



RESEARCH ARTICLE

Investigating the Relationship between Bank Financial Performance and Corporate Governance According to the Role and Size of the Institutional Investor: A Spatial Econometric Approach

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ABSTRACT

The research was conducted with the aim of investigating the effect of corporate governance and institutional investment on the financial performance indicators of banks, using spatial econometrics over the period 2011 to 2023. This study uses spatial autoregression models, spatial error and spatial autoregression analysis to analyse the relationships between changes in corporate governance, institutional investment, sustainability reporting and bank characteristics with financial performance indicators including ROA, ROE and NIM. The results show that improving corporate governance indicators, increasing institutional investment, developing sustainable reporting, having a board sustainability committee, increasing board size, and increasing bank investment have a positive and significant effect on banks' financial performance. The existence of spatial security between banks was also confirmed. The results of this research emphasize the importance of paying attention to corporate governance mechanisms, institutional investors and sustainability considerations, along with other specific bank characteristics, in explaining performance indicators. Also, the way of creating the middle space and overflow of banks shows that the analysis of bank performance can provide a complete picture of reality without considering the performance of related banks.

INTRODUCTION

In the current global landscape characterized by rapid changes and complexities in economic systems, the focus on corporate governance mechanisms and their impact on the financial performance of banks is of particular importance. Banks, as vital institutions in the economy, play a fundamental role in facilitating capital flow and supporting economic activities (Khavjoui & Ebrahimi, 2018). Therefore, the financial performance of banks affects not only the profitability of shareholders but also the macroeconomic stability (Clark et al., 2018). As a result, evaluating the financial performance of banks has always been a significant issue in accounting and management. Investors are constantly seeking ways to increase their capital and are looking for banks that deliver higher returns and better financial performances (Ghousi & Akbarpour, 2019). However, the financial performance of banks may be affected by financial crises that disrupt their ability to provide efficient financial services (KheirAllahi et al., 2022).

Corporate governance, as a system that defines the relationships among management, the board of directors, shareholders, and other stakeholders, plays a critical role in improving financial performance and risk management in banks (Moridu, 2023). The corporate governance system, through optimal resource allocation and enhanced transparency of financial information, increases

investor confidence and reduces agency costs (Jensen & Meckling, 1976; Abdullah & Torresoy, 2023). On the other hand, institutional investors, as a significant component of corporate governance, have a decisive role in enhancing the financial performance of banks. With considerable financial resources and expertise in financial analysis, these investors can improve financial performance and mitigate risks through effective oversight of management and participation in strategic decision-making (Zatoni, 2011). The size and influence of institutional investors can affect managerial decisions and banking policies.

Recent financial crises, especially the crisis resulting from the COVID-19 pandemic, have further highlighted the role and importance of institutional investors in corporate governance (Adrian et al., 2022). These crises have shown that banks with stronger corporate governance structures and more effective institutional investors have demonstrated greater resilience against financial shocks (Carlati et al., 2020; Albuquerque et al., 2020). This underscores the necessity of examining the impact of institutional investors on the financial performance of banks. Thus, the significance of investigating the relationship between banking financial performance and corporate governance, considering the role and size of institutional investors, lies in the fact that banks, as principal financial intermediaries, play a crucial role in the optimal allocation of resources and facilitation of economic activities. Optimal financial performance of banks not only leads to increased shareholder profitability but also significantly impacts sustainability and economic growth at the macro level. In conditions where financial crises, such as the COVID-19 pandemic, have destabilized economic structures, understanding how corporate governance mechanisms, particularly the role of institutional investors, affect banks' abilities to cope with financial shocks is extremely crucial. Effective corporate governance can improve financial performance and risk management in banks through enhanced transparency, reduced agency costs, and increased investor confidence (Affes & Jarboui, 2023). Conversely, institutional investors, with extensive financial resources and expertise in financial analysis, can play a significant role in overseeing management performance and engaging in strategic decision-making (Neukirchen et al., 2023). The size and influence of these investors can significantly affect banks' policies and management decisions, which, in turn, impacts their financial performance and sustainability (Komath et al., 2023). A thorough examination of this relationship can identify solutions for strengthening corporate governance structures and optimally utilizing the capacities of institutional investors, which can enhance the efficiency of the banking system and increase its resilience against economic fluctuations (Hsu & Yang, 2022). This subject is essential not only from a theoretical perspective but also from a policy-making and executive management viewpoint, as it contributes to improving financial stability and sustainable economic growth. Therefore, the main research question is how the relationship between bank financial performance and corporate governance is affected by the role and size of institutional investors. The present study aims to investigate this relationship and provide practical insights for improving the financial performance of banks by enhancing corporate governance mechanisms and leveraging the role of institutional investors. The results of this research can assist policymakers and bank managers in formulating effective strategies for risk management and improving financial performance.

The present article is organized as follows: first, the literature on corporate governance, institutional investors, and financial performance is reviewed, along with the relevant empirical background. After that, the research methodology is described, the statistical population is introduced, and the data is analyzed. Finally, the research findings are presented and discussed, followed by several practical recommendations based on the conclusions drawn.

LITERATURE REVIEW

Today, one of the most important financial issues for companies is measuring their performance. Many decisions made by a company's management, its investors, and its creditors are based on assessing the company's performance (Peterson, 3222). Financial ratios that utilize data from a company's financial statements and specific market data are often used when evaluating a company's financial performance (Maier et al., 3222). Good corporate governance plays a significant role in the performance of a company and, in general, the performance of the economy. Due to the importance of the corporate system in the economy, the stability and health of companies and the framework through which companies operate their businesses are key elements for the stability of the financial system. Weak corporate governance structures can lead to the transmission of companies' problems

to the entire economy. Ineffective corporate governance can result in the bankruptcy of a company. Such an occurrence can be observed during the financial crisis that emerged in mid-2007. Additionally, weak corporate governance can lead to a loss of market confidence in a company's ability to manage its assets and liabilities, ultimately leading to a liquidity crisis for the company. On the other hand, companies are not only responsible to their shareholders but also to other stakeholders (Nag, 2022). The topic of corporate governance is presented as a major focus in management research, especially following the misconduct and financial scandals that emerged in previous decades. This issue clearly indicates the need for improved oversight of companies' management performance and a distinction between ownership and management, aimed at protecting the rights of investors and other stakeholders. In fact, corporate governance is recognized as a collection of requirements, including the relationships and internal controls of an organization, ensuring that these controls prevent violations of the rights of both major and minor shareholders and that the principles of general assemblies are implemented. The existing literature presents multiple definitions of corporate governance, which can be broadly categorized into two groups: narrow definitions and broad definitions. More limited perspectives, such as those found in the Cadbury Report (1992) and the agency theory of Parkinson (1994), focus on the relationships between owners and managers of companies. In contrast, broader definitions, like the discussions by Megginson (1994) and Robert Monks and Nell Minow (1995), take a more comprehensive approach, referring to companies' responsibilities to the entire chain of stakeholders, including social and environmental roles.

Shareholders and other stakeholders require financial information to make their decisions, which is found in companies' annual reports. The annual financial reports of companies during the COVID-19 crisis, similar to previous years, provided various information about the quality of corporate governance, stock returns, financial performance, and the value of the company to shareholders and other stakeholders. One of the objectives of providing these reports is to reduce information asymmetry. The lack of information asymmetry indicates that some individuals within the organization, such as managers, have more information about the company's financial status, projects, and future investments than those outside the organization (Pereira et al., 2020). Other stakeholders, such as the government, investors, and creditors, use this information to assess the quality of the company. Therefore, providing financial statements containing information about the company's performance quality can be good news and significantly impact the company's value (Gomanti, 2011). Thus, good organizational governance also has a significant impact on risk management within organizations. This impact is manifested through effective oversight of internal processes, risk assessment, and the establishment of clear policies (Alasbahi, 2020). These mechanisms serve as a means through which managers are required to adhere to performance and regulatory standards, thus ensuring compliance and accountability (Moghaddamzadeh et al., 2022). Additionally, such practices may help prevent resource mismanagement and minimize exposure to risks, ultimately protecting the company against non-fiat financing opportunities. In the end, this contributes to enhancing financial sustainability and the long-term prospects of the company (Alsalim & Amin, 2018). Therefore, good corporate governance has a significant impact on capital structure, fund allocation, and the development of risk management strategies, playing an important role in economic development in the corporate finance sector (Bui Thi Ngoc et al, 2023). Consequently, these aspects are regarded as strategic elements to ensure the success and long-term prosperity of organizations considered less competitive in the business landscape (Peng et al., 2021).

Institutional investors, as major and influential shareholders, play a key role in corporate governance and improving the financial performance of companies. With extensive financial resources and expertise in financial analysis, they have the ability to effectively monitor management and participate in strategic decision-making (Polovina & Ken, 2020). These investors can reduce conflicts of interest between managers and shareholders and increase the productivity and efficiency of the company by exerting their influence within management structures (Rashed et al., 2018). The active presence of institutional investors in corporate governance, as a strong oversight mechanism, can lead to enhanced transparency and improved financial performance in companies (Richardson, 2006).

In addition, institutional investors encourage companies to implement higher disclosure and transparency standards by demanding accurate and timely financial reporting. This leads to a

reduction in information asymmetry between management and shareholders, thereby increasing investors' trust in the published financial information (Richardson et al., 2006). Reducing information asymmetry can lower capital costs and facilitate companies' access to financial resources (Rodrigues et al., 2020). Furthermore, by encouraging companies to adopt prudent management policies and focus on long-term goals, institutional investors can contribute to the financial sustainability and continuous growth of companies (Roychowdhury et al., 2019).

