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Aim and Scope:

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Investigating the Impact of Digitalization of Clients and the Expertise of Auditing Firms in the Digital Field on Audit Quality: Evidence from IRAN

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Abstract

Objective: This study examines the relationship between the degree of digitalization of clients and the expertise of audit firms in the digital field on audit quality. It considers the role of auditors in this digital era.

Methodology: This research has been carried out using annual data of listed firms on the Tehran Stock Exchange from 2014 to 2022. Multivariate linear regression has been used based on panel data was used to test the research hypotheses.

Results: The results show that clients with high digitalization have high audit quality when they are audited. Also, expert auditors in the digital field provide a higher audit quality. In addition, the results of this research show that clients with high digitalization have high audit quality when audited by a firm with evolved and advanced information technology. The expertise of auditors in the digital field reduces the audit risk and increases the quality of the audit.

Innovation: The results of this study can be transformed by how external auditors can transform through digitalization and the use of newly developed digital tools. The development of new digital tools can also help the audit profession as one of the corporate governance mechanisms.

Keywords: Digitalization of clients, The expertise of auditing firms in the digital field, Audit quality.

1. Introduction

This study examines whether the degree of client digitalization affects audit quality. It also investigated whether the expertise of audit companies in the digital field affects audit quality. Since 2016, when Deloitte used artificial intelligence in the accounting industry, several researchers have indicated that information technology and digitization are essential in the audit market. During the 2019 coronavirus pandemic (COVID-19), many companies have adopted a digital strategy to increase the return on their assets (Singh et al, 2022). Therefore, auditors who audit a high-tech or digital company may face the challenge of adapting to technology such as blockchain-based distributed ledger (Rahman et al., 2023). Yang et al. (2020) found that audit firms with little digital expertise find it difficult to audit digitalized clients. With the increasing number of companies using new technologies and complex information systems to store data, auditors are required to adopt digital skills (Eulerich et al., 2023). Digitization helps auditors collect more valuable audit information (Eulerich et al., 2023). Their expertise in digital analysis is also an important issue. This research examines whether the digitalization of clients affects the quality of auditing. It also examines whether the expertise of audit firms in information technology affects audit quality. In recent years, digitization and artificial intelligence concepts have become very popular, and their applications in auditing have also attracted a lot of attention. This study examines the relationship between the degree of digitalization of clients and the expertise of audit firms in the digital field to assess audit quality and considers the role of auditors in this digital age. Manita et al. (2020) stated that the new stream of research shows the increasing attention to digitalization in organizations. The development of digital technology – massive data, AI and blockchain – creates many opportunities and challenges for accounting and auditing (Al-Htaybat and von Alberti-Alhtaybat, 2017; Tiberius and Hirth, 2019; Fähndrich, 2023). Ibrahim et al. (2021) emphasized the significant overlap between big data and accounting. Big data improves auditing and accounting tools that rely on data, such as performance measurement, audit evidence, and financial reporting. Meanwhile, many companies invest in blockchain as a technological innovation in the digital age (Han et al., 2023). Large auditing companies in advanced countries attach great importance to the development and implementation of blockchains (Han et al., 2023). Li et al. (2020) proposed blockchain-based public auditing, a new technique that can improve security and eliminate the "heavy computational and communication overhead" in cloud storage. Gao et al. (2020) say that more digital clients have more data available and ready. Audit firms with high digital expertise use big data analytics to assess the risk of material misstatement. Adapting from past literature, it is argued that the demand for audit quality can be driven by client motivations, determined by the client's ability to digitize, such as incorporating big data, blockchain, Artificial intelligence, and robotic process automation into business operations. These technologies are most common in the digital transformation of business that demands audit quality. It is also argued in this research that to survive in the competitive market; audit companies are introducing new technology into their processes and studying how to manage big data and new digital tools to add value to their clients. This digitization can improve audit quality and affect audit provision. For example, the digitization capabilities of clients and the pressure to provide higher audit quality are forcing audit firms to digitize their processes with relevant and reliable information. Since the impact of digitalization on auditing has been discussed in foreign studies, no evidence from Iran addresses this issue. Iranian research on auditing and digitalization mainly reviews the literature. It rarely does empirical analysis to examine the relationships between digitalization and audit quality, digitalization and digital skills, and auditors' digital skills and audit quality. In this study, examining the relationship between the company's use of digital technology, audit quality, and the demand for auditors with digital skills, the need for more research is answered, whether a digitalized company achieves

high audit quality or highly digitalized auditors needs? Furthermore, do auditors with digital skills provide better audit quality than their peers? Overall, this paper contributes to a dynamic understanding of the impact of digitalization of clients and audit firms' digital expertise on audit quality. This article is organized as follows:

Section 2 provides a theoretical background. Section 3 provides a literature review and discusses the hypotheses' development. Section 4 describes the methodology, sample selection and model. Section 5 presents the empirical analysis and results and finally, the discussion and conclusions are presented.

