufficient profits are unlikely to attract investments or loans required for implementing various projects. In this context, the long-term sustainability and survival of a firm depend largely on its ability to generate earnings that fulfill obligations and reward key stakeholders (Osulian et al., 2016).

Given this, identifying the determinants of profitability is critical. One such determinant is the method of managing working capital. In today's volatile economic environment—characterized by heightened environmental pressures and limited access to external financing—working capital, comprised of current assets and liabilities, plays a vital role. Effective working capital management not only represents a potential competitive advantage but also directly influences a firm's financial performance, profitability, and liquidity (Le, 2019).

Working capital management encompasses the short-term financing of investment activities and typically constitutes a substantial portion of a company's balance sheet across various industries. When managed effectively, it can significantly enhance corporate performance (Nastiti et al., 2019).

According to Jensen and Meckling's (1976) agency theory, working capital indicators are aligned with the metrics used to measure a company's operating cycle, also referred to as the cash conversion cycle. This cycle spans the period between the outflow of cash for material purchases and the inflow of cash from product sales. A longer cash conversion cycle implies more capital invested in working capital, potentially resulting in liquidity constraints. However, a well-managed cash conversion cycle can also lead to increased sales and ultimately greater profitability (Barros et al., 2021).

Business Strategy, Working Capital Management, and Profitability

A prolonged cash conversion cycle can adversely affect a company's profitability. Firms that tie up excessive funds in working capital—resources that could otherwise be invested in productive ventures—often face increased financing costs. Conversely, companies with more efficient working capital management, requiring less investment in current assets, are generally more profitable.

In broader terms, strategy represents an organization's roadmap toward achieving its long-term objectives. In management theory, strategy formulation is a critical function, forming the foundation for decisions that ensure organizational sustainability and growth. A well-crafted strategy not only responds effectively to external environmental conditions but also aligns with internal capabilities and the strategies implemented at other organizational levels. Strategic coherence and integration across corporate, business, and functional levels are essential for achieving overall success (Izedi, 2013).

Companies typically adopt either **offensive (aggressive)** or **defensive** business strategies. Defensive firms aim to establish and maintain a secure market position, often within stable industries. These firms tend to offer a narrow product or service range and seek to maintain competitiveness through lower prices, higher quality, or superior service. They generally avoid taking the lead in innovation or entering unfamiliar markets, preferring to resist changes that do not directly affect their core operations (Marfouf & Shakeri, 2018).

In contrast, aggressive firms emphasize innovation, creativity, and proactive market engagement. Such a strategy is particularly suitable in dynamic and highly competitive environments. For these companies, market penetration and technological advancement often take precedence over short-term profitability. As a result, organizational strategic orientation—whether offensive or defensive—can significantly influence a firm's financial reporting practices and overall financial performance (Hajiha & Ranjbarnavi, 2018).

Research Background

Delgosha and Raei Ezabadi (2023), in their study titled *"The Role of Financial Constraint in Determining the Relationship between Working Capital and Financial Performance"*, found a significant negative relationship between working capital and financial constraints with the financial performance of companies. Although the moderating role of financial constraints in this relationship was negative, it was not statistically significant.

In their research titled *"Investigating the Relationship between Working Capital Management in Boom and Recession Periods"*, Ghodrati Zavarem et al. (2022) revealed that during periods of economic recession, managers tend to adopt conservative working capital policies, whereas during inflationary periods, more aggressive working capital management strategies are implemented.

Mazaheri and Shokrizadeh (2021), in their study *"Investigating the Effect of Working Capital Management on Stock Liquidity"*, emphasized that working capital management plays a key role in corporate finance, particularly in affecting the liquidity of stocks. Their findings confirmed a significant relationship between working capital management and stock liquidity.

Asadi et al. (2021), in *"The Moderating Role of Business Strategy on the Relationship between Social Responsibility and Firm Performance"*, found that corporate social responsibility positively impacts economic and market value, and this relationship is significantly enhanced by an aggressive business strategy. The results suggest that firms with more aggressive strategies experience a stronger link between social responsibility initiatives and firm performance.

Nabavi Chashemi et al. (2021), in a study titled *"Investigating the Relationship between Managers' Ability and Working Capital Management"*, found that managerial ability extends the cash conversion cycle and inventory turnover period. Moreover, a significant negative relationship exists between managerial ability and the accounts payable period.

Esmailzadeh et al. (2020), in *"Identifying Business Strategies to Face Environmental Uncertainties: A Review Study"*, identified 203 basic strategic responses to uncertainty, categorized into 29 organizing themes, which were further condensed into four overarching strategies: foresight, adaptation, acceptance, and moderation. This framework aids managers in selecting appropriate strategies to respond to environmental uncertainty.

Wallismas (2023), in his study *"The Moderating Effects of Strategy in Relation to Working Capital Management with Profitability"*, reported that aggressive strategies have a diminishing moderating effect, while defensive strategies have an enhancing moderating effect on the relationship between working capital management and profitability.

Tarcom (2022), in *"The Impact of COVID-19 on Working Capital Management: The Moderating Effect of Investment Opportunities and Government Incentives"*, found that the adverse effects of the pandemic on working capital management could be mitigated by increasing investment opportunities and government incentives.

Rodiavarni et al. (2022), in *"Business Strategy and Competition in Industries"*, concluded that aggressive firms outperform defenders financially for up to two years post-strategy implementation. Furthermore, innovative firms perform better than defenders in highly competitive environments, underlining the need for strategic alignment in such conditions.

Finally, Selaigua (2022), in a study on Czech firms titled *"Working Capital Management and its Impact*

on the Size and Profitability of Companies", demonstrated that factors such as the cash conversion cycle, current asset ratio, current liabilities ratio, and working capital ratio significantly influence the profitability of firms in the manufacturing, wholesale, and retail sectors.

Research Hypotheses

Based on the theoretical foundations and empirical literature, the following research hypotheses are proposed:

H1: Aggressive business strategy has a significant moderating effect on the relationship between working capital management and profitability.

H2: Defensive business strategy has a significant moderating effect on the relationship between working capital management and profitability.

Research Methodology

The present study is **applied** in terms of its purpose, aiming to address practical problems related to corporate financial performance and strategic management. Regarding the **research method**, it adopts a **descriptive-causal** approach, seeking to describe relationships between variables and examine causal effects, particularly the moderating role of business strategy on the relationship between working capital management and profitability.