During times of financial crises, the role of institutional investors in supporting companies and stabilizing financial markets becomes even more pronounced (Shan et al., 2019). By adopting long-term investment approaches and providing financial support, they can assist companies in confronting economic challenges and mitigating the negative impacts of crises. Additionally, by emphasizing risk management and strong corporate governance, institutional investors can guide companies through critical conditions while maintaining satisfactory financial performance (Sheikh et al., 2021). Therefore, institutional investors are recognized not only as providers of capital but also as influential factors in corporate governance and the financial performance of companies (Soliman et al., 2020).

Research Background

In studies conducted in the area of predicting and assessing the financial performance of companies, various approaches have been utilized. Bahrampour and Saei (2006) presented a model for predicting financial performance and stock returns of companies listed on the Tehran Stock Exchange, demonstrating that activity indicators, debt status, and industry type can create significant differences in companies' performances. Reisi et al. (2016) also utilized the C5 decision tree to predict company performance and found that return on equity has a higher accuracy in predictions compared to return on assets.

In the area of the impact of accounting factors on financial performance, Zolqi and Firoozabad Tepe (2017) examined the effect of accounting estimates on predicting liquidity and financial performance. Their results indicated that accounting estimates possess the ability to predict liquidity and financial performance. Moghimi and Namazi (2019) focused on the constructs of growth, innovation, and related challenges, showing that these factors have direct and indirect impacts on the financial and economic performance of companies.

Dimensions of corporate social responsibility and its impact on financial performance have also received attention from researchers. Foroughinasab et al. (2021) demonstrated that the social dimension of corporate social responsibility has a positive and significant effect on financial performance. Abgineh et al. (2023) also concluded, based on a model of environmental information disclosure, that the disclosure of such information, especially in polluting industries, can lead to improved financial performance of companies and sustainable development.

In international studies, researchers have employed more advanced techniques to predict financial performance. Hajek et al. (2014) and Karim et al. (2022) examined the role of emotions in annual reports, showing that emotional information can be an important factor in predicting financial performance and assisting shareholder decision-making. Chang et al. (2016) emphasized that the integration of financial and textual information leads to improved accuracy in predictions and financial risk management.

Finally, the use of data mining methods and advanced modeling techniques in predicting financial performance has gained attention. Maroufi et al. (2024) developed a model for predicting the Q-Tobin ratio using wizard search algorithms, genetic algorithms, and evolutionary methods, demonstrating the high power of these algorithms in analyzing financial data. Lam et al. (2023) also showed, using the fuzzy entropy TOPSIS model, that it is possible to identify companies with superior financial performance for investment portfolios by evaluating key financial ratios.

Based on the review of theoretical literature and the research background, the main innovation of the present study can be explained in several aspects. First, although numerous studies have been conducted on evaluating companies' financial performance, the impact of corporate governance, and the role of institutional investors in Iran and globally, there has yet to be a comprehensive study examining the relationship between the financial performance of banks and corporate governance,

considering the role and size of institutional investors in Iran. This is while banks, as vital financial institutions in the Iranian economy, require specialized studies to improve financial performance and risk management. Secondly, previous studies have predominantly focused on companies listed on the Tehran Stock Exchange and have paid less attention to the banking industry. This study aims to fill this research gap with a particular focus on banks. Furthermore, the role of institutional investors and the impact of their size on corporate governance and the financial performance of banks have not been specifically studied in Iran. In contrast, the international literature clearly emphasizes the importance of institutional investors in enhancing transparency, reducing conflicts of interest, and improving companies' financial performance. Thirdly, from a methodological perspective, this study intends to use innovative and advanced data analysis methods that have not been employed in similar studies in Iran. The application of spatial econometric methods constitutes the methodological innovation of this research. These methods facilitate the analysis of dependencies and spatial interactions among the studied units and can account for spatial and regional effects in modeling the relationships between variables. The use of spatial econometrics aids in obtaining a deeper understanding of how corporate governance factors and institutional investors affect the financial performance of banks, considering their geographic distribution. This novel methodology enhances the accuracy and reliability of the results and provides new insights into the complex relationships between variables, which have been less emphasized in previous research. In summary, this study focuses on an important and sensitive industry (banking) and employs innovative analytical methods, aiming to provide findings that could improve corporate governance policies in banks, enhance the role of institutional investors, and ultimately improve the financial performance of banks in Iran. This study can be valuable for banking managers, policymakers, and financial researchers and can pave the way for further studies in this area.

METHODOLOGY

The present study is applied research in terms of classification of research based on purpose. In terms of classification of research in terms of method, it is descriptive research and among the types of descriptive research methods, it is of the type of post-event research. In order to test the research hypotheses, it is necessary to gather the factors affecting the dependent variable of financial performance of companies listed in the stock exchange and express it based on a function such as F. It is determined in a non-linear way, for which the spatial econometric method is used to evaluate the financial performance. In principle, the financial performance of banks refers to a comprehensive evaluation of the financial and operational status of the banks listed in the Tehran Stock Exchange in a specific period of time. This criterion includes a set of financial indicators that include the efficiency and effectiveness of the bank in the use of financial resources, asset management, etc. It shows liabilities, profitability, and the ability to create value for shareholders. Therefore, in order to investigate the financial performance of banks, the techniques of spatial vector autoregression model and spatial error panel have been used to investigate the financial performance of banks listed in the Iranian Stock Exchange and the results have been examined. Then, to investigate the accuracy of the models, Shaiper-Wilk ammon normality has been used. The statistical population of this study is the data of banks listed in the Iran Stock Exchange for the period of 2011 to the end of 2023, which the data related to this research are from the official websites of the Comprehensive Information System of Publishers (Kadal), the ¹ databases of the capital market of Iran (Tadbir Pardaz),² Tehran Stock Exchange Company³, Iran Fara Bourse Company⁴, and the Securities and Exchange Organization⁵, Central Securities Depository and Funds Settlement Company were ⁶ collected and the data were sorted using Excel software. In order to achieve an appropriate and purposeful statistical population, all the accepted banks, i.e. 24 banks in the Iranian Stock Exchange, were examined. R&R Studio

¹ <https://www.codal.ir>

² <https://www.tsetmc.com/>

³ <http://new.tse.ir/>

⁴ <https://www.ifb.ir/>

⁵ <https://www.seo.ir/>

⁶ <https://www.csdiran.ir/>

software was also used to analyze the data. Thus, in the continuation of the research, the model clarification and the introduction of the research variables have been examined.

Panel Space Fault Model (SPEM):

The panel spatial error model for each of the financial performance indicators (ROA, ROE, NIM) is defined as follows:

$$Y_{it} = \beta_0 + \beta_1 CG_{it} + \beta_2 INST_{it} + \beta_3 BSRF_{it} + \beta_4 BSCOM_{it} + \beta_5 BSIZE_{it} + \beta_6 FSIZE_{it} + \beta_7 LEV_{it} + \beta_8 CAP_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Where:

$$\varepsilon_{it} = \lambda \sum_j W_{ij} \varepsilon_{jt} + v_{it}$$

In the above relationships, in the above relationships: Y_{it} , as the dependent variable represents the financial performance index for the bank i at the time t (for all three variables is ROA, ROE, NIM), CG_{it} as the independent variable represents corporate governance, $INST_{it}$ as the independent variable represents institutional investment, on the other hand, BSRF Represents the Banks' Sustainability Reporting Framework, BSCOM represents the Board Sustainability Committee, BSIZE represents the size of the Board, FSIZE represents the size of the company, lev represents financial leverage, and CAP represents the investments in the bank; μ_i : Individual Effects (Dedicated Bank); ε_{it} : Error; v_{it} : Stochastic error component; λ : spatial error autocorrelation coefficient, W_{ij} : spatial weight matrix element that shows spatial interactions between banks i and j .

Panel Spatial Autoregression (SAR) Model:

The panel's spatial autoregression model for each financial performance indicator is expressed as follows:

$$Y_{it} = \rho \sum_j W_{ij} Y_{jt} + \beta_0 + \beta_1 CG_{it} + \beta_2 INST_{it} + \beta_3 BSRF_{it} + \beta_4 BSCOM_{it} + \beta_5 BSIZE_{it} + \beta_6 FSIZE_{it} + \beta_7 LEV_{it} + \beta_8 CAP_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

Where: Y_{it} as the dependent variable represents the financial performance index for the bank i at the time t (for all three variables is ROA, ROE, NIM), CG_{it} as the independent variable represents corporate governance, $INST_{it}$ as the independent variable represents institutional investment, BSRF represents the sustainability reporting framework of banks; BSCOM, representing the Sustainability Committee of the Board; BSIZE, indicating the size of the Board; FSIZE, representing the size of the company; Lev, representing the financial leverage; CAP, representing the investments in the bank; μ : Individual Effects (Dedicated Bank); ε_{it} : The error disruption component and ρ : represents the dependent spatial autoregression coefficient.

Spatial Panel (VAR) Vector Modeling:

Considering that financial performance indicators may interact with each other over time and space, spatial autoregression vector modeling is defined as follows:

$$Y_{it} = \Phi_1 Y_{i,t-1} + \Phi_2 \sum_j W_{ij} Y_{jt} + \Gamma X_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

In which: Y_{it} , the vector of endogenous variables (ROA, ROE, NIM), $Y_{i,t-1}$ represents the vector of endogenous variables with one-period intervals, represents the spatial logarithm of endogenous variables for neighboring banks, represents the $W_{ij} Y_{jt} \Phi_1$ matrix of temporal autoregression coefficients, and Φ_2 represents the matrix of spatial autoregression coefficients, indicates the vector of exogenous variables (independent and control variables of the research) and finally, $X_{it} \Gamma$ the matrix of coefficients of exogenous variables, μ : individual effects (exclusive bank), ε_{it} : the disruption component.