2. Theoretical framework

Digitization technologies

Advanced auditing technologies refer to new technologies such as big data analytics, robotic process automation, artificial intelligence, and blockchain (Kend and Nguyen, 2020; d. Huang and Vasarhely, 2019; Cao et al., 2015).

Big data technology

The use of big data technologies in auditing is still in its early stages. The impact of big data on the workplace has already been discussed in the audit literature. Unlike the current audit methods, which are mainly manual, the big data technique offers a unique approach (Yudowati and Alamsyah, 2018). Big data enables auditors to increase their efficiency. Combining big data and auditing is likely to eliminate audit time and environmental constraints, reduce audit costs, increase audit efficiency, improve audit targeting, and create a competitive advantage for the organization. The audit method became more comprehensive and appropriate in the context of the big data era (Gepp et al., 2018). Kend and Nguyen (2020) proved that big data analytics frees auditors from repetitive and time-consuming tasks, allowing them to focus their expertise and abilities on more important assessment tasks and key audit judgments.

External auditors can consider big data technology a critical tool to eliminate audit costs and improve profitability. Internal auditors can also consider big data technology because of its cost-effectiveness (Littley, 2012). The audit profession can use big data technology implicitly to improve business transactions with financial and non-financial data (Cao et al., 2015). Appelbaum and Nehmer (2017) pointed out some challenges of auditors regarding big data technology, which include the lack of experience working with unfamiliar data sources and the problems of evaluating data suitability, reliability and objectivity (Appelbaum and Nehmer, 2017). Also, how to establish a logical connection between non-structural and non-financial data and structural and financial data is not clear (Yoon et al., 2015).

Blockchain

Blockchain is primarily a fully decentralized database that stores information chronologically (White, 2017). A blockchain system could potentially reduce the number of auditors by having intermediaries verify the accuracy of financial reports. Users who adopt blockchain technology can trust transactions stored in a public blockchain system that is decentralized and validated. However, for audit purposes, auditors still need to verify transactions in a private blockchain system (Strüker et al., 2019). Overall, a blockchain system's risks and potential benefits for auditing purposes have not yet been fully explored (Dai and Vasarhelyi, 2017).

Artificial intelligence

Artificial intelligence has been the most promising but threatening invention of recent years (Clifford, 2019). As a subcategory of machine intelligence, artificial intelligence is considered the intelligence revealed by machines compared to human and animal intelligence (Haenlein and Kaplan, 2019). Artificial intelligence is involved in various activities related to human information processing, including planning, learning, and pattern recognition (Minsky, 1961). More importantly, artificial intelligence is used in language recognition, visual pattern recognition or logical problem solving (Gershman et al., 2015). Jordan and

Mitchell (2015) investigated the effects of artificial intelligence in auditing and found that top auditing firms use artificial intelligence to collect and validate data. Therefore, AI can detect anomalies in accounting data for auditing purposes. Gershman et al. (2015) mentioned several effects of artificial intelligence in auditing. For example, artificial intelligence can easily and automatically review financial data, identify fraud in accounting and interpret financial and non-financial data, enabling auditors to optimize their resources.

Robotic Process Automation

Robotic process automation, or RPA, refers to using robotic systems to automate an organization or business. In other words, robotic automation is a type of technology that provides these conditions for computer software to simulate and integrate human performance when using a digital system. Robotic automation of processes has been widely used in finance and accounting, especially in auditing. (Moffitt et al, 2018). According to Aguirre and Rodriguez (2017), recent studies report the benefits of robotic process automation in terms of productivity, cost, speed, and error reduction. Moffitt et al. (2018) claimed that robotic automation of processes can be used to advance audit automation. Aguirre and Rodriguez (2017),proposed a framework for using robotic automation of processes for auditing and emphasized that structured, rule-based, and repetitive auditing activities can be automated. Huang and Vasarhelyi (2019) applied robotic process automation to the audit context and proposed a framework that prevents auditors from performing repetitive audit tasks. Due to the high efficiency and low error tolerance of the robotic automation of processes for processing accounting information, the reliability of audit information is guaranteed, thereby improving the quality of the audit and guiding management in its decisions. With the popularity of automation and digital technology, robotic process automation as a business process automation tool or platform based on software robots and artificial intelligence - It is widely installed as software on personal computers, servers in large accounting firms to assist or replace auditors. Robotic automation of processes in various repetitive operations can help auditors perform many audit tasks faster, better and safer. Therefore, robotic automation of processes helps accounting firms to significantly improve the quality and efficiency of their audits. Robotic automation of processes replaces manual work and reduces the cost of highly repetitive tasks and processing time. According to Aguirre and Rodriguez (2017), the cost of setting up a robotic process automation software is about one-ninth of the cost of hiring an employee. The probability of error of robotic automation of processes in auditing is less than that of accountants (Moffitt et al, 2018). Finally, robotic automation of processes offers a flexible workflow Aguirre and Rodriguez (2017).