In terms of **data collection**, the study is of the **historical (ex post facto)** type, meaning that it relies on past data to analyze relationships among variables. The method of gathering data is **library-based**, involving the use of existing financial statements, reports, and other archival records.

To test the research hypotheses, **regression analysis** will be employed after selecting the sample firms and collecting the required data. For data processing and analysis, **Excel** spreadsheet software has been used for initial organization, and **EViews** software has been utilized for statistical and econometric analyses.

The **spatial scope** of the research includes all firms listed on the **Tehran Stock Exchange (TSE)** during the period **2014 to 2023**. Based on the defined criteria and research limitations (such as data availability and consistency), a final sample of **135 companies** has been selected for empirical analysis.

Operational Definitions of Research Variables

Research Dependent Variable: Profitability (ROA)

Profitability, according to the research of Willismas (2023), is derived from the ratio of net profit to total assets.

Independent Variable: Working Capital Management (WCM)

According to the studies of Eskandar Nejad et al. (2020) and Badavar Nahandi and Taghizadeh Khanqah (2016), the main components of working capital—namely accounts receivable, inventory, accounts payable, and the efficient use of cash in operational activities—have been utilized as indicators to represent working capital management, which is treated as the dependent variable in this research. Specifically, the study employs the cash conversion cycle (CCC) and its constituent elements to quantify working capital performance.

The cash conversion cycle reflects the average time required for a company to convert its investments in inventory and other resources into cash flows from sales. It includes three core components:

- Accounts Receivable Period (ARP): the average number of days required to collect payments from customers;
- Inventory Period (INVP): the average time goods remain in inventory before being sold;
- Accounts Payable Period (APP): the average duration the firm takes to pay its suppliers.

In the regression models and hypothesis testing of this study, each component of the cash conversion cycle is also individually examined as a dependent variable to provide a more detailed understanding of working capital dynamics, consistent with the approach of Bolo et al. (2012).

$$CCC = \left(\frac{\frac{AR_t + AR_{t-1}}{2}}{\frac{Sales}{365}}\right) + \left(\frac{\frac{INV_t + INV_{t-1}}{2}}{\frac{COGS}{365}}\right) - \left(\frac{\frac{AP_t + AP_{t-1}}{2}}{\frac{Purchases}{365}}\right)$$

In the above relationships:

CCC: Cash Conversion Cycle

Sale: Net Selling

COGS: Cost of Goods Sold

Purchases: The cost of the goods sold plus the inventory at the end of the period minus the first item of the period.

AR: Accounts Receivable

INV: Inventory

AP: Accounts Payable

Moderating Variable: Business Strategy (Defensive (DEF) and Offensive (PRO))

In the present study, and in line with the methodologies adopted by Hrosita and Suryadinata (2022), Rostami et al. (2021), and Tanani and Mohebkhah (2014), the combined scoring model of Ittner and Larcker (1997) is employed to determine the strategic orientation of each company. This scoring approach is based on five financial and operational ratios:

1. Sales growth rate,
2. Advertising expense to total sales,
3. Number of employees to sales,
4. Market value to book value, and
5. Fixed assets ratio.

To implement the scoring system, the companies are first divided into quintiles (five equal groups) for each of the first four ratios. Companies in the top quintile receive a score of 5, while those in the lowest quintile receive a score of 1. The remaining companies are scored proportionally based on their respective quantiles.

For the fifth ratio (fixed assets ratio), the scoring is reversed: companies in the top quintile receive a score of 1, and those in the lowest quintile receive a score of 5, again with the rest assigned proportionally.

In the final step, the scores across all five indicators are summed to calculate each company's combined strategy score, which ranges from 5 to 25. Based on this aggregate score:

- Companies scoring between 5 and 15 are classified as following a defensive strategy,
- Companies scoring between 15 and 25 are considered to follow an aggressive strategy.

Accordingly, the moderating variable in this research is treated as a binary (dummy) variable:

- If a company adopts either an aggressive or a defensive strategy, it is coded as 1,
- Otherwise, it is coded as 0.

Table 1 - How to Score Business Strategy

punjak	Sales Growth Rate	Advertising Cost	Number of Employees	Company Market Value	Fixed Assets
		Total Sales	Total Sales	Book Value of the Company	Total Assets
1	5	5	5	5	1
2	4	4	4	4	2
3	3	3	3	3	3
4	2	2	2	2	4
5	1	1	1	1	5

Research Control Variables

Company size (SIZE): The natural logarithm of total assets.

Sales Growth (SG): The sales of the current period minus the sales of the previous period divided by the sales of the previous period.

Financial Leverage (LEV): The ratio of total liabilities to total assets.

Liquidity Ratio (OCF): The ratio of operating cash to total assets.

Capital Intensity (FA/TA): The ratio of fixed assets to total assets.

Research Regression Model

Following the research of Walismas (2023), the model has been introduced as follows to test the research hypotheses.

$$\begin{aligned} ROA_{it} = {} & \beta_0 + \beta_1 WCM_{it} + \beta_2\, PRO_{it} + \beta_3\, DEF_{it} \\ & + \beta_4 (WCM_{it} \times PRO_{it}) \\ & + \beta_5 (WCM_{it} \times DEF_{it}) \\ & + \beta_6\, SIZE_{it} + \beta_7 SG_{it} + \beta_8\, LEV_{it} \\ & + \beta_9\, OCF_{it} + \beta_{10}\, FA/TA + \varepsilon_{it} \end{aligned}$$

Research Findings

The presented descriptive statistics related to 135 sample companies in the 10 years (2013-2022) or (1350-firm-years) are presented in Tables 3 and 4.

The primary measure of central tendency used in this study is the mean, which represents the equilibrium point and the center of gravity of the distribution, serving as a reliable indicator of the data's centrality. For instance, the mean value of the leverage variable is 0.55, indicating that most data points are concentrated around this value. Dispersion measures are essential for assessing the extent to which data values spread out or deviate from the mean. Among these, the standard deviation is one of the most important indicators of dispersion. In this research, the standard deviation for working capital management is 243.2, reflecting a high degree of variability, whereas the standard deviation for company liquidity is 0.12, indicating relatively low variability. Additionally, the minimum and maximum values for each variable provide insight into the range of data by indicating the lowest and highest observed values, respectively.