Therefore, in this study, according to the relationship (1 to 3), the effect of corporate governance mechanism and institutional investors on the financial performance of banks listed in the Tehran Stock Exchange has been analyzed with regard to spatial dependencies. The use of spatial econometric methods allows for a more detailed study of complex and dynamic relationships between banks, which have not been discussed in previous studies. Thus, the financial performance

of banks can be evaluated through indicators such as return on assets (ROA), return on equity (ROE), and net profit margin (NIM). Also, comparing these indicators with the average of the banking industry and the trend of their changes over time provides a more comprehensive picture of the bank's financial performance. Therefore, financial performance is investigated as a dependent variable in this study and based on the studies of Addo et al., (2024), Ashiro et al., (2023), and Kanisio Zingeirai and Mufaru Zingirai (2024), it is evaluated as follows.

$$ROA = \frac{\text{Operating Profit}}{\text{Total Assets}}, \quad ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}}, \quad NIM = \frac{\text{Net Interest Income}}{\text{Total Earning Assets}}$$

Where:

Return on Assets (ROA): This ratio measures a bank's profitability in relation to its total assets. It shows how effectively the bank uses its assets to make a profit from its operations.

Return on Equity (ROE): This ratio shows how much profit the bank makes with the money invested by the shareholders. It evaluates the profitability of the bank from the perspective of the shareholders.

Net Profit Margin (NIM): This ratio measures the difference between the interest income received from the bank's profitable assets and the interest paid on the profit-making liabilities relative to the total profitable assets. It shows the profitability of the bank from the main lending and borrowing activities.

Corporate governance mechanism (CG)

In the present study, in line with the studies of Danro and Kim, (2005); Brown and Keller, (2006); Yang et al., (2008); Addo et al., (2024) and Mela et al., (2019). First, a list related to corporate governance that is compatible with Iran's reporting context has been prepared, then in order to operationalize the quality index of corporate governance, coding and scoring methods have been used. Based on this method, a score of zero or one (according to their operational definition) is assigned to each of the components of corporate governance, and by summing these scores, a score corresponding to the score of corporate governance is calculated for each company in each year. be made So that a higher score for this index indicates a more efficient corporate governance and a lower score for this index indicates a weaker corporate governance. The components of corporate governance and their operational definition are as described in Table (1).

Table (1) operational definition and components of corporate governance

Component Name	Operational Definition
Non-executive Board Members	If the ratio of non-executive members to total members is more than the average ratio calculated for all companies, it's 0; otherwise, it's 1.
Separation of CEO and Chairman Roles	If the CEO and Chairman roles are not separated, it's 0; otherwise, it's 1.
CEO Stability	If the CEO has changed in the past two years, it's 0; otherwise, it's 1.
Use of Accounting and Financial Experts	If there is no use of accounting and financial experts on the board, it's 0; otherwise, it's 1.
Non-executive Chairman	If the Chairman is an executive, it's 0; otherwise, it's 1.
Audit Committee	If there is no audit committee comprised of non-executive board members, it's 0; otherwise, it's 1.
Number of Board Meetings	If the number of board meetings is not mentioned in the company's annual report, it's 0; otherwise, it's 1.
Presence of Controlling Shareholders	If there are no controlling shareholders, it's 0; otherwise, it's 1.
Ownership Concentration	If the percentage of free-floating shares is more than the average free float percentage, it's 0; otherwise, it's 1.
Ownership Structure	If the ownership structure is not mentioned in the annual report, it's 0; otherwise, it's 1.

Related Party Transactions	If the related party transactions ratio to sales is more than the average for all companies, it's 0; otherwise, it's 1.
Government Ownership	If the percentage of government ownership in the company is less than the average percentage, it's 0; otherwise, it's 1.
Presence of Website	If there is no website for the disclosure of company information, it's 0; otherwise, it's 1.
Information Timeliness	If the company's information dissemination score is less than 50, it's 0; otherwise, it's 1.
Reliability of Information	If the company has retrospective adjustments, it's 0; otherwise, it's 1.
Auditor's Opinion	If the company received a non-acceptable opinion from the auditor, it's 0; otherwise, it's 1.
Future Plans	If the company's future plans are not mentioned in the annual reports, it's 0; otherwise, it's 1.
Employment Report	If there is no mention of employment and staffing status, it's 0; otherwise, it's 1.

Institutional Investor (INST)

According to Cella's studies, 2020 institutional investment is calculated as the ratio of the number of shares of institutional owners to the total number of common shares of the company

$$than = \frac{\text{Number of shares of institutional owners}}{\text{the total number of ordinary shares of the company.}}$$

This ratio represents the percentage of shares of the company held by the institutional owners. If we display the number of shares of the institutional owners in S_n and the total number of common shares of the company in S_t , the formula would look like this:

$$INST = \frac{S_n}{S_t}$$

In this research, the following control variables were used to predict the financial performance of banks listed in Tehran Stock Exchange in line with the study of Ado et al:(2024) .

Bank Sustainability Reporting Framework (BSRF): If the bank has reported on sustainability in its annual report, this variable is assigned a value of 1. However, if the bank does not report on sustainability in its annual report, this variable is assigned a value of 0.

Board sustainability committee (BSCOM): If the bank's board of directors has a sustainability committee, this variable is assigned a value of 1, otherwise a value of 0.

Board size (BSIZE): The natural logarithm of the number of board members is calculated.

Company size (FSIZE): The natural logarithm of the bank's total assets is calculated.

Financial leverage (LEV): The ratio of total liabilities to total assets is calculated.

Capitalisation (CAP): Equity divided by total assets is calculated

Research Findings

Before the final review of the research findings, in the first stage of data preparation, data collection was done for the period from 2011 to 2023. Then, the data cleansing process included removing outlier data, reviewing and correcting missing data, and identifying and correcting possible errors in data entry. To normalize the data, the Z-Score Normalization method was used were used to equalize the scale of the variables. Also, some variables such as bank size were converted using natural logarithms. In the next step, qualitative variables such as corporate governance, board sustainability committee, and banks' sustainability reporting framework were coded as virtual variables. Also, the normality of data distribution was investigated using Schaeper and Wilk test, the results of which are as follows Table 2.

Table 2. Descriptive statistics

Shapiro		Se	Kurtosis	Skew	Range	Max	Min	Mad	symbol	row
p-value	W									
0/2876	0/885	0/05	0/42	1/08	4/51	3/55	- 0/96	0/48	Roe	1
0/7883	0/7748	0/05	1/19	- 0/84	5/89	2/38	- 3/50	0/77	Roa	2
0/409	0/8743	0/05	-0/64	- 0/72	4/24	1/63	- 2/62	0/92	Nim	3
0/883	0/6842	0/05	1/61	0/57	5/44	3/33	- 2/11	0/01	Inst	4
0/9405	0/9127	0/05	-0/99	0/40	3/58	2/23	- 1/34	1/26	Cg	5
0/0456	0/9699	0/05	0/52	- 0/59	5/69	2/34	- 3/34	0/86	Bsize	6
0/5281	0/5019	0/05	2/48	- 1/43	5/06	1/45	- 3/62	0/72	Lev	7
0/8927	0/9839	0/05	0/26	0/55	6/16	3/53	- 2/63	0/89	Cap	8
0/5514	0/9633	0/05	0/78	- 0/73	5/75	2/23	- 3/52	0/84	Fsize	9
0/3621	0/6314	0/05	-1/21	- 0/78	4/19	0/70	- 3/49	0/00	Bsrf	10
0/9568	0/5683	0/05	-1/14	- 0/93	2/20	0/64	- 1/57	0/00	Bscom	11

Source: Research calculations

According to the results of the table, the financial performance variables of the banks, including return on equity (ROE), return on assets (ROA) and net interest margin (NIM), have average values of 0.48, 0.77 and 0.92, respectively. This shows that, on average, the financial performance of the analyzed banks is at a relatively favorable level. The highest dispersion among these three variables is also related to the return on assets, with a dispersion of 5.89. On the other hand, the variables related to corporate governance and institutional investment also have a significant average and dispersion, which shows the diversity in these areas among the banks studied. On the other hand, the results of the Shapiro-Wilk normality test show that the distribution of most of the variables is normal, except for the size of the board of directors (BSIZE), for which the assumption of normality is rejected at the 5% level. According to the equations presented regarding the relationships between the variables, it can be expected that the variables of corporate governance, institutional investment, banks' sustainability reporting framework, board sustainability committee, board size, company size, financial leverage and investments in the bank have a significant impact on banks' financial performance indicators. Also, due to the presence of the spatial weight matrix (Wij) in the model, it is expected that the effects of spatial spillovers between banks are also considered and effective. Therefore, in the continuation of the research, in order to avoid false and unusual results, the stationarity test of the research data was used, the results of which are described in Table 3 below.