Audit quality

One of the important factors determining the demand for auditing quality is the ability of the client. DeFond and Zhang (2014) defined client empowerment as her (his) ability to satisfy the need for audit quality that originates from her motivation. Past literature on customer empowerment has been based on corporate governance and audit quality. For example, stronger corporate governance helps the firm to increase audit quality by hiring industry expert auditors, selecting auditors from top firms, and paying higher audit fees. give (Beasley and Petroni, 2001; Cassell et al , 2012; Beasley and Salterio, 2001). External audit is one of the important mechanisms of corporate governance in modern organizations (BenYoussef and Drira, 2020). Specific corporate governance mechanisms such as audit committee characteristics, internal control reporting, and internal audit functions can help clients achieve a desired level of audit quality (DeFond & Zhang, 2014). Recent research on customer capabilities focuses on a new corporate governance mechanism called "customer digitization rate"; Something that helps clients achieve the desired level of audit quality. For example, Gao et al. (2020) stated that data analytics can improve audit quality among more digital clients. Multi-industry companies (such as

technology) are more digital in attracting customers, creating new products, and facilitating operations (Fotoh and Lorentzon, 2021). Gao et al. (2020) found that human capital investment in data mining and digitized clients improved audit quality using data they collected manually on US audit firm employees' skills in data mining. Shahzad et al. (2019) found out the effect of financial reporting quality and audit quality on the investment efficiency of companies listed on the Pakistan Stock Exchange; That is, the high quality of financial reporting and the high quality of auditing are related to the high efficiency of investment. Maghakyan et al. (2020) using data from the US and Europe (Finland) found that audit firms with highly digitized clients receive higher audit fees than firms that do not have this expertise. Therefore, in this study, it is predicted that customer capability (especially the level of digitalization of customers) can meet their need for audit quality. Various factors can affect auditors' motivation to provide audit quality. Watts and Zimmerman (1981) stated that the supply of audit quality is a function of the auditor's motivation in terms of independence and competence. Many previous studies on auditors' capabilities mainly focus on auditors' industry expertise, firm size, and audit process characteristics (DeFond and Zhang, 2014). A new direction in the growing literature on auditor capabilities and their impact on audit quality is the digitalization of audit firms. The performance of financial artificial intelligence in auditing is attracting increasing attention. Manita et al. (2020) conducted qualitative research on the digital transformation of external auditing by interviewing auditors of the top five auditing firms in France. The findings showed that digital technology can also work on all client data to improve audit quality. The impact of artificial intelligence on companies has also been investigated. Haenlein and Kaplan (2019) reported that artificial intelligence can have internal and external effects; Internally, AI can efficiently complete high-quality audits, and externally, the adoption of AI can impact the relationship between audit firms and their clients.

3. Literature Review

Previous studies show that the critical task of auditing is to determine the reliability and security of audited accounts or reports (Boylan et al, 2018). According to Flint (1988), the main purpose of auditing is to determine whether specific tasks are being performed effectively, honestly, and correctly in compliance with fundamental rules and regulations. Cleartex (2019) defined auditing more precisely and presented the view that an auditor is a person who is supposed to check the books of accounts of the company and the validity and correctness of the transactions made. Cleartex (2019) also added that the auditor should arrive at an opinion about the overall outlook of the financial statements of the employer by considering a "true and fair view" of the financial position of the employer. Wallerstedt et al. (2006) pointed out that auditing is necessary in society; Therefore, those involved in this profession must continuously address criticisms and participate in discussions. Finally, Flint (1988) concluded by stating that an audit is a special type of review that is part of accountability assurance that is conducted by a third party who objectively compares performance to expectations and reports the result. Mankind has made continuous advances in technology (Granlund, 2007), which in recent decades has led to the globalization of societies and markets. Breman and Felländer (2014) pointed to continuous economic changes and described one of these structural changes as digitalization. Information technology and digitization are the reality of today's society. Information technology affects our daily life in different waysdifferently (Ghasemi et al., 2011). But these cases were initially ignored (Spraakman et al., 2015). Previous research has identified the vital relationship between digitization and auditing due to the paradigm shift towards a digital society where information technology is increasing daily. (Berman and Fllander, 2014; Han et al, 2016). Most research published in the last 20 years concerns audit quality (DeFond and Zhang, 2014). DeAngelo (1981) defines audit quality as: "The extent to which a given auditor both detects and reports a violation of the client's