Table 2- Descriptive statistics of research variables

Variable	Mean	S. dev.	Min.	Max.
ROA	0.14	059	-0.22	0.15
WCM	313.08	682.00	79.24	243.2
SIZE	14.91	20.00	11.40	1.67
Sg	0.38	2.13	-0.39	0.46
LEV	0.55	1.01	0.10	0.20
OCF	0.11	0.48	-0.14	0.12
FA/TA	0.26	0.68	0.019	0.17

Table 3- Frequency Distribution of Business Strategy Variable

Variable	Value	Frequency	Percent Frequency
PRO	1	605	44.81
DEF	0	745	55.19
Total	-	1350	100

As can be seen in Table 3, the total year of the companies under study is equal to 1350, among which 605 years - companies equivalent to 44.81% of the year - companies have an aggressive strategy and 745 firm-years—i.e., 55.19% of the year - companies have a defensive strategy.

According to the results obtained in Table 4, it can be seen that the significance level of the variables in

the durability test is less than 5% and indicates the reliability of the variables.

According to the results obtained in Table 5, it can be seen that the significance level of the Chow test for the research model is less than 5% and indicates the acceptance of the panel data model, which requires the presentation of the Hausman test, which is presented below (Platouni, 2018).

According to the results obtained in Table 6, it can be seen that the significance level of the Hausman test in the research model is less than 5% and indicates the acceptance of fixed effects.

***Table 4*- Stability Test Quantity Variables**

Variable	Test Statistics	Sig	Results
ROA	-5.31733	0.0000	Stationary
WCM	-23.6722	0.0000	Stationary
SIZE	-18.3167	0.0000	Stationary
Sg	-2.59579	0.0000	Stationary
LEV	-8.81136	0.0000	Stationary
OCF	-11.1637	0.0000	Stationary
FA/TA	-8.94694	0.0000	Stationary

Table 5 - F-Limmer test results

Test Model	Test Statistics	Sig
Research Model	2.9543	0.0000

Table 6 - Results of the Hausman Test

Test Model	Test Statistics	Sig
Research Model	172.73	0.0000

Table 7- The result of the hypothesis test

$$ROA_{it} = \beta_0 + \beta_1 WCM_{it} + \beta_2 PRO_{it} + \beta_3 DEF_{it} + \beta_4 (WCM_{it} \times PRO_{it}) + \beta_5 (WCM_{it} \times DEF_{it}) + \beta_6 SIZE_{it} + \beta_7 SG_{it} + \beta_8 LEV_{it} + \beta_9 OCF_{it} + \beta_{10} FA/TA + \varepsilon_{it}$$

Dependent Variable: Profitability

Variables	Coef	Std	Statistic t	Sig	VIF
WCM	0.024	0.010	2.37	0.017	2.22
PRO	0.012	0.008	1.45	0.14	3.20
DEF	0.0003	0.007	0.048	0.96	1.08
WCM× PRO	0.016	0.007	2.27	0.023	3.54
WCM× DEF	0.011	0.006	1.79	0.072	1.06
SIZE	0.034	0.005	6.24	0.0000	1.47
Sg	0.034	0.005	6.91	0.0000	1.26
LEV	-0.40	0.019	-20.8	0.0000	1.10
OCF	0.13	0.021	6.36	0.0000	1.06
FA/TA	-0.35	0.019	-18.11	0.0000	1.37
C	-0.13	0.084	-1.62	0.10	-
AR(1)	0.37	0.10	3.53	0.0004	-
Coefficient of determination	0.90				
Watson Durbin	1.96				
F	70.1126				
Sig	0.0000				

The results presented in Table 7 indicate that the interaction between working capital management and aggressive business strategy has a positive and significant effect on firm profitability, with a coefficient of 0.016 and a significance level of 0.023 (less than 5%). Therefore, the first research hypothesis is accepted at the 5% significance level. Conversely, the interaction between working capital management and defensive business strategy, with a significance level of 0.072 (greater than 5%), does not have a significant effect on profitability. Hence, the second hypothesis is rejected at the 5% significance level.

The model's coefficient of determination (R^2) is 0.90, indicating that the independent and control variables collectively explain 90% of the variance in the dependent variable (firm profitability). Additionally, the Durbin-Watson statistic is 1.96, which lies within the acceptable range of 1.50 to 2.50, suggesting no significant autocorrelation problem in the residuals. The variance inflation factor (VIF) values are all below 5, confirming the absence of multicollinearity among the research variables. Finally, the F-test statistic is significant at less than 5%, indicating that the overall regression model has a good fit and is statistically reliable.

Research Results

As previously noted, the main objective of this study is to examine the moderating role of business strategies—specifically defensive and aggressive strategies—on the relationship between working capital management and profitability. In general terms, a strategy is a comprehensive plan and vision for future goals that an organization develops and implements to achieve its objectives. In management science, however, strategy formulation is considered one of the most critical functions of management, serving as the foundation for key decisions that ensure the survival and long-term success of the organization.

In the contemporary business environment, most organizations no longer rely solely on a unified, overarching strategy. Instead, they adopt a portfolio of strategic approaches, each designed and implemented at different organizational levels. Among these, business-level strategy plays a pivotal role in determining how a company responds to industry, economic, and political changes to achieve and sustain a competitive advantage. It represents a management plan tailored to a specific area of the organization's operations, guiding the optimal allocation of resources to secure strong performance outcomes within that business domain.

Companies typically pursue either aggressive or defensive strategies, depending on their capabilities and objectives. According to the findings of this study, it was observed that an aggressive business strategy has a significant moderating effect on the relationship between working capital management and profitability. Firms adopting an aggressive strategic posture—characterized by proactive market penetration, innovation, and resource commitment—are more likely to enhance their financial performance by expanding market share and strengthening their competitive position. Consequently, the interaction between efficient working capital management and profitability is amplified in companies pursuing aggressive strategies.

In contrast, defensive strategies—which emphasize cost control, risk avoidance, and stability—did not demonstrate a significant moderating effect on the relationship between working capital management and profitability in this study. These results diverge from the findings of Walismas (2023), who concluded that business strategy, in general, does influence the working capital–profitability relationship.

Based on the findings related to the first hypothesis, it is recommended that companies with greater competitive potential adopt aggressive strategies to enhance overall performance. These strategies may enable firms to better utilize their working capital and improve profitability. Regarding the second hypothesis, which indicated that defensive strategies do not significantly impact the working capital–profitability relationship, it is suggested that firms operating in volatile economic environments focus on proactive planning to enhance profitability.