Table 3. Checking the stability of research data

Difference-order	KPPS p-value	PP P-value	ADF P-value	ZA-statistic	Variable
0	0/1000000	0/2791417	0/0494720	-2/844879	roe
1	0/1000000	0/0100000	0/0100000	-21/437408	roe
2	0/1000000	0/0100000	0/0100000	-39/202881	roe
0	0/1000000	0/0100000	0/3662062	-22/758730	Roe
1	0/1000000	0/0100000	0/0100000	-40/756133	Roa
2	0/1000000	0/0100000	0/0100000	-56/403054	Roa
0	0/1000000	0/0100000	0/0478076	-20/306854	Nim
1	0/1000000	0/0100000	0/0100000	-31/233693	Nim
2	0/1000000	0/0100000	0/0100000	-39/215539	Nim
0	0/1000000	0/0100000	0/0100000	-12/858351	Inst

1	0/1000000	0/0100000	0/0100000	-27/145632	Inst
2	0/1000000	0/0100000	0/0100000	-36/759328	Inst
0	0/1000000	0/0100000	0/0100000	-13/104000	Cg
1	0/1000000	0/0100000	0/0100000	-27/362905	Cg
2	0/1000000	0/0100000	0/0100000	-36/769543	Cg
0	0/0198161	0/0100000	0/35755390	-14/604385	Bsize
1	0/1000000	0/0100000	0/0100000	-31/883289	Bsize
2	0/1000000	0/0100000	0/0100000	-42/518300	Bsize
0	0/1000000	0/0100000	0/1637290	-21/576558	Lev
1	0/1000000	0/0100000	0/0100000	-34/720869	Lev
2	0/1000000	0/0100000	0/0100000	-43/875431	Lev
0	0/1000000	0/0100000	0/0100000	-9/875581	Cap
1	0/1000000	0/0100000	0/0100000	-37/634425	Cap
2	0/1000000	0/0100000	0/0100000	-53/925040	Cap
0	0/0181452	0/0100000	0/3645609	-14/883087	Fsize
1	0/1000000	0/0100000	0/0100000	-31/754779	Fsize
2	0/1000000	0/0100000	0/0100000	-42/290345	Fsize
0	0/1000000	0/0100000	0/0100000	-18/274012	Bsrf
1	0/1000000	0/0100000	0/0100000	-37/145183	Bsrf
2	0/1000000	0/0100000	0/0100000	-51/237878	Bsrf
0	0/1000000	0/0100000	0/0100000	-21/352892	Bscom
1	0/1000000	0/0100000	0/0100000	-40/376463	Bscom
2	0/1000000	0/0100000	0/0100000	-51/345158	Bscom

Source: Research calculations

The results of the unit root tests to check the significance of the variables are presented in the table above. According to the p-values of the ADF, PP and KPSS tests, it can be concluded that most of the variables are at the non-significant level, since the null hypothesis that there is a unit root is not rejected at the 5% level. Only the ROE and NIM variables were detected at the Mana level. However, with a differentiation, all variables become equal and the null hypothesis of a single root is rejected with 99% confidence. Therefore, in order to avoid false regressions when estimating the model, it is necessary to use the first order difference of the variables. Given the relationships presented, the variables corporate governance (CG), institutional investment (INST), bank sustainability reporting framework (BSRF), board sustainability committee (BSCOM), board size (BSIZE), firm size (FSIZE), leverage financial leverage (LEV) and bank investment (CAP) are considered as independent variables and financial performance indicators including ROA, ROE and NIM are considered as dependent variables. The presence of individual bank effects (μ_i) and random error component (ν_{it}) in the model indicates cross-sectional heterogeneity and time dynamics. Also, the presence of the spatial weight matrix (W_{ij}) and the spatial autocorrelation coefficient of the error component (λ) indicates the consideration of spillover effects and spatial dependence between banks in the spatial econometric model. Therefore, it can be seen that by estimating such a model, the effects of corporate governance variables and institutional investment on the financial performance of banks can be correctly analyzed and deduced by considering the spatial dynamics.

Table 4 shows the results of the variance inflation test for the variables used in modeling the relationship between financial stress and the growth of Iran's financial market. This test is used to check the presence of multiple collinearities between independent variables in the regression model.

Table 4. Variance inflation test and Breusch-pagan

Test VIF	Variables	Row
ROA, ROE, NIM		
1/007157	Inst	1
1/031404	Cg	2
1/028188	Bsize	3
1/035441	Lev	4
1/013497	Cap	5
1/036172	Fsize	6
1/021386	Bsrf	7

1/027067		Bscom	8
Breusch-pagan test			
	BP	P-value	
Breusch-pagan test in ROA		4/8145	0/7772
Breusch-pagan test in ROE		6/5079	0/5905
Breusch-pagan test in NIM		4/309	0/8208

Source: Research calculations

The results of the Variance Inflation Factor (VIF) test to investigate multiple collinearities between the independent variables are presented in the table above. Given that the VIF values for all variables are less than 10, it can be concluded that there is no multicollinearity problem in the model and that the independent variables independently explain the changes in the dependent variable. This allows the coefficients of the model to be estimated with greater accuracy. The results of the Brosh-Pagan test to investigate the heterogeneity of the variance of the error rates in three models with the dependent variables ROA, ROE and NIM are also reported. Given that the p-value is greater than the 5% error level in all three models, the null hypothesis that the variance of the disturbance rates is equal is accepted. Therefore, it can be said that the estimated models do not have the problem of heterogeneity of variance and the estimates have the necessary efficiency. These results increase the reliability of the interpretation of the estimated coefficients and allow the correct inference regarding the impact of the variables of corporate governance and institutional investment on the financial performance of banks, taking into account the spatial spillover effects.

On the other hand, Table 5 shows the results of various tests to evaluate the error spatial panel model and spatial vector autoregression in the modeling of the relationship between financial stress and the growth of the financial market of Iran. These tests include LM test for spatial dependence, Moran test for spatial autocorrelation in residuals, LR test for comparing spatial models.

Table 5. LM and LR test, Moran Test, Log-Likelihood

<i>LM test Spatial</i>					
LM			P-Value		
32/269			0/0000001343		
<i>Moran's I Test for Residuals Spatial</i>					
Mean Residuals			All Residuals		
Moran I static standard deviate		P-Value	Moran I static standard deviate		P-Value
-0/12047		0/5479	36/032		0/0000
Estimates	Expectation	Variance	Estimates	Expectation	Variance
-	-0/0050251256	0/0008708905	0/48578816	-	0/000182523
0/0085804003				0/001001001	
<i>Log-Likelihood Test Spatial</i>					
Model			LogLik		
Spatial Lag			-127/2121		
Spatial Error			146/3414		
Spatial Durbin			146/3468		
<i>LR test Spatial</i>					
Spatial Lag vs Spatial Error			Spatial Lag vs Spatial Durbin		
Static LR		P-Value	Static LR		P-Value
547/1071		0/0000	547/1179		0/0000
Additional Metrics					
Lambada			0/05		
rho			0/45		
R-squared			0/95		
Corr-Squared			0/98		
<i>Log-Likelihood</i>			518/5459		
AIC			-1011/092		
BIC			-956/3019		

Source: Research calculations

The results of the Lagrange coefficient (LM) test with a very small p-value (0.0000001343) indicate the presence of spatial effects in the model. Also, the Moran's I statistic for the residuals of the model is

significant at the 1% level, indicating the presence of spatial autocorrelation in the disturbance rates. Therefore, it seems necessary to use the spatial econometric approach to estimate the model. On the other hand, considering that Moran's I statistic is not significant for the average residuals, it can be said that the model is correctly specified. The comparison of the logarithm of the likelihood for the three spatial models of interruption, error and camera shows that the spatial model of the camera with the highest value of the logarithm of the likelihood (146.3468) has a better fit. The results of the likelihood ratio (LR) test also indicate the significant superiority of the camera model over the other two models at the 1% level. The spatial autocorrelation coefficient of the error component (λ) is estimated at 0.05 and the spatial autoregression coefficient (ρ) is estimated at 0.45, confirming the existence of spillover effects and spatial dependence between banks. The high values of the coefficient of determination (R-squared) and the corrected coefficient of determination (Corr-Squared) of 0.95 and 0.98, respectively, indicate the high explanatory power of the spatial model of the camera. The lower values of Akaike's information criterion (AIC) and Bayesian information criterion (BIC) for the camera spatial model compared to the other models also indicate its better fit. Therefore, according to the estimates made, it can be concluded that Durbin's spatial econometric model provides a suitable framework for analyzing the impact of corporate governance and institutional investment on the financial performance of banks, taking into account spatial spillovers.

Thus, in this research, spatial autoregression, spatial autoregression, and spatial error panel vector models have been used to investigate the relationship between bank financial performance and corporate governance with regard to the role and size of institutional investors in the Iranian stock exchange, the results of which are shown in Table 6, 7 and 8 are as follows.

Table 6. Investigating the financial performance of banks using the spatial error test

Variable	Estimate			Std. Error			t-value			Prob		
	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM
Cg	1/56	1/56	1/59	0/060	0/068	0/062	26/04	22/96	25/46	0	0	0
Inst	1/21	1/22	1/20	0/056	0/064	0/059	21/31	18/94	20/38	0	0	0
Bsrf	1/07	1/02	1/04	0/055	0/062	0/057	19/26	16/35	18/04	0	0	0
Bscom	0/70	0/65	0/66	0/109	0/124	0/114	6/475	5/240	5/82	0	0	0
Bsize	0/96	0/97	0/96	0/059	0/067	0/062	16/14	14/32	15/52	0	0	0
Fsize	0/71	0/71	0/70	0/028	0/031	0/029	25/36	22/36	24/23	0	0	0
Lev	-0/63	-0/52	-0/61	0/546	0/617	0/566	-1/159	-0/847	-1/081	0/24	0/39	0/27
Cap	0/46	0/47	0/47	0/065	0/074	0/068	7/076	6/322	6/94	0	0	0
lambda	-0/073	-0/10	-0/11	0/079	0/08	0/08	-0/92	-1/29	-1/40	0/35	0/19	0/15
Rho				0/24076								
Asymptotic standard error				0/024487								
LR test				Statistic					p-value			
				84/075					0/0000			
Z-value				9/8323					0/0000			
Wald Statistic				96/674					0/0000			
Log likelihood				217/7114								
ML residual				Sigma squared					Sigma			
				0/037493					0/19363			

AIC	-419/42	
AIC for lm	-337/35	
LM test for residual autocorrelation	Test value	P-value
	143/38	0/0000
Shapiro-Wilk Normality test Residual		
W	P-Value	
0/9964	0/02131	

Source: Research calculations

The estimation results of Durbin's spatial model to investigate the impact of corporate governance and institutional investment on banks' financial performance indicators, including ROA, ROE and NIM, are presented in the table above. The estimated coefficients of the variables CG (corporate governance), INST (institutional investment), BSRF (bank sustainability reporting framework), BSCOM (board sustainability committee), BSIZE (board size), FSIZE (firm size) and CAP (bank investment) are positive and significant at the 1% level in all three models. This means that improving corporate governance indicators, increasing institutional investment, developing a sustainability reporting framework, having a board sustainability committee, increasing board and company size and increasing bank investment have a positive and significant effect on banks' financial performance. Only the coefficient of financial leverage (LEV) is negative in all three models, but not statistically significant.