financial statements." Therefore, according to DeAngelo's (1981) definition, audit quality is a function of the auditor's ability to detect misstatements in data and report errors. Here, the discovery of distortion in the data can be called the technical capabilities of the auditors, and the error report can be considered as their independence. Palmerose's (1988) definition of audit quality in terms of assurance level is considered the real audit quality in the relevant literature (DeFond and Zhang, 2014). According to Palmrose (1988), considering that the main purpose of the audit is to provide a certificate of assurance of the client's financial statements, the quality of the audit is the probability that there is no distortion in the data in the financial statements. The above definition mainly uses audit results that have the reliability of financial statements, which ultimately reflects the quality of the audit. According to Simunik (1980), auditors provide assurance services that are an economic product. DeFond and Zhang (2014) argued that audit quality is determined by both client demand and audit supply, which depend on client and auditor motivations and capabilities, respectively. This study argues that the demand for audit quality can be driven by client motivations determined by client capabilities in digitalization, such as bringing big data, blockchain, artificial intelligence, and robotic automation of processes into business operations. These technologies are most common in the digital transformation of businesses that demand audit quality. For example, Gao et al. (2020) argued that data sourcing helps improve audit quality among increasingly digitalized clients. This research argues that the supply of audit quality can be affected by the digitization of audit firms. For example, the digitalization capabilities of clients and the pressure to provide higher audit quality can force audit firms to digitize the audit process with reliable and relevant information. Porter and Heppelmann (2014) pointed out that competition and increased client pressure to provide reliable and relevant information are the main factors forcing audit firms to digitize their services. Due to new technologies, digitalization is progressing (Tiberius and Hirth, 2019) and will probably continue progressing (Verhoef et al., 2021). Parviainen et al. (2017) introduced digitization as beneficial for businesses, communities and governments. According to Verhoef et al. (2021), a company's digitalization can show the extent of its use of computers and digital technologies. Companies that use digital technology can gain more advantages by converting existing services or products into digital items (Parviainen et al., 2017). Using digital technologies, companies want to change their business model in such a way as to gain more value (Björkdahl, 2020). By turning their work into software and digitizing their manual tasks and operations, companies can better understand cost drivers, risk causes, and process performance (Parviainen et al., 2017). In the review of research in the fields of accounting and auditing, it is found that more and more research deals with the relationship of accounting and auditing with digitalization. Also, the concepts of digital audit (Rahmatullin and Guzelbaeva, 2019) and digital transformation in these professions (Pizzi et al., 2021) have attracted much attention.Big data is one of the important components of digitization (Tiberius and Hirth, 2019). Decision-making is expected to become easier because big data can improve information provision, accuracy and correctness of data analysis, and diversity of data sources (Fähndrich, 2023). New technology implemented in work operations such as enterprise resource planning, improves data provision and flexibility of information provision in the enterprise (Manita et al., 2020). Ibrahim et al. (2021) pointed out that big data can help auditors obtain appropriate and sufficient audit evidence that is more consistent with auditing standards and improves the overall level of assurance. Depending on the digital technology used, accountants and auditors can obtain a large amount of processed data in real time (Ibrahim et al., 2021). Pizzi et al. (2021) investigated how digital transformation affects internal auditing and found that organizations are gradually paying attention to the risks and opportunities associated with investing in or using new technologies. Pizzi et al. (2021) acknowledged that the