By doing so, they can better respond to external threats and potentially convert them into opportunities for strategic growth.

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The Impact of Company Geographic Location on Stock Market Indices

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Abstract

Objectives: This study investigates the relationship between the geographical distribution of firms and stock market indices, aiming to understand how regional firm location influences market behavior and overall index performance.

Methodology/Design/Approach: Company location data were collected using Geographic Information Systems (GIS) and relevant APIs. The research follows a descriptive-survey approach, complemented by analytical methods. Regression analysis and fixed effects models were used to test the hypotheses and analyze the data, examining the correlation between firm location and stock market performance.

Findings: The empirical findings reveal a negative regression coefficient between geographic location and the overall stock market index. Specifically, each unit increase in the geographic location metric corresponds to an approximate 93.297-unit decrease in the index. Moreover, if all companies were hypothetically located in the same geographic region, the projected overall market index would be 12,235. These results emphasize the significant effect that relocating companies from higher to lower geographic locations can have on the market index.

Innovation: This study contributes to the literature by quantifying the impact of geographic distribution on stock market indices. It highlights that firm location is not merely a contextual factor but a determinant that can meaningfully affect overall market performance, offering new insights for investors, policymakers, and urban economic planners.

Keywords: Operational Efficiency; Regional Distribution; Economic Indicators; Market indices.

1. Introduction

The transmission of information within regional energy stock markets can generate significant ripple effects across global financial markets and has attracted considerable scholarly attention over the past two decades. Given the critical role that energy industry stock markets play in various regions worldwide, coupled with their vulnerability to a broad spectrum of influencing factors, conducting a thorough and comprehensive analysis of the determinants governing these markets is of paramount importance. Such an investigation offers invaluable support to investors and industry stakeholders by facilitating well-informed decisions related to investment strategies and risk management.

Within this framework, the stock exchange index emerges as a key determinant in guiding the selection and allocation of investments across energy stock markets situated in diverse geographic regions. This study aims to scrutinize, evaluate, and monitor stock exchange indices across different locales to provide investors with insights derived from an integrated analysis of company performance, economic growth, and employment trends within these regions. As noted by Alawi et al. (2023), the energy market is influenced by a constellation of factors, including corporate performance, geographic location, stock market conditions, employment dynamics, and economic growth. Accordingly, a rigorous exploration of these determinants can yield nuanced and valuable insights for investors and other market participants.

Among the array of factors shaping energy stock market dynamics, geographic location is particularly salient. Certain regions possess abundant natural resources relevant to the energy sector, enabling higher levels of energy production. This advantage can lead to significant increases in the valuation of energy companies operating within these regions. The stock exchange index functions as a fundamental metric for evaluating market performance and exerts a profound influence on stock prices and market fluctuations.

A recent study by Saadawi et al. (2023) examined the impact of geographical risks on the Saudi Arabian stock market index, revealing that such risks materially influence market volatility and index performance. This underscores the critical importance of the stock market index as a key indicator of market health and a determinant of company stock prices, with its fluctuations bearing direct and indirect consequences for investment decision-making.

Furthermore, Daniel Mascare's work on the importance of geographic location for stock market participation highlights the influence of rural-urban disparities on investor behavior in Canada. Additional studies, including those by Fleming and Ali (2016) and Lian and Hamoudi (2017), have investigated the effect of geographic location on corporate performance across various industries in Mexico and France, respectively. Moreover, Fakhari and Naqdi (1396) identified a significant negative relationship between a company's geographic location and reported information asymmetry, alongside a positive correlation between geographic distance and corporate cash holdings.

Broadly, the literature consistently underscores the considerable impact of geographic location on corporate performance within stock markets. This influence holds particular significance for investors, as a precise understanding of geographic effects enables more effective investment strategies and risk management approaches. Geographic positioning also represents a critical determinant of physical and logistical risks faced by firms.

Additionally, research on the relationship between geographic location and company performance generates valuable insights applicable across diverse economic sectors. Economic policymakers, equipped with comprehensive knowledge of these geographic influences, are better positioned to engage in effective planning and make well-informed decisions.

The primary objective of this study is to investigate the influence of companies' geographic locations on the stock market index, recognizing it as a pivotal factor closely linked to corporate performance in financial markets. This inquiry aims to benefit a broad spectrum of stakeholders navigating the

complex financial landscape. While the effect of geographic proximity between auditors and stakeholders has been examined within auditing research (e.g., Seyyednejad Fahim and Khodashahri, 2023), the specific impact of companies' geographic locations on the stock market index remains an underexplored area. This study seeks to address this gap, contributing to the expanding body of knowledge in this domain.

Literature Review

The influence of geographic location on stock market indices, corporate profitability, and audit practices has been extensively examined, leading to the development of various foundational theories and concepts. Among these, the theory of local markets, first proposed by Robert Patlon (1993), stands out prominently. This theory posits that unique local and cultural conditions within different regions shape investor behavior, resulting in distinct local markets where stock prices are primarily influenced by region-specific factors. Consequently, variations in stock market indices and corporate profitability can be observed across geographic locales. Complementing this perspective, the theory of semi-predictable markets, introduced by James Sanders and Timothy McDaniel (1990), offers an additional explanatory framework regarding the impact of geographic location on stock market indices and corporate profitability. According to this theory, markets influenced by local factors demonstrate a degree of predictability in approximately half of their behaviors, while the remainder is governed by unpredictable, stochastic dynamics.

In the domain of corporate auditing, geographic location has also received significant scholarly attention. Choi, Kim, Koo, and Jang (2012) highlighted that auditors operating in various regions within a country encounter distinct challenges and disparities in the auditing process due to divergent local conditions and regulatory environments. This regional variability can substantially affect audit quality and procedures. Furthermore, the theory of semi-predictable markets has been employed to elucidate how geographic factors contribute to differential outcomes in stock market indices and corporate profitability, reinforcing the notion that local environmental influences play a critical role in shaping financial market behavior.

A recent study by Wilkens, Decaiser, Bruynseels, and Neumann (2023), titled "Reviewing Market Power of Auditors and Audit Quality: Concentration Effects, Market Share Disparity, and Leadership," reevaluates the relationship between auditor market power and audit quality. Utilizing audit data from publicly listed companies on the Belgian Stock Exchange, the study finds that increased market concentration, characterized by dominant auditor market power, correlates with a decline in audit quality. Moreover, disparities in market share and the presence of market leadership further exacerbate variations in audit outcomes. These findings underscore the critical influence of market structure on the integrity and reliability of financial audits.