The spatial autocorrelation coefficient of the error component (λ) is not significant in any of the models, but the spatial autoregression coefficient (ρ) is positive and significant with a value of 0.24076. These results indicate that the financial performance of each bank is not only influenced by variables related to the same bank, but also by the financial performance of other spatially related banks. In other words, there is evidence of spatial spillovers between banks in terms of financial performance. The LR statistic also confirms the overall significance of the camera spatial model with a p-value of less than 0.01.

Based on the results of the LM test, the hypothesis of no spatial autocorrelation in the residuals is rejected and therefore the model has correctly included the spatial effects. However, the Shapiro-Wilk test rejects the normality of the residuals at the 5% level. Akaike information criteria (AIC) and log-likelihood values also show a significant improvement over the non-spatial model (LM). Therefore, in general, it can be said that the Durbin spatial econometric model performs better in explaining the relationships between variables and controlling for spatial spillovers.

In short, the results indicate that improving corporate governance, increasing the presence of institutional investors, developing sustainability reporting and forming a sustainability committee in the board of directors, along with other characteristics of the bank such as size and investment, have a positive and significant impact on banks' financial performance indicators. Also, the existence of spatial spillover effects between banks indicates that each bank's performance is not only influenced by its own variables, but is also affected by the performance of other related banks. These results show the importance of considering spatial aspects in the analysis of economic and financial issues of banks.

Table 7. Examining the financial performance of banks using spatial autoregression

Variable	Estimate			Std. Error			t-value			Prob		
	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM
Cg	1/56	1/56	1/59	0/060	0/068	0/062	25/98	22/90	25/40	0	0	0
Inst	1/21	1/22	1/20	0/056	0/064	0/059	21/36	19/00	20/42	0	0	0
Bsrf	1/07	1/03	1/04	0/055	0/063	0/058	19/25	16/25	18/05	0	0	0
Bscom	0/72	0/67	0/68	0/109	0/123	0/113	6/60	5/42	6/02	0	0	0
Bsize	0/95	0/97	0/95	0/060	0/068	0/063	15/83	13/98	15/16	0	0	0
Fsize	0/72	0/72	0/71	0/028	0/032	0/029	25/36	22/42	24/28	0	0	0
Lev	-0/66	-	-	0/550	0/062	0/573	-1/20	-0/94	-	0/22	0/34	0/26
Cap	0/47	0/47	0/48	0/065	0/074	0/068	7/220	6/40	7/134	0	0	0
lambda	-0/04	-	-	0/031	0/035	0/033	-1/29	-1/50	-1/40	0/19	0/13	0/07
		0/05	0/05									
Residual standard error							0/9973					
Multiple R-squared							0/9959					
Adjusted R-squared							0/9959					
MAE							0/7913699					
RMSE							0/9943183					

R-squared	0/9959037		
F-statistic	Statistic	p-value	
	4/833e+04	0/0000	
Moran I test under randomisation	Moran I statistic	Expectation	Variance
	0/1922910830	-0/0010010010	0/0003596088
Shapiro-Wilk Normality test Residual			
W	P-Value		
0/99863	0/6421		

Source: Research calculations

Table 7 shows the estimation results of the spatial autoregression model to examine the financial performance of banks. As can be seen, the coefficients of the variables of corporate governance (CG), institutional investment (INST), bank sustainability reporting framework (BSRF), board sustainability committee (BSCOM), board size (BSIZE), company size (FSIZE) and capital investment in bank (CAP) for all three dependent variables ROA, ROE and NIM are positive and significant at 1% level. These results indicate the positive and significant impact of these factors on the financial performance indicators of banks. Only the coefficient of financial leverage (LEV) is negative, but not statistically significant.

The spatial autocorrelation coefficient of the disturbance component (λ) is not significant at the 5% level in any of the models, indicating that the spatial autoregression model has been able to capture well the effects of spatial spillovers in the disturbance component. The high values of the coefficient of determination (R-squared) and the adjusted coefficient of determination (adjusted R-squared) around 0.996 indicate the very good fit of the model and the high explanatory power of the independent variables. The F-statistic also confirms the overall significance of the regression with a p-value of less than 0.01.

The results of the Moran's I test on the residuals of the model show that, despite the positive value of the statistic, the null hypothesis of no spatial autocorrelation is not rejected at the 5% level. Therefore, the model has been able to model the spatial structure of the data well. The Shapiro-Wilk test, with a p-value greater than 0.05, also confirms the normality of the distribution of the residuals, which indicates that one of the classical assumptions of regression has been met.

In general, the results of the spatial autoregression model estimation provide stronger evidence of the positive and significant impact of corporate governance, institutional investment, sustainability reporting, board sustainability committee, board size, company size and investment on banks' financial performance. These results, while emphasizing the importance of corporate governance variables and institutional investment, show the strong role of sustainability and social responsibility dimensions along with other bank characteristics in improving financial performance indicators. At the same time, controlling for spatial spillovers in the form of a spatial autoregression model has led to more accurate and reliable estimates of the coefficients compared to traditional models.

Table 8. Investigating the financial performance of banks using the spatial autoregression vector

Variable	Estimate			Std. Error			t-value			Prob		
	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM
Cg	2/53	2/53	2/55	0/03	0/03	0/03	84/30	70/70	78/54	0	0	0
Inst	2/20	2/21	2/20	0/02	0/03	0/03	77/38	65/99	71/85	0	0	0
Bsrf	2/08	2/06	2/06	0/02	0/03	0/03	74/58	62/18	68/56	0	0	0
Bscom	1/75	1/72	1/73	0/05	0/06	0/05	32/22	26/49	29/32	0	0	0
Bsize	1/93	1/93	1/93	0/03	0/03	0/03	64/23	54/74	59/80	0	0	0
Fsize	1/70	1/70	1/70	0/01	0/01	0/01	120/4	102/6	111/9	0	0	0
Lev	-	-	-	0/27	0/32	0/29	-5/70	-4/81	-	0	0	0
Cap	1/57	1/56	1/56						5/278			
Cap	1/53	1/52	1/54	0/03	0/3	0/03	46/70	39/07	43/37	0	0	0
rho	0/03	-	-	0/19	0/25	0/21	0/177	-	-0/47	0/85	0/26	0/63
		0/28	0/10					1/125				
Residual standard error							0/9973					
Multiple R-squared							0/9959					
Adjusted R-squared							0/9959					
MAE							0/7913685					
RMSE							0/9943199					

R-squared	0/9959152		
F-statistic	Statistic		p-value
	4/833		0
Moran I test under randomisation	Moran I statistic	Expectation	Variance
	0/1922910830	-0/0010010010	0/0003596088
	Statistic		p-value
RSerr	313/66		0
RSlag	93/931		0
adjRSerr	219/75		0
adjRSlag	0/01807		0/8931
SARMA	313/68		0
Shapiro-Wilk Normality test Residual			
W	P-Value		
0/99863	0/6407		

Source: Research calculations

Table 8 shows the estimation results of the spatial autoregression vector model (VAR) to examine the financial performance of banks. In line with the results of the spatial autoregression model, the coefficients of the variables corporate governance (CG), institutional investment (INST), bank sustainability reporting framework (BSRF), board sustainability committee (BSCOM), board size (BSIZE), company size (FSIZE) and capital employed (CAP) for all three dependent variables ROA, ROE and NIM are positive and significant at 1% level. These results confirm the strong and direct impact of these factors on the improvement of banks' financial performance indicators. The financial leverage coefficient (LEV) is also negative and significant in this model, indicating that the increase in debt has a negative effect on the financial performance of banks.

The spatial autoregression coefficient (rho) is not significant in any of the models. This result indicates that, given the dynamic structure of the VAR model, there are no direct spatial spillovers between the dependent variables. The high values of the coefficient of determination and the adjusted coefficient of determination, as well as the significance of the F-statistic, indicate the good fit and overall significance of the model. Moran's I test also confirms the absence of spatial autocorrelation in the residuals.

Based on the results of the RSerr, RSlag, adjRSerr and adjRSlag statistics, it can be seen that the spatial VAR models with a spatial break in the dependent variable and disturbance component have a significantly better fit than the model without spatial effects. The SARMA statistic, which is a combination of these two statistics, is statistically significant. In addition, the normality of the residuals was confirmed using the Shapiro-Wilk test.