current internal audit framework is not flexible enough to accept and adopt digitization. Al-Htaybat and von Alberti-Alhtaybat (2017) pointed out inherent contradictions between a company's digital transformation and corporate reporting. For example, the main condition of corporate reporting is accuracy, and presenting the report with past information can be more reliable (Fähndrich, 2017). But when big data technology is used, timely information is less reliable, a phenomenon referred to as the paradox of reliability versus timeliness (Fähndrich, 2017). Al-Htaybat and von Alberti-Alhtaybat (2017) also describe the paradox of ease and complexity of corporate reporting. Big data improves the provision of data and information to facilitate decision-making (Al-Htaybat and von Alberti-Alhtaybat, 2017). In contrast, Al-Htaybat and von Alberti-Alhtaybat (2017) were concerned that digital technology could increase the complexity of corporate reporting, as participants may not have relevant data analysis and IT skills. This study argues that the demand for audit quality can be driven by client motivations determined by client capabilities in digitization, such as bringing big data, blockchain, artificial intelligence, and robotic process automation into business operations. These technologies are most common in the digital transformation of businesses that demand audit quality. For example, Gao et al. (2020) argued that data sourcing helps improve audit quality among digital clients. Considering the findings of Gao et al. (2020), we expect audit quality to improve among more digital clients. In addition, based on the results of Fotoh and Lorentzon (2021), it is argued that companies with more technology are more digital in attracting clients, creating new products, and facilitating operations. It is also argued that more digital clients have more readily available data that auditors can use to mitigate the risks of data distortion. Therefore, audit quality is expected to be more prominent in clients of more digital industries. Based on the above arguments, the following hypothesis is proposed: according to Kend and Nguyen (2020), digital technologies, such as big data analysis, artificial intelligence, and robotics, generally have a positive impact on auditing. Unlike manual tasks, digital audits do not require much time and can be spread over more important tasks. Manita et al. (2020) conducted qualitative research through interviews with auditors of the top five auditing firms in France to study the digital transformation of external auditing, and they showed that digital technology can also work on client data and improve audit quality. Digital technology enables auditors to analyze various processes and client data more and identify discrepancies and errors in financial reports. Lois et al. (2020) surveyed 105 people from the largest audit firm in Greece and proved that technological advancement is important in creating an efficient digital audit system. Reviewing past literature can show the controversial effect of digital technology or digitization in auditing. In examining auditing in the digital age, the risks that digitization creates for auditing have always been important. The importance of auditors' technology, computer science or data analysis skills is well recognized (Lois et al., 2020; Pizzi et al., 2021). Maghakyan (2020) analyzed firm-level data from the US and Finland and found that audit partners with expertise in digitization command higher audit fees than their peers. Gao et al. (2020) conducted an empirical analysis of US data to investigate the effect of data sourcing on audit quality. This ultimately found that audit quality improved with auditors' ability to analyze data. Moreover, this effect was more significant in more digital clients and those with accounting estimates and complex business activities (Gao et al., 2020). Maghakyan (2020) and Gao et al. (2020) did a lot of work on the relationship between auditors' skills in data analysis, audit quality and the degree of digitization of audit clients. This study argues that audit firms are now incorporating new technology into their audit process to stay competitive and analyze how to handle big data and new digital tools to add value to clients. This digitization can improve audit quality. For example, the auditor can evaluate all the data of his client companies using digital tools such as big data mining and no longer

needs to use the audit sampling method (Manita et al., 2020). In addition, an audit firm with a high degree of digitization can help the auditor assess business risk and judgment quality by identifying all anomalies and providing solutions for critical issues (Manita et al., 2020). Finally, it is argued that the supply of audit quality can be affected by the digitalization of audit firms. For example, the ability to digitize clients and the pressure to provide higher quality can force companies to digitize their audit process with relevant and reliable information. Porter and Heppelmann (2014) pointed out that competition and increased pressure from clients to provide reliable and relevant information are among the main factors that force audit companies to digitize audit services. Based on the above arguments, the following hypothesis is proposed:

3.1. Research hypotheses

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

Hypothesis 1. Clients' digitalization is significant and positively related to audit quality.

Hypothesis 2. Auditors' digital expertise is significant and positively related to audit quality.

Hypothesis 3. Auditors' digital expertise moderates the relationship between clients' digitization and audit quality.

4. Methodology

4.1. Statistical population and samples

The collection and inductively analysis of quantitative data longitudinally and retrospectively performed this correlational research. The statistical population includes all companies listed on the Tehran Stock Exchange from 2014 to 2022 whose shares are listed on the stock exchange. To collect and analyze the data required for the research, we used the information site of the capital market publishers and Rahavard Novin's software. A systematic removal method was used to select the samples; applying the following conditions, 152 companies were considered as the statistical sample:

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

4.2. Research Model and Variables

Model of the first research hypothesis

Model (1)

$AQ= a_0 +a_1Digi\_ Cli +a_2Tenure + a_3 Change + a_4 InvRec + a_5 LEV + a_6 ROA + a_7 LnSize + a_8 CFO + \varepsilon$

Model of the second research hypothesis

Model (2)

$AQ = a_0 + a_1 Digi\_Aud +a_2Tenure + a_3 Change + a_4 InvRec + a_5 LEV + a_6 ROA + a_7 LnSize + a_8 CFO + \varepsilon$