Parallel to these investigations, emerging research has explored the impact of environmental, social, and governance (ESG) factors on corporate financial performance, particularly in the Levant region. Al Aamush, Khateeb, and Ananzeh (2023) analyzed financial data from companies listed on stock exchanges in Jordan, Syria, and Palestine, demonstrating that firms exhibiting strong ESG performance experience marked improvements in financial performance metrics. The study emphasizes that effective management of environmental and social responsibilities can exert a direct and significant positive influence on corporate financial outcomes. Collectively, these findings highlight the growing importance of integrating ESG considerations into corporate strategies to enhance financial performance.

Amini and Rahmani (2023) provide a comprehensive review of recent research concerning sustainable investments, environmental and social objectives, and financial performance. Their analysis covers key concepts such as the competitive advantages gained through sustainable projects,

methods for evaluating financial performance in sustainability contexts, and the role of sustainable investments in fostering economic and social development. The authors conclude by proposing directions for future research, emphasizing the evolving importance of sustainability in financial decision-making.

Alavi et al. (2023) investigate information transmission across energy industry stock markets in different regions. Using vector regression and quantity models, the study analyzes inter-market relationships and identifies price linkages among these markets. The findings demonstrate that energy stock markets worldwide influence one another directly and indirectly, underscoring the interconnectedness of regional markets. This work offers valuable insights for investors and industry professionals seeking to understand cross-regional market dynamics in the energy sector.

Fleming and Ali (2016) explore the effects of companies entering the retail market in various Mexican regions. Their results reveal that new company entries significantly affect market competition, although the magnitude and nature of these effects differ geographically. Nonetheless, the study does not extensively address the implications of these entries for local communities and employment levels.

Maskar (2018) examines the impact of geographic location on Canadian stock market participation. The study finds that firms situated in rural areas tend to have lower stock market participation, likely due to greater physical distance from central markets and limited access to information. However, the consequences of company location on local communities and employment are not thoroughly investigated.

Lian and Hamoudi (2015) analyze the influence of company establishment and dissolution on employment patterns across French regions. Their findings indicate that new company formations positively correlate with employment growth, while company closures contribute to employment decline. The authors caution that these results may vary in different contexts due to regional economic, geographic, and cultural heterogeneity.

Levine and Rubinstein (2017) empirically examine how indigenous enterprises and communities affect stock market participation in the United States. Defining "community" as groups bound by common cultural, linguistic, historical, and religious traits within geographic areas, they find that indigenous communities foster higher local market engagement, encouraging firms to participate actively in the stock market. This study highlights the critical role of localized social factors in shaping corporate market behavior and provides valuable insights for investors and researchers.

Haque and Islam (2017) offer a comprehensive study on geographic determinants impacting Indian stock market performance. Their results affirm that factors such as urban location, political and economic stability, and proximity to central markets significantly influence corporate performance metrics. However, the study stops short of fully elucidating the mechanisms by which these geographic factors affect firm outcomes or their complex interrelations.

Rai and Deyang (2018) focus on the contribution of corporate geographic locations to regional economic growth. Their empirical evidence suggests that companies situated in particular regions can enhance local economies by creating jobs and increasing production capacity. Yet, the authors acknowledge challenges in directly comparing their findings with other studies, given differences in research focus and geographic characteristics.

In summary, this review of extant literature reveals the profound influence of geographic determinants—including urban positioning, closeness to central markets, and regional development levels—on the operational performance of corporations and stock markets. Nevertheless, it is essential to consider that research outcomes vary due to cultural, economic, and geographic disparities across regions. Hence, further empirical investigations that account for the distinctive features of various geographic locales are vital to

deepen understanding of how these factors shape corporate and market performance.

Using the bibliometric software **Reviewer** and data extracted from the **Scopus** scientific database, a keyword co-occurrence map was generated to analyze the most frequent terms in the field of geographical location of companies and stock market indicators. The dataset comprised scholarly articles and publications indexed in Scopus between 2010 and 2023.

The analysis revealed that the majority of scientific research in this domain originates from India, accounting for approximately 35% of the total publications. Notably, Iran ranks above countries such as Italy, Australia, and Spain, highlighting the significant research activity and impact of Iranian scholars in this area. A historical search identified pioneering contributions by Sandaram and Lu from the Michigan Business School, who published their seminal paper in 1996, accumulating 51 citations to date. The most recent indexed article was authored by Ahmed et al. from the School of Information Management and Technology in Egypt, which, at the time of analysis, had not yet received citations. The most cited publication remains the work of Norris et al., which has garnered 171 citations.

To compile this dataset, keywords including "corporate performance," "geographical location," "stock market," and "stock index" were queried within the Scopus search engine, yielding an initial pool of 287 articles. Subsequently, specialized filters were applied to focus on publications within the disciplines of accounting, management, business, economics, and finance. The selection was further refined to include only English-language journal articles, conference proceedings, and business journals. After applying these criteria, the final validated corpus comprised 159 articles.

(TITLE-ABS-
KEY (company AND performance) AND TITLE-ABS-
KEY (geographical AND location) OR TITLE-ABS-KEY (stock AND market) AND TITLE-ABS-
KEY (stock AND exchange AND index)) AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p") OR LIMIT-TO (SRCTYPE , "d")) AND (LIMIT-TO (PUBSTAGE , "final") OR LIMIT-TO (PUBSTAGE , "aip"))

The details of these research papers were entered as data into the visual bibliography software called VOSviewer. Within the visual representations created by this software, every data point is symbolized by a circle and a link line. The bigger the size of the circle, the thickness of the link line, and the shorter length of the line signify the strength of that particular data point. In essence, a larger circle, a thicker line, and a shorter link line convey a higher level of significance for that data point.