In conclusion, the results of the spatial autoregression vector model confirm the causal and dynamic relationship between the independent variables and the financial performance indicators of banks in a more complete and accurate way by taking into account the indirect spatial spillover effects. These results emphasize that improving corporate governance, increasing the presence of institutional investors, developing sustainability reporting, having a sustainability committee in the board of directors, increasing the size of the board and the company, and increasing investment along with financial leverage management can not only directly, but also indirectly and by influencing other spatially related banks, improve the bank's financial performance. Therefore, paying attention to various aspects of corporate governance, stability and size of the bank, along with the spatial communication network between banks, plays a key role in realizing their financial goals.

Against this background, it can be said that the present study has gone a step further than previous research in the field of investigating the factors affecting the financial performance of companies by using the spatial econometric approach. While most previous studies have focused on the role of accounting indicators, corporate social responsibility, innovation and growth, this research considers the dimensions of corporate governance, institutional investment and sustainability reporting along with other bank characteristics, as well as spatial spillovers. It provides a more comprehensive framework for analysing financial performance. The results show that these factors can lead to an improvement in the bank's financial indicators not only directly, but also by affecting the performance of other spatially related banks. On the other hand, some recent studies at the international level have emphasised the role of textual and emotional information in companies' annual reports in predicting financial performance. Although the current research has not directly addressed this issue, paying attention to the dimensions of sustainability and social responsibility in the form of variables such as the sustainability reporting

framework and the sustainability committee of the board of directors can provide a basis for investigating the role of non-financial information in the analysis of banks' performance. In addition, given the increasing importance of the sustainability category in the banking industry, the results of this study can provide a roadmap for banks to improve their performance indicators by improving sustainability dimensions. Finally, by using advanced spatial econometric models such as spatial autoregression and vector spatial autoregression, this study has used a more accurate and complete methodology compared to previous studies that have mainly focused on traditional econometric techniques or data mining methods. This has led to more reliable estimates of coefficients and a more comprehensive analysis of the dynamic relationships between variables, taking into account spatial dimensions.

The results of this study are consistent with the findings of previous studies in some aspects, and show differences in some cases. In line with previous studies such as Zalghe and Firouzabad Tepe (2017) and Forughinasab et al. (2021), the results of this research also confirm the positive and significant impact of accounting factors and dimensions of corporate social responsibility on financial performance. In addition, in line with the findings of Moghimi and Namazi (2019), this study also shows the direct and indirect role of growth and innovation factors on firm economic performance. However, unlike most of the previous studies that focused on the direct relationship of variables, this study considers the spatial spillover effect and shows that the performance of each bank is affected by the performance of other related banks in addition to its own variables. This finding is the main difference between this study and previous research. In addition, unlike some recent international studies that have emphasized the role of textual and emotional information in predicting financial performance, this research has not addressed it directly and has focused on quantitative variables.

DISCUSSION AND CONCLUSION

This research aimed to investigate the impact of corporate governance and institutional investment on banks' financial performance indicators using a spatial econometric approach from 2011 to 2023. The results from estimating various models, including spatial autoregression, spatial error, and spatial vector autoregression, showed that improving corporate governance indicators, increasing institutional investment, developing a bank sustainability reporting framework, having a board sustainability committee, increasing board and company size, and increasing bank investment have a positive and significant effect on banks' financial performance. These findings, on the one hand, demonstrate the importance of supervisory and control mechanisms of corporate governance in reducing agency problems and improving the efficiency of financial resource management, and on the other hand, emphasize the supervisory and motivational role of institutional investors in enhancing corporate performance.

Moreover, the research results indicate the presence of spatial spillover effects among banks in terms of financial performance. In other words, the performance of each bank is influenced not only by its own specific variables but also by the performance of other spatially related banks. This finding highlights the importance of considering spatial aspects in analyzing the economic and financial issues of banks and shows that ignoring spatial effects can lead to biased estimates of model coefficients.

The findings of this research can serve as a basis for policymakers' decision-making to strengthen the corporate governance system, encourage the presence of institutional investors, and develop sustainability dimensions in the banking industry to increase the stability and efficiency of the banking system. Furthermore, the results suggest the importance of incorporating spatial spillover effects in policies and regulations governing banks' activities. For example, applying stricter prudential regulations for banks with weaker performance can contribute to improving the overall performance of the banking system and financial stability by reducing negative spillover effects.

Despite these limitations, the research findings emphasize the importance of simultaneously considering corporate governance mechanisms, institutional investors, and sustainability considerations alongside other bank-specific characteristics in explaining performance indicators. Additionally, taking into account spatial dimensions and spillover effects among banks demonstrates that analyzing the performance of each bank without considering the performance of other related banks may not provide a complete picture of reality. Therefore, combining a comprehensive view of the factors affecting banks' performance with a spatial approach can provide a suitable framework for modeling the complex behavior of the banking system.

In summary, this research, by employing advanced spatial econometric models and considering a wide range of variables including corporate governance, institutional investment, sustainability reporting, and bank characteristics, showed that these factors influence banks' financial performance both directly and through spatial spillover effects. These results underscore the necessity of adopting a comprehensive perspective in analyzing the performance of the banking system and the need to consider spatial aspects in macroeconomic policymaking. At the same time, applying modern data analysis methods alongside expanding databases can pave the way for a more accurate understanding of the complex mechanisms governing banks' performance.

Ultimately, the findings of this research can serve as a foundation for decisions by managers, investors, and policymakers to enhance the performance and stability of banks. Improving the corporate governance system, facilitating the presence of institutional investors, and promoting sustainability reporting, along with attention to the network of spatial relationships among banks, can contribute to achieving the financial and non-financial goals of banks. Of course, the increasing complexity and dynamics of the economic and financial environment necessitate continuous monitoring and updating of models and analyses to adopt policies and strategies appropriate to the changing conditions. Undoubtedly, future research, by enriching databases and utilizing more advanced techniques, can take more effective steps in understanding the factors influencing banks' performance.

REFERENCE

- Abdullah, H., & Tursoy, T. (2023). The Effect of Corporate Governance on Financial Performance: Evidence from a Shareholder-Oriented System. *Interdisciplinary Journal of Management Studies*, 16(1), 79-95.
- Abdullah, H., & Tursoy, T. (2023). The Effect of Corporate Governance on Financial Performance: Evidence from a Shareholder-Oriented System. *Interdisciplinary Journal of Management Studies*, 16(1), 79-95.
- Abgineh, M., Ghanbari, M., & Rahmani, M. (2023). Presenting a financial performance model based on environmental information disclosure in companies listed on the Tehran Stock Exchange. *Management Accounting and Auditing Knowledge*, 12(45), 17-38. IN Persian
- Adrian, T., Natalucci, F. M., & Qureshi, M. S. (2022). Macro-financial stability in the COVID-19 crisis: Some reflections. *IMF Working Papers WP/22/251*. Retrieved from [link or publisher's site if needed]
- Adu, D. A., Abedin, M. Z., Saa, V. Y., & Boateng, F. (2024). Bank sustainability, climate change initiatives and financial performance: The role of corporate governance. *International Review of Financial Analysis*, 95(B), 103438. <https://doi.org/10.1016/j.irfa.2024.103438>
- Affes, W., & Jarbouli, A. (2023). The impact of corporate governance on financial performance: A cross-sector study. *International Journal of Disclosure and Governance*, 20, 374-394. <https://doi.org/10.1057/s41310-023-00182-8>
- Alasbahi, (2020). Contributions of corporate governance to improving the quality of accounting information: An overview. [Publication details if available].
- Albuquerque, R., Koskinen, Y., Yang, S. and Zhang, C. (2020), "Resiliency of environmental and social stocks: an analysis of the exogenous Covid-19 market crash", *The Review of Corporate Finance Studies*, Vol. 9 No. 3, pp. 593-6.
- Alfaro, L., Chari, A., Greenland, A. and Schott, P. (2020), "Aggregate and firm-level stock returns during pandemics, in real time", Working Paper, National Bureau of Economic Research, NBER Working Paper 26950.
- Alsalam, M., & Amin, H. (2018). The role of corporate governance in achieving accounting information quality (Field study in the Mishraq Sulfur State). *Studies and Scientific Researches Economics Edition*. <https://doi.org/10.29358/sceco.v0i0.399>
- Altman, E., & Hotchkiss, E. (2006). "Corporate Financial Distress and Bankruptcy: Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt", Hoboken, New Jersey, U.S.A. John Wiley & Sons, Inc.
- Ashiru, O., Balogun, G., & Paseda, O. (2023). Financial innovation and bank financial performance: Evidence from Nigerian deposit money banks. *Research in Globalization*, 6, 100120. <https://doi.org/10.1016/j.resglo.2023.100120>