Model of the third research hypothesis

Model (3)

$AQ= a_0 + a_1 Digi\_ Cli + a_2 Digi\_Aud +a_3Digi\_ Cli *Digi\_Aud + a_4Tenure + a_5 Change + a_6 InvRec + a7 LEV + a8ROA + a9 LnSize + a10 CFO + \varepsilon$

Table 1. The Definitions of the Variables

Meaning	*Category*	*Name*	*Symbol*
The natural logarithm of audit fees paid by the client	Dependent	audit quality	AQ
Indicators indicated by the frequency of keywords in the reports reflect the digitization of the listed companies. In this research, "artificial intelligence technology", "blockchain", "cloud computing", "big data technology" and "digital technology" are used as digitalization indicators. Digi_Cli is represented by the frequency of keywords that appear in a company's annual reports.	Independent	digitalization of Clients	Digi_Cli
Ratio of audit fees of digitalization industries (audit fees of digital companies / total industry audit fees)	Moderator And Independent	expertise of auditing firms in the digital field	Digi_Aud
The number of consecutive years that the auditor has been responsible for the company	Control	Auditor tenure	Tenure
It is a dummy variable equal to one if the company has changed its auditor during the financial year and zero otherwise.	control	Audit change	Change
The sum of inventories and receivables divided by total assets	control	Inventory and receivables	InvRec
Asset-to-debt ratio (Total Debt / Total Asset)	control	Financial Leverage	LEV
Net profit divided by total assets	control	return on assets	ROA
The natural logarithm of the market value of equity	control	company size	Size
Net cash flow from operations divided by total assets	control	company's operating cash flow	CFO

5. Research Findings

5.1. Descriptive statist

Table 2 presents descriptive statistics for the primary variables used in the analyses. These indicators mainly include information about central indicators such as mean median and dispersion indicators such as standard deviation. The most important central indicator is the average, which is a good indicator to show the centrality of data. For example, the digitalization of the Clients Index has an average value of 0.66, indicating that most data are focused around this point. In general, the dispersion parameters are the criteria for determining the dispersion of each other or their dispersion relative to the mean. One of the most essential dispersion parameters is the standard deviation. The value of this parameter for the financial lever variable is (0.211).

Table 2. The descriptive statistics of the observed research variables

Max	*Min*	*Sd*	*Mean*	*variables*
074/4	477/2	4/0	24/3	AQ
2	0	62/0	66/0	Digi_Cli
150/0	002/0	049/0	061/0	Digi_Aud
6	1	34/1	24/2	Auditor tenure
1	0	048/0	002/0	Audit change
751/0	007/0	167/0	268/0	Invrec
920/0	051/0	211/0	423/0	Lev
217/0	239/0-	063/0	043/0	ROA
190/4	690/9	67/0	710/6	Ln Size
237/0	166/0-	069/0	045/0	CFO

5.2. The results of the first research hypothesis:

Table 3 shows less than 5%, so we conclude that the model is generally statistically acceptable, and the Fisher statistic's high value indicates a strong relationship between variables in this model. As the coefficient of determination and the adjusted coefficient of determination indicate, it confirms the high power of the model explanation. From the value provided by the Watson-Durbin statistics, which can be confirmed by the lack of correlation in the model, there is no need to review this statistic due to the short period. Now, considering the significant confirmation of the whole fitted model, the meaningful analysis of each explanatory variable is discussed. As shown in the table below, for each coefficient variable, t statistic, and finally, the value of p is given. For meaning, each of the variables in the model is referenced to the p column or the same level of significance. Now, concerning the value of p, if the arbitrary error α is compared with the values of p, one can consider the meaning of each of the variables. Also, considering that the variance inflation factor (VIF) value for all research variables is less than five, the model has no collinearity problem. Table 3 presents the regression results of the first model. The results show a positive and significant coefficient with audit quality, indicating that highly digitalized clients have higher audit quality when audited. This result shows that a company with a high level of digitalization has a better operating system than other companies; therefore, its audit risk is lower. Therefore, the first hypothesis of the research is confirmed.