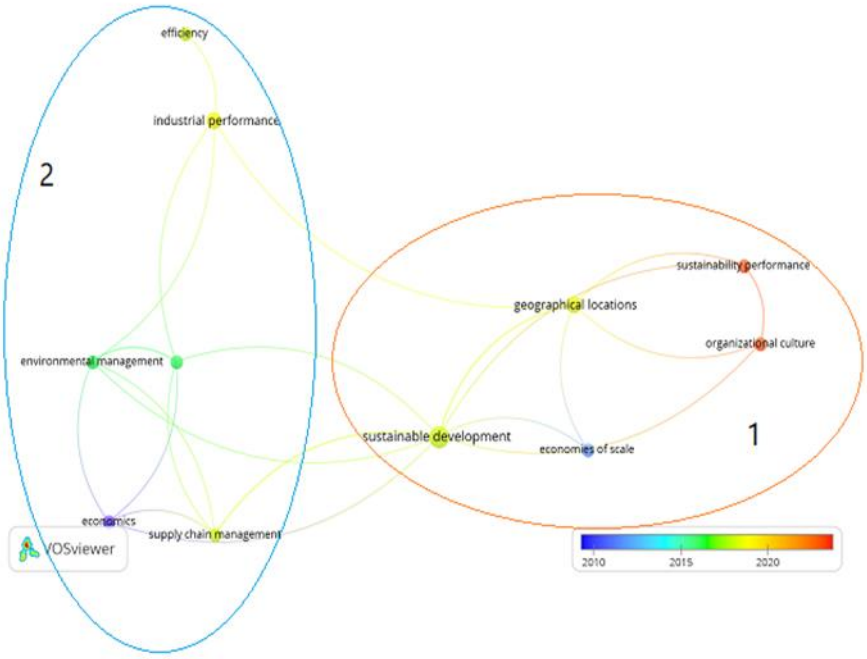

Fig1. Overlay visualization Map of the Most Frequent Author Keywords

The visual map underscores the relative importance of frequently employed keywords by authors over time, with a particular focus on geographical location, sustainable development, and organizational culture. In this visualization, two distinct clusters become apparent: the concise connections between "sustainable performance," "organizational culture," and "geographical location" highlight a concentrated exploration of organizational criteria and sustainable development within the first cluster. Meanwhile, the grouping of keywords such as "efficiency," "industrial performance," "environmental management," "supply chain management," and "economics" in the second cluster suggests that researchers have specialized in two specific research domains. Notably, there seems to be a research gap in the areas of supply chain management, economics, geographical location, and efficiency. Therefore, it is recommended that researchers allocate more attention to these domains.

Additionally, this map encapsulates the changing trends in keywords used by authors over the period from 2010 to 2023, represented by shifts in color. Cool blue and purple hues represent the author's interests from 2010 to 2015. As the colors transition to warmer tones, it signifies a shift in researchers' focus toward emerging topics. The prevalence of yellow color suggests that authors currently emphasize geographical location and sustainable development. Expectations indicate that in the coming years, as indicated by the red color, researchers will predominantly delve into the realm of organizational culture and sustainable performance within the context of geographical location.

Research Methodology

This study employs a descriptive-analytical approach with a cross-sectional time frame, concentrating exclusively on the year 2021. Therefore, the results

and conclusions are applicable only within the context of this specific period. Utilizing a quantitative research method, the study investigates the impact of companies' geographic locations on stock market indices through the analysis of secondary data sourced from publicly available platforms such as financial websites and official stock exchange databases.

The data analysis employs statistical tools including correlation coefficients and t-tests to explore the relationships and differences between relevant variables.

Complementing these traditional quantitative methods, the research introduces an innovative technique by constructing a behavioral map of companies based on their trading volumes using AutoCAD software. This novel approach is unprecedented in accounting and financial research, offering a distinctive visualization of trading behavior relative to geographic location.

The study population encompasses all publicly listed companies on the Tehran Stock Exchange (TSE). To assess the influence of geographic location on market performance, the research utilizes the overall stock market index as the primary indicator, reflecting the aggregated performance of all listed companies and thus capturing the potential effects of geographic factors on the stock market.

The Iranian stock market index comprises numerous key companies operating across diverse economic sectors. The following section organizes these companies by their respective provinces:

- Tehran:
    1. Iran Minerals Development Company
    2. National Iranian Oil Products Distribution Company
    3. Pars Welfare and Sports Services Company
    4. Telecommunication Company of Iran
    5. Pars Oil and Gas Company
    6. Esfahan Mobarakeh Steel Company
    7. Mobile Telecommunication Company of Iran (Hamrah-e-Avval)
    8. Iran Airports Company
    9. Bandar Abbas Oil Refining Company
    10. Jam Petrochemical Company
    11. Khuzestan Steel Company
    12. National Iranian Copper Industries Company
    13. SAIPA Group
    14. Iran Steel Company
    15. Khorasan Petrochemical Company

Isfahan:

- Isfahan Casting Industries Company
- Esfahan Mobarakeh Steel Company

Khuzestan:

- Khuzestan Steel Company

Hormozgan:

- Bandar Abbas Oil Refining Company

Fars:

- Bandar Abbas Oil Refining Company

Razavi Khorasan:

- Pars Oil and Gas Company

Qazvin:

- Telecommunication Company of Iran

This methodology underscores the systematic approach employed in this research, combining quantitative analysis with an innovative behavioral mapping technique to comprehensively explore the influence of geographic locations on stock market indices.

The research questions regarding the impact of geographical location on the stock market index are as follows:

1. Does the location of stock exchange-listed companies in different regions affect the performance of the stock market index?
2. Is there a direct relationship between geographical location and the performance of the stock market index?
3. Do geographical differences between regions have an impact on the analytical state of the stock market?

Research Findings

The table presented above offers an overview of the distribution of companies across various provinces. For example, based on the list of companies included in the Tehran Stock Exchange's comprehensive index, **15 companies operate in Tehran province**. The **average number of companies per province** according to this index is **4.14**.

Table 1. Descriptive Statistics of Trading Volume in Each Province

Province: The number of companies present in each province
Tehran 15
Isfahan 2
Khuzestan 1
Hormozgan 1
Fars 1
Khorasan Razavi 1
Qazvin 1
The average number of companies present in each province 4
The standard deviation of the number of companies present in each province is 5. 49

The **standard deviation** of the number of companies per province, which measures the degree of dispersion in the data, is relatively high at **5.49** for the Tehran Stock Exchange's overall index. This indicates a significant deviation from the mean, reflecting considerable variability in the number of companies distributed across provinces. These findings highlight notable differences in company presence among provinces.