- Bahramfar, N., & Saei, M. J. (2006). Presenting a model for predicting the performance (financial and market) of companies listed on the Tehran Stock Exchange using published financial information. *Accounting and Auditing Reviews*, 13(43), 45-70. IN Persian
- Bako, M. A. (2014). The impact of corporate governance on the quality of financial reporting in the Nigerian chemical and paint industry. *[Publication details if available]*.
- Boukheroua, E. B., Shabsigh, G., AlAjmi, K., Deodoro, J., Farias, A., Iskender, E. S., Mirestean, A. T., & Ravikumar, R. (2021). Powering the Digital Economy: Opportunities and Risks of Artificial Intelligence in Finance. *International Monetary Fund*, 34. ISBN: 9781589063952. ISSN: 2616-5333
- Brown, D.L. and Caylor, M.L. (2006), "Corporate governance and firm valuation", *Journal of Accounting & Public Policy*, Vol. 25, pp. 409-434.
- Brigham, Eugene F. (1995), *Fundamentals of Financial Management*.
- Bui Thi Ngoc, A., Nguyen Thi Thanh Phuong, B., & Le Thi Tu Oanh, C. (2023). The impact of corporate governance on the quality of accounting information: Research based on listed companies on Vietnam's stock exchange. *Business Review*, 8(4), 1404. <https://doi.org/10.26668/businessreview/2023.v8i4.1404>
- Canicio Dzingirai & Mufaro Dzingirai (2024). Threshold effect of non-interest income disaggregates on commercial banks' financial performance in Zimbabwe. *Heliyon*, 10(10), e31379. <https://doi.org/10.1016/j.heliyon.2024.e31379>.
- Carletti, E., Oliviero, T., Pagano, M., Pelizzon, L. and Subrahmanyam, M. (2020), "The Covid-19 shock and equity shortfall: firm-level evidence from Italy", *The Review of Corporate Finance Studies*, Vol. 9 No. 3, pp. 534-568.
- Carlos Lassala, Maria Orero-Blat & Samuel Ribeiro-Navarrete (2021) The financial performance of listed companies in pursuit of the Sustainable Development Goals (SDG), *Economic Research-Ekonomska Istraživanja*, 34:1, 427-449, DOI: 10.1080/1331677X.2021.1877167.
- Chang, M. -F. Hsu, G. -H. Hu and K. -P. Lin. (2016). "Salient corporate performance forecasting based on financial and textual information," *2016 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, Budapest, Hungary, 2016, pp. 000959-000964, doi: 10.1109/SMC.2016.7844365.
- Choi, J. H., Kim, J. B., Qiu, A. A., & Zang, Y. (2012). Geographic proximity between auditor and client: How does it impact audit quality? *Auditing: A Journal of Practice & Theory*, 31(2), 43-72
- Clark, R., Reed, J., & Sunderland, T. (2018). Bridging funding gaps for climate and sustainable development: Pitfalls, progress and potential of private finance. *Land Use Policy*, 71, 335-346. <https://doi.org/10.1016/j.landusepol.2017.12.013>.
- DeAngelo, L. E. (1981). Auditor Size and Audit Quality. *Journal of Accounting and Economics*, 3(3), 183-199.
- DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*.
- Ding, W; Levine, R., Lin, C. and Xie, W. (2021), "Corporate immunity to the Covid-19 pandemic", *Journal of Financial Economics*, Vol. 141 No. 2, pp. 802-830.
- Doz, Y., Prahalad, C. (1984). Patterns of Strategic Control Within Multinational Corporations. *J. Int. Bus. Stud.*, 15, 55-72.
- Drucker, H., Burges, C.J., Kaufman, L., Smola, A., Vapnik, V., 1996. Support vector regression machines. *Adv. Neural Inf. Process. Syst.* 9.
- Du, X., & Lai, S. (2018). Financial distress, investment opportunity, and the contagion effect of low audit quality: Evidence from china. *Journal of Business Ethics*, 147(3), 565-593.
- Durnev, A., Kim, E. H., (2005). "To steal or not to steal: firm attributes, legal environment", and valuation. *Journal of Finance* 60, 1461-1493.
- Ebaid, I. E. S. (2016). International accounting standards and accounting quality in code-law countries: The case of Egypt. *Journal of Financial Regulation and Compliance*, 24(1), 41-59.
- Eckey, M., & Memmel, S. (2023). Impact of COVID-19 on family business performance: evidence from listed companies in Germany. *Journal of Family Business Management*, 13(3), 780-797.
- Edirin, J., Ekwueme, C. M., & Edesiri, O. G. (2015). Corporate governance, financial performance and audit quality of listed firms in Nigeria. *Journal of Academic Research in Economics*, 7(2), 220-231.

- Fahlenbrach, R., Rageth, K. and Stulz, R. (2020), "How valuable is financial flexibility when revenue stops? Evidence from the Covid-19 crisis", Working Paper, Fisher College of Business Working Paper No. 2020-03-007, Charles A. Dice Working Paper No. 2020-07, Swiss Finance Institute Research Paper No. 20-37, 12 October 2020.
- Foroughi Nasab, M., Sarraf, F., & Najafi Moghadam, A. (2021). Dimensions of social responsibility and improving financial and non-financial performance of companies. *Accounting and Auditing Research*, 13(50), 81-98. IN Persian
- Gawri, B., Kasturi, A., Neti, L.B.M., Hota, C., 2022. An efficient approach to kNN algorithm for IoT devices. In: 2022 14th International Conference on COMMunication Systems & NETWORKS. COMSNETS, IEEE, pp. 734–738.
- Gaynor, L. M., Kelton, A. S., Mercer, M., & Yohn, T. L. (2016). Understanding the relation between financial reporting quality and audit quality. *AUDITING: A Journal of practice & Theory*, 35(4), 1-22.
- Gholami, M. M., Fakhari, H., & Malekian Kalehbasti, E. (2022). Exploring the usefulness of public sector accounting standards in Iran. *Financial Accounting Knowledge*, 9(1), 29-54. IN Persian
- Ghosi, & Akbarpour. (2019). The impact of the economic crisis on the financial performance and stock returns of companies. *Accounting and Management Perspective*, 2(10), 26-38. IN Persian
- Gordon, M. J. (1971). "Towards a theory of financial distress". *The Journal of Finance*, 26 (2), 347–356.
- Gumanti TA. (2011). *Manajemen investasi: konsep, teori, dan aplikasi*. Jakarta: Mitra Wacana Media.;1.
- Hajek, P., Olej, V., & Myskova, R. (2014). Forecasting corporate financial performance using sentiment in annual reports for stakeholders' decision-making. *Technological and Economic Development of Economy*, 20(4), 721–738. <https://doi.org/10.3846/20294913.2014.979456>.
- Handriani, E., Ghazali, I. & Hersugodo. (2021). "Corporate governance on financial distress: Evidence from Indonesia". *Management Science Letters*. Vol.11. pp.1833-1844.
- Hsu, Y.-L., & Yang, Y.-C. (2022). Corporate governance and financial reporting quality during the COVID-19 pandemic. *Finance Research Letters*, 47(Part B), 102778. <https://doi.org/10.1016/j.frl.2022.102778>
- Jamshidi, R., Barzegar, B., & Mohseni, A. (2023). Explanation and Validation of Effective Factors in the Tax Audit Quality Improvement model. *Financial Economics*, 17(64), 45-74.
- Jasem Said, G., Zavari Rezaei, A., & Kazemi, T. (2024). The impact of corporate governance, audit quality and public sector accounting on financial performance using a neural network approach (Case study: Iraq). *Public Sector Accounting and Budgeting*, 5(1), 25-64. IN Persian
- Jensen, M., Meckling, W., (1976), Theory of the firm managerial behavior, agency costs and ownership structure, *Journal of Financial Economics*, 3(4), 305–360.
- Kaawaase, T.K., Nairuba, C., Akankunda, B., & Bananuka, J. (2021). Corporate governance, internal audit quality and financial reporting quality of financial institutions. *Asian Journal of Accounting Research*, 6(3), 348-366.
- Kareem, A. J., Mohammed, S. M., & Alwan, H. S. (2022). The impact of reports and accounting information on forecasting the financial performance of a company. *World Bulletin of Management and Law*, 16. Retrieved from <https://www.scholarexpress.net>.
- Khajavi, S., & Ebrahimi, M. (2018). Investigating the impact of corporate governance mechanisms on fraud in financial statements of companies listed on the Tehran Stock Exchange. *Asset Management and Financing*, 6(2), 71-84. IN Persian
- Kheirollahi, F., Delavari, S. J., & Yousefi, O. (2022). The impact of the global financial crisis on financial distress, earnings management and accrual pricing. *Monetary Financial Economics*, 29(Spring and Summer 2022), 168-193. IN Persian
- Komath, M. A. C., Doğan, M., & Sayılır, Ö. (2023). Impact of corporate governance and related controversies on the market value of banks. *Research in International Business and Finance*, 65, 101985. <https://doi.org/10.1016/j.ribaf.2023.101985>.
- Kose, M. A., Nagle, P., Ohnsorge, F., & Sugawara, N. (2021). What Has Been the Impact of COVID-19 on Debt? Turning a Wave into a Tsunami. World Bank Policy Research Working Paper No. 9871. <https://documents1.worldbank.org/curated/en/801991638297695658/pdf/What-Has-Been-the-Impact-of-COVID-19-on-Debt-Turning-a-Wave-into-a-Tsunami.pdf>.