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

$AQ= a_0 +a_1Digi\_ Cli +a_2Tenure + a_3 Change + a_4 InvRec + a_5 LEV + a_6 ROA + a_7 LnSize + a_8 CFO + \varepsilon$				
VIF	**Probability**	**t-statics**	**Coefficient**	**Variables**
١,٣٣١١٧١	٠,٠٠٠٠	٢٤,٤٤٢١٨	٢,٠٢٦٨٩٩	Digi_ Cli
١,٠٩٢٦٦٠	٠,٠٤٧٤	-١,٩٨٤١٠٨	-٢,٢٠٩٠٠١	Auditor tenure
١,٢٢٩٥٥٥	٠,٠٠٠٠	-١٠,٨٦٩٣١	-١٣,٦٥٢٢٩	Audit change
١,٢٠٣٩٦٧	٠,٠٤٨٧	١,٩٧٢٧٨٨	١٠,٧٥٧٦٢	Invrec
١,٢٠٤٩٤٤	٠,٠٠٠٠	-١١,٨٣٦٥٠	-١٧,٥٩٢٩٨٣	Lev
٤,٩١٩٨٦٥	٠,٠٠٠٠	٥,٦٦٩٣٤٢	٠,١٩٨٤١٧	ROA
٤,٢٠١٠٣٥	٠,٠٠٠٠	٥,٤٠١٦٨٥	٠,١٨٧٠٥٧	Ln Size
١,٢٢٤٦٦٣	٠,٠١٧٦	٢,٣٨٠٢٥٩	٠,٠٤٠٦٢٤	CFO
-	٠,٠٠٠٤	-٣,٥٨٤٢١٣	-١٥,٦٣٤٥٦	C
٠,٦٣٩٤٣٢		R-squared		
٠,٦٣٦٤٨٨		Adjusted R-squared		
٢١٧,١٦١٢		F-statistic		
٠,٠٠٠٠		F-probability level		
١,٦٩٦١٦٧		Durbin-Watson		

5.3. The results of the second hypothesis:

The results in Table 4 show a positive and significant coefficient of Digi_Aud with audit quality, which shows that if the information technology of the audit company evolves and develops under the same conditions, its audit quality is higher. The second hypothesis is confirmed because auditors who specialize in digital provide higher audit quality. In models 1 and 2, if the auditor company has changed during the financial year, the audit quality will decrease, which indicates a significant negative relationship between the audit firm's tenure and the quality of the client's audit. The results show a positive and significant relationship between company size and audit quality.

Table 4: Estimation of the coefficients of the model 2

AQ(LnAF) = a0 + a1 Digi_Aud +a2Tenure + a3 Change + a4 InvRec + a5 LEV + a6 ROA + a7 LnSize + a8 CFO + ε				
VIF	**Probability**	**t-statics**	**Coefficient**	**Variables**
١,٤٧٨٠٠٤	٠,٠٠٠٠	٤,٠٨٩٩٠٢	٣,٧٣٣٣٧٥	Digi_Aud
٢,٣٦٨٨٨١	٠,٠٠٠٠	-٧,٣٧٩٠٩٧	-٩,١٨٢١٤٨	Auditor tenure
١,٠١٦٦٧٥	٠,٠٢٣٣	-٢,٢٧١٥٣٧	-٠,١٩٦٧٥١	Audit change
١,٠٦٠٠١٥	٠,١٦٣٦	١,٣٩٣٩٦٥	٠,٢٠٣٩٢٩	Invrec
١,٥٦٢٦٦٦	٠,٠٠٠٠	٤,١١٣٧٠٦	٢,٨٢٩٥٤٨	Lev
١,٠١١٣٧٢	٠,٣١٦٤	١,٠٠٢٢٠٢	٠,٠٠٤٦٧٧	ROA
١,٥٨٨٢٠٠	٠,٠١١٥	٢,٥٣٠٠٨٢	٢,٢٣٩٩٨٣	Ln Size
١,٠٤٣٧٨٥	٠,٠١٥١	٢,٤٣٢٦٢٠	٠,١٦١٧٦٧	CFO
-	٠,٠٠٠٠	٤,٤٥٧٩٧٥	٥٢,١٣٠٩٤	C
٠,٥٦٣٣٩٧		R-squared		
٠,٥٥٧١٨٣		Adjusted R-squared		
٩٠,٦٦٨٢٦		F-statistic		
٠,٠٠٠		F-probability level		
٢,١٩٣٨٢٥		Durbin-Watson		

5.4. The results of the third hypothesis:

Table 5 presents the moderating effect of auditors' digital expertise on the relationship between clients' digitalization and audit quality. The regression results show a positive and significant coefficient (Digi_ Cli *Digi_Aud) with audit quality. Highly digitized clients have high audit quality when audited by an audit firm with evolved and advanced information technology. This result shows that auditors' expertise in information technology reduces audit risk and increases their audit quality.