In the following table, several statistical measures related to transaction volumes are provided:

- The **coefficient of variation** is defined as the ratio of the variance of transaction volumes to the mean transaction volume, serving as a relative measure of dispersion.
- **Skewness** quantifies the asymmetry of the transaction volume distribution relative to its mean. A skewness value below zero indicates a distribution with longer tails on the left (wider tails than a normal distribution), while a skewness value above zero signifies longer tails on the right (narrower tails than normal).
- Specifically, skewness measures the degree of imbalance between small and large transaction volume data compared to a normal distribution. A skewness value equal to 1 indicates a perfectly normal skewness; values less than 1 suggest a wider distribution, and values greater than 1 imply a narrower distribution.

Table 2. Trading Volume of Companies in the Overall Index by Province

Province	Trading Volume	Minimum Trading Volume	Maximum Trading Volume	Skewness	Kurtosis	Coefficient of Variation (%)
Tehran	7,244,396,661,630	51,546,805,850	3,036,620,664,200	2249	2419	5/514
Isfahan	264,606,800,770	1,745,558,550	61,361,507,260	3.270	8.734	636
Khuzestan	158,801,750,110	1,604,903,950	39,352,936,630	6.054	5.497	106
Hormozgan	110,156,695,760	387,754,600	32,282,935,160	6.542	8.360	1.356
Fars	102,218,336,670	1,439,695,400	25,768,357,680	4.669	7.994	177
Khorasan Razavi	51,546,805,850	1,478,169,100	10,135,597,800	2.111	3.663	546
Qazvin	19,205,066,130	129,092,700	2,547,518,490	19.585	81.836	11.780
Average	1,625,696,465,957	6,266,945,725.7	20,116,587,365.2	4.21	12.811	2.761.714
Median	110,156,695,760	1,604,903,950	32,282,935,160	4.669	7.994	546
Standard Deviation	3,285,367,097,289	15,803,991,137.6	18,195,096,559.9	3.07	28.272	4,175.904

Furthermore, a behavioral map of the studied companies based on their trading volume is presented, which has been drawn using AutoCAD software.

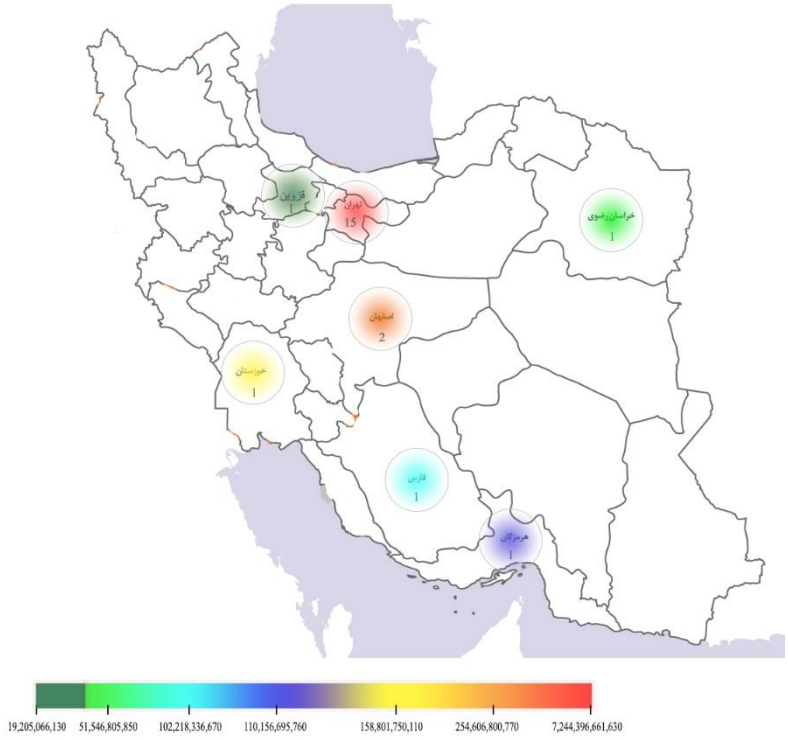

Figure 2. Schematic representation of the behavioral map of trading volume by companies based on geographical location.

In Figure 1, the color transition from green to red signifies a progressive increase in trading volume. This schematic depiction distinctly showcases that Tehran, Isfahan, and Khuzestan take the lead in this trading index. These findings indicate that geographical location significantly influences trading volume. Considering the implications of these findings, it raises an intriguing question for future research: Why does Qazvin, despite its geographical proximity to Tehran, exhibit relatively lower trading volume? What unique infrastructural or contextual elements distinguish Tehran and Isfahan from other cities in this regard? This exploration into regional disparities in trading volumes can offer valuable insights into the dynamics of economic activities and market behavior.

Houseman Test Results

In our research, we begin with the null hypothesis that posits a uniform impact of geographical location on the stock index across all provinces. To scrutinize this null hypothesis, we employ two distinct statistical models: the random effects model and the fixed effects model. Our initial step involves calculating the parameter governing the influence of trading volume using the random effects model. Subsequently, we estimate the parameter associated with geographical location effects using the fixed effects model. Ultimately, we turn to the Hausman statistic as a means to compare the disparities in estimators between these two models. This statistical examination is crucial in assessing whether geographical location

significantly affects the stock index in varying ways across provinces.

Table 3. Hausman Test

Pattern	Statistic Value	Significance Level
Random Effects Model Results		
Fixed Effects:	-0.0000865	
Trading Volume Effect		
Fixed Effects Model Results:		
	-0.0000913	
Trading Volume Effect		
Geographic Location Effect:	-0.0000048	

As per the conducted analyses, the p-value registers at zero, which is significantly smaller than the chosen significance level of 0.05. Consequently, we must reject the null hypothesis, indicating that the geographic location exerts differing effects on stock prices across various provinces. In essence, the fixed-effects model, which takes into account these geographic variations, emerges as a more suitable approach compared to the random-effects model. It's essential to emphasize that this test's validity hinges upon both the random-effects and fixed-effects models having sound estimators, as well as the accurate establishment of the null hypothesis (that geographic location effects are uniform). Furthermore, it's crucial to note that the results derived from this test are specific to the utilized dataset and require reevaluation when applied to new data.

Diagnostic tests:

df1 test: 0.1271151 (p-value: 0.722301)
df2 test: 1.234134 (p-value: 0.217020)
Hansen test: 17.16515 (p-value: 0.507771)

In this model, an additional variable, trading volume, has been introduced, with coefficients of -551.48095 and 143.79069 for the geographical and trading volume variables, respectively. Notably, both coefficients exhibit p-values below the 0.05 significance threshold, indicating their significant influence on the overall stock price index. The incorporation of the trading volume variable into the model not only enhances the results but also improves the precision of forecasting the comprehensive stock price index.