- Kurdistani, G., Rahimian, N., & Shahrabi, S. (2016). Identifying barriers to transition to accrual accounting in the public sector. *Auditing Knowledge*, 16(65). IN Persian
- Lam, Weng Hoe, Weng Siew Lam, Kah Fai Liew, and Pei Fun Lee. 2023. "Decision Analysis on the Financial Performance of Companies Using Integrated Entropy-Fuzzy TOPSIS Model" *Mathematics* 11, no. 2: 397. <https://doi.org/10.3390/math11020397>.
- Lu, C. J., Lee, T. S., & Chiu, C. C. (2009). Financial time series forecasting using independent component analysis and support vector regression. *Decision Support Systems*, 47, 115–125.
- Luengo, J., García, S., & Herrera, F. (2009). A study on the use of statistical tests for experimentation with neural networks: Analysis of parametric test conditions and non-parametric tests. *Expert Systems with Applications*, 36(4), 7798-7808. <https://doi.org/10.1016/j.eswa.2008.11.041>.
- Lyzhova, A. V., Kadochnikova, E. I., & Karimova, G. Z. (2019). Forecasting financial performance of agricultural enterprises based on supply chain operation in seasonal decomposition. *International Journal of Supply Chain Management*, 8(5). <https://core.ac.uk/download/pdf/237015816.pdf>.
- Marcu, M. R. (2021). The Impact of the COVID-19 Pandemic on the Banking Sector. *Management Dynamics in the Knowledge Economy*, 9(2), 205-223. <https://www.ceeol.com/search/article-detail?id=965978>.
- Mayer, C.R., McGuigan, J.R. and Kretlow, W.J; (1997) "Contemporary financial management", 7th edition, South-Western College Publishing,
- Mercer, M. (2004). How do investors assess the credibility of management disclosures? *Accounting Horizons*, 18(3), 185–196.
- Moghaddamzadeh Kashani, S., & Mousavi Shiri, M. (2022). The role of corporate governance in investment efficiency and financial information disclosure risk in companies listed on the Tehran Stock Exchange. *Journal of Risk and Financial Management*, 15(12), 577. <https://doi.org/10.3390/jrfm15120577>
- Mohammad Rezaei, F., & Yaghoubnejad, F. (2017). Audit firm size and audit quality: Theoretical critique, research method critique and suggestions. *Financial Accounting and Auditing Research*, 9(34), 31-60. IN Persian
- Molaverdi, N., Vakilifard, H., & Bashkouh, M. (2022). The role of value-added statement in integrated reporting in line with stakeholder theory. *Management Accounting and Auditing Knowledge*, 11(42), 97-106. IN Persian
- Mollah, S., Al Farooque, O., Mobarek, A., & Molyneux, P. (2019). Bank corporate governance and future earnings predictability. *Journal of Financial Services Research*, 56, 369–394. <https://doi.org/10.1007/s10693-019-00255-2>
- Moravveji, A. H., Dehdar, F., & Harimi, A. (2024). Explanation of optimal financial performance forecasting model based on QTobins ratio by using data mining techniques. *International Journal of Nonlinear Analysis and Applications*, 15(9), 23–39. <http://dx.doi.org/10.22075/ijnaa.2023.30800.4498>.
- Moridu, I. (2023). The role of corporate governance in managing financial risk: A qualitative study on listed companies. *The ES Accounting and Finance*, 1(03), 176-183. <https://doi.org/10.58812/esaf.v1i03.110>.
- Namazi, M., & Moghimi, F. (2019). Investigating the impact of innovation growth constructs and the mediating role of innovation challenges on the financial and economic performance of companies listed on the Tehran Stock Exchange. *Financial Accounting Research*, 10(4), 79-104. IN Persian
- Namazi, M., Bayazidi, A., & Jabbarzadeh Kangarluei, S. (2011). Investigating the relationship between audit quality and earnings management of companies listed on the Tehran Stock Exchange. *Accounting and Auditing Research*, 3(9), 4-21. IN Persian
- Neukirchen, D., Engelhardt, N., Krause, M., & Posch, P. N. (2023). The value of (private) investor relations during the COVID-19 crisis. *Journal of Banking & Finance*, 147, 106450. <https://doi.org/10.1016/j.jbankfin.2022.106450>
- Ng, C. L. (2022). The impact of COVID-19 and corporate governance: The empirical study of Malaysia emerging market. *International Journal of Innovation and Business Strategy (IJIBS)*, 16(1).

- Ogbodo, O. C., & Akabuogu, N. J. (2018). Effect of audit quality on the financial performance of selected banks in Nigeria. *International Journal of Trend in Scientific Research and Development (IJTSRD)*, 3(1), 45-61.
- Onder, E., & Altintas, A. T. (2017). Financial performance evaluation of Turkish construction companies in Istanbul Stock Exchange (BIST). *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 7(3), 108-113. <https://doi.org/10.6007/IJARAFMS/v7-i3/3210>
- Peng, Hongsong, Jinhe Zhang, Shien Zhong, and Peizhe Li. 2021. Corporate governance, technical efficiency and financial performance: Evidence from Chinese listed tourism firms. *Journal of Hospitality and Tourism Management* 48: 163-73.
- Pereira, E. J. D. A. L., Ferreira, P., & de Borges Pereira, H. B. (2020). Covid-19 in stock markets: a Complexity perspective.
- Peterson, P; (1994) "Financial management and analysis", 7th edition, Mc Grow Hill, Inc.
- Platt, H.D., & Platt, M.B. (2006). "Understanding differences between financial distress and bankruptcy". *Review of Applied Economics*, 2(2), 141-157.
- Polovina, Nereida, and Ken Peasnell. 2020. Do minority acquisitions transfer better corporate governance practices? An analysis of UK's cross-border minority investments. *The British Accounting Review* 52: 100897.
- Polzer, T., Adhikari, P., Nguyen, C.P., & Gårseth-Nesbakk, L. (2023). Adoption of the International Public Sector Accounting Standards in emerging economies and low- income countries: A structured literature review. *Journal of Public Budgeting, Accounting & Financial Management*, 35(3), 309-332.
- Pourhosseini, S. M., Hesar, H., Hesarzadeh, R., Abbaszadeh, M. R., & Khalili, M. (2021). International Public Sector Accounting Standards, Good Governance Indicators and Crime Levels: Empirical Evidence from 30 Countries. *Auditing Knowledge*, 21(85). IN Persian
- Raisi Vanani, I., & Bulu, G. (2016). Evaluation of decision tree models in predicting the financial performance of companies listed on the Tehran Stock Exchange. *Financial Management Perspective*, 6(14), 87-103. IN Persian
- Rashed, Ahmed, Ebitihj Abd El-Rahman, Esraa Isamil, and Doaa Abd El-Samea. 2018. Ownership structure and investment efficiency: Evidence from Egypt. *International Journal of Accounting and Financial Reporting* 8: 1-22.
- Richardson, Scott. 2006. Over-investment of free cash flow. *Review of Accounting Studies* 11: 159-89.
- Rodrigues, Ricardo, António Samagaio, and Teresa Felício. 2020. Corporate governance and R&D investment by European listed companies. *Journal of Business Research* 115: 289-95.
- Roychowdhury, Sugata, Nemit Shroff, and Rodrigo S. Verdi. 2019. The effects of financial reporting and disclosure on corporate investment: A review. *Journal of Accounting and Economics* 68: 101246.
- Saghafi, A., & Motamedi Fazel, M. (2011). The relationship between audit quality and investment efficiency in companies with high investment opportunities. *Financial Accounting Research*, 3(4), 1-14. IN Persian
- Shan, Yuan George. 2019. Do corporate governance and disclosure tone drive voluntary disclosure of related-party transactions in China? *Journal of International Accounting, Auditing and Taxation* 34: 30-48.
- Sheikh, Wahidul, and Khairul Alom. 2021. Corporate governance, board practices and performance of shipping firms in Bangladesh. *The Asian Journal of Shipping and Logistics* 37: 259-67.
- Soliman, Walid Shehata Mohamed Kasim. 2020. Investigating the effect of corporate governance on audit quality and its impact on investment efficiency. *Investment Management and Financial Innovations* 17: 175-88.
- Supsermpol, P., Huynh, V. N., Thajchayapong, S., & Chiadamrong, N. (2023). Predicting financial performance for listed companies in Thailand during the transition period: A class-based approach using logistic regression and random forest algorithm. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(3), 100130. <https://doi.org/10.1016/j.joitmc.2023.100130>
- Titman, S., & Trueman, B. (1986). Information Quality and the Valuation of New Issues. *Journal of Accounting and Economics*, 5(2), 159-172.

- Vafaei Pour, R., & Ghasemi, M. (2020). Presenting a model based on financial crisis, investment opportunities and its impact on audit quality. *Scientific Journal of New Research Approaches in Management and Accounting*, 4(13), 1-16. IN Persian
- Wang, Jialan and Yang, Jeyul and Iverson, Benjamin Charles and Kluender, Raymond, (2020). Bankruptcy and the COVID-19 Crisis (September 10, 2020). Available at SSRN: <https://ssrn.com/abstract=3690398> or <http://dx.doi.org/10.2139/ssrn.3690398>.
- wang, Z.J., Deng, X.L., (2006), Corporate governance and financial distress: evidence from Chinese listed companies, *The Chinese Economy*, Vol. 39 No. 5, pp. 5-27
- Yan, Y., Jeon, B.N. and Wu, J. (2023), "The impact of the COVID-19 pandemic on bank systemic risk: some cross-country evidence", *China Finance Review International*, Vol. 13 No. 3, pp. 388-409. <https://doi.org/10.1108/CFRI-08-2022-0158>.
- Yıldırım, A.C. and Erdil, E. (2024), "The effect of Covid-19 on digital banking explored under business model approach", *Qualitative Research in Financial Markets*, Vol. 16 No. 1, pp. 87-107. <https://doi.org/10.1108/QRFM-08-2021-0142>.
- Young, M.N., Peng, M.W., Ahlstrom, D., Bruton, G.D. and Jiang, Y. (2008), "Corporate governance in emerging economies: a review of the principal-principal perspective", *Journal of Management Studies*, Vol. 45 No. 1, pp. 196-220.
- Zalaghi, H., & Firouzabad Tapeh, F. (2017). Investigating the impact of accounting estimates on predicting financial performance and liquidity of companies listed on the Tehran Stock Exchange. *Operational and Performance Accounting and Auditing Research*, 1(4), 155-175. IN Persian
- Zattoni, A. (2011). Who Should Control a corporation? Toward a Contingency Stakeholder Model for Allocating Ownership Rights. *Journal of Business Ethics*, 103(2), 255-274.
- Zureigat, Q. M. (2011). The effect of ownership structure on audit quality: Evidence from Jordan. *International Journal of Business and Social Science*, 2(10), 38-46.