Table 4. Regression Results

	Pr(>|t|)	t-value	Std.	Error
	Estimate	Coefficients :		
	2.094e-05	-4.2818	128.71656	-
551.48095 location				
	< 2.2e-16	13.2875	10.83148	143.79069
	volume			

Two-Step (GMM) estimation results:
==========
GMM criterion: 1.399e+03
Q(2) test: 83.53 p-value: 7.497e-19

	Estimate	Std. Error	z-value	Pr(>|z|)
(Intercept)	159.7461	14.1266	11.3029	< 2.2e-16 ***
location	-551.4809	128.7166	-4.2818	2.094e-05 ***
volume	143.7907	10.8315	13.2875	< 2.2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1" 1

Table5. Coefficients, statistical metrics

Residuals:

Min	1Q	Median	3Q	Max
-1345.17	-287.61	19.91	283.37	1070.34

Coefficients:

	Estimate	Std. Error	t-value	Pr(>|t|)
(Intercept)	12235,000	126.904	96.425	< 2e-16 ***
location	-93.297	30.911	-3.016	0.00274 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1" 1

Residual standard error: 413.6 on 476 degrees of freedom
Multiple R-squared: 0.0189, Adjusted R-squared: 0.01633
F-statistic: 9.095 on 1 and 476 DF, p-value: 0.00274

In the table presented above, you can examine the intricacies of the model, including its coefficients, statistical metrics, and the p-values associated with each coefficient. Within this model, the coefficient for the "location" variable is calculated at -93.297, with a

p-value that falls below the significance threshold of 0.05. This signifies that the "location" variable exerts a meaningful influence on the overall stock index, indicating that stock prices can indeed exhibit significant variations across different geographical regions, thereby affecting the comprehensive stock index.

Table 6. Analysis of Residuals

```
Residuals:
     Min       1Q   Median       3Q      Max 

-1345.17  -287.61    19.91   283.37  1070.34 


Coefficients:

             Estimate Std. Error t-value Pr(>|t|)    

(Intercept) 12235.000    126.904  96.425  < 2e-16 ***
location      -93.297     30.911  -3.016  0.00274 ** 

---

Sign if. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


Residual standard error: 413.6 on 476 degrees of freedom
Multiple R-squared:  0.0189,    Adjusted R-squared:  0.01633 
F-statistic: 9.095 on 1 and 476 DF,  p-value: 0.00274
```

This analysis provides a comprehensive overview of various statistical metrics that shed light on the formulation of a pertinent model designed to address the research question. At its core, the output initiates with the invocation of a linear regression model, skillfully constructed through the amalgamation of the provided input data and specified commands.

Subsequently, the ensuing output furnishes key statistical indicators central to the model, encompassing:

Residuals: A collective representation of the model's residuals.
Coefficients: Illuminating the coefficients attributed to each independent variable within the model.
- Sign if. Codes: Offering insight into the statistical significance of each coefficient, signified in this output by the "location" coefficient's significance level (0.01) indicated by three asterisks (*).
Residual standard error: Quantifying the standard error of the residuals concerning the model's degrees of freedom.
Multiple R-squared: Presenting the model's multiple correlation coefficient.
Adjusted R-squared: Reflecting the adjusted multiple correlation coefficient tailored to the model.
F-statistic: A pivotal statistical measure determining the collective significance of the model's coefficients.
p-value: Unveiling the p-value associated with each coefficient.

With these metrics in consideration, it becomes apparent that the "location" variable exerts a substantial and statistically significant influence on the overarching stock index. The "location" coefficient, denoted as -93.297 with a p-value below 0.05, attests to this significance. The linear regression model is succinctly expressed as:
index = 12235–93.297 * location

In this model configuration, "index" is representative of the overall stock index, while "location" denotes the geographic positioning. Furthermore, the determination coefficient (R-squared) for this model approximates 0.019, signifying that approximately 1.9% of the variability observed in the overall stock index can be attributed to variations in the "location" variable.

Interpreting the positive or negative nature of regression coefficients, it becomes evident that with each positive unit increment in geographical location, the overall stock index experiences an approximate decrease of 93.297 units. In essence, the act of relocating from a region marked by a higher geographical location to one characterized by lower geographical coordinates may precipitate a diminishment in the overall stock index.

Within the framework of linear regression models, the constant value assumes the role of predicting the value of the dependent variable (y) when all independent variables (x) are set to zero. In this context, the constant value (12235) signifies the anticipated value of the overall stock index when the "location" variable equals zero. Thus, were all companies positioned within a specific region boasting a distinct geographical location, disregarding actual "location" variable values, the overall stock index would be forecasted at 12235. This underscores the premise that geographical shifts from regions characterized by higher to lower geographical coordinates could potentially yield a decline in the overall stock index.

Discussion and Conclusion

The primary objective of this study was to investigate whether the geographical locations of publicly traded companies across various regions exert a tangible influence on the performance of the stock market index. The research findings provide strong evidence supporting the notion that geographical factors significantly affect the overall stock index of the Tehran Stock Exchange. Specifically, cities such as Tehran and Isfahan, characterized by higher trading volumes, exert a more substantial impact on the index. This suggests that, alongside systemic and internal factors extensively examined in prior research, geographical location constitutes an important element influencing stock market performance.

Figure 1 visually illustrates the relative significance of specific companies in shaping the index based on their geographic locations. This representation highlights the critical importance of examining infrastructural disparities among cities, which have contributed to the success of these companies. These findings align closely with earlier studies conducted by Fleming and Ali (2016), Lian and Hamoudi (2017), and Masgar (2018).

The model's coefficient of determination (R^2) is approximately 0.019, indicating that around 1.9% of the variance observed in the Tehran Stock Exchange's overall stock index can be attributed to geographical variables. These results carry practical implications for corporate management, including strategic considerations such as branch establishment, potential mergers with companies located in different regions, and other regional growth strategies.

Moreover, this study opens avenues for future research, particularly in exploring whether unique infrastructural factors within different regions influence corporate valuations. Further investigation could shed light on the specific infrastructural components that meaningfully affect company performance and stock market outcomes.

One noteworthy caveat of this study pertains to its cross-sectional nature, constrained within a delimited timeframe. Consequently, the discerning course of action would entail extending such investigations across protracted temporal horizons, affording insight into the evolving dynamics of the stock market.

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