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

AQ= a_0 + a_1 Digi_ Cli + a_2 Digi_Aud +a_3Digi_ Cli *Digi_Aud + a_4Tenure + a_5 Change + a_6 InvRec + a7 LEV + a8ROA + a9 LnSize + a10 CFO + ε				
VIF	**Probability**	**t-statics**	**Coefficient**	**Variables**
١,٠٩٥٥٥٧	٠,٠٠٠٢	٣,٧٦٠٦٩٣	٤٧,٣٢٣٢٥	Digi_ Cli
١,١٥٩١٣٤	٠,٠١٠٠	٢,٥٨٦٢٩٤	٨,١٠٤١٠٩	Digi_Aud
١,٠٢٨٩٨٦	٠,٠٢٨٩	٢,١٩٢٠٨١	٢,٥٢٨٤٧٠	Digi_ Cli *Digi_Aud
١,٠٤٣٥٢٦	٠,٠٠٦٩	-٢,٧١٦١١٧	-٤,٣٨٧٩٠٣	Auditor tenure
٣,٢٥٥٧٤٧	٠,٠٠٠٠	-٧,١٦٥٩٦١	-٦,٦٦٤٤٦٤	Audit change
١,١٠٧٥١٧	٠,٠٨٤٩	١,٧٢٧١٦٠	١,٤٧٩٨١٥	Invrec
١,١٤٦٦١٤	٠,٠٤٨٠	١,٩٧٩٧٤٨	٠,٣٦٥٧٣٠	Lev
١,٢٨٦٤٢٠	٠,٠٠٧٤	-٢,٦٨٩٦٧٠	-٢,٩٨٦٥٢٤	ROA
١,٢٥٥٣٥٣	٠,٠٢١٢	٢,٣١٣٨٠٠	٣,٥١٨٦٢٣	Ln Size
١,٠٢٤٩٩٦	٠,٠٠٨٩	-٢,٦١٥٣٥٦	-٠,٠١١٢٧٧	CFO
-	٠,٠٠٦١	٢,٨٨٢٢٤٢	٠,٦١٣٧٦١	C
٠,٤٤٥٩٣٤		R-squared		
٠,٣٠٧٤١٧		Adjusted R-squared		
٣,٢١٩٣٥٣		F-statistic		

$AQ= a_0 + a_1$ Digi_ Cli + a_2 Digi_Aud +a_3Digi_ Cli *Digi_Aud + a_4Tenure + a_5 Change + a_6 InvRec + a7 LEV + a8ROA + a9 LnSize + a10 CFO + ε				
VIF	**Probability**	**t-statics**	**Coefficient**	**Variables**
۰,۰۰۲۷۶۳		F-probability level		
۲,۱۶۱۲۶۵		Durbin-Watson		

6. Discussion and Conclusions

This study investigated the effect of the client's level of digitalization and the auditor company's expertise in the digital field on audit quality. The results show that a company with a high level of digitalization has a better operating system and, as a result, has a low audit risk. This result shows that clients with a high level of digitalization have more ready and easily accessible information. These findings are consistent with previous literature findings. Gao et al. (2020) found that human capital investment in big data improves audit quality. Using data from the United States and Europe (Finland), Maghakyan et al. (2020) find that audit firms specializing in digital receive higher audit fees from clients with a high level of digitalization than non-expert auditors. Haenlein and Kaplan (2019) also reported that artificial intelligence has internal and external effects. Internally, AI efficiently completes quality audits. Externally, adopting artificial intelligence affects the relationship between audit firms and their clients. The findings of this research also play a role in the supply theory of audit quality, which says the supply of audit quality can be affected by the digitalization of audit firms. For example, clients' ability to digitize and the pressure to provide higher quality can force firms to digitize their audits with reliable and relevant information. These findings are consistent with the findings of Porter and Heppelmann (2014). These people pointed out that competition and increased pressure from clients to provide reliable and relevant information are the main factors that lead audit companies to digitize audit services. Finally, these findings improve the audit quality and corporate governance literature by clarifying how external audits are evolving through digitization and the inclusion of newly developed digital tools such as big data, data analytics, artificial intelligence, and robotic automation of processes. Our research findings provide valuable practical applications for management and audit professionals to better understand the evolution of digital transformation strategies and audit methodology. This study may also help audit professionals in other ways. For example, importing digital tools can automatically monitor financial transactions and detect fraud. Digital tools such as artificial intelligence can interpret different data sources, enabling auditors to optimize their resources and use their expertise to evaluate documents on a larger scale and in greater depth. These findings provide important information to policymakers and legislators. For example, our study can help legislators and audit policymakers to identify and implement necessary reforms in auditing standards. In addition, our findings help university business schools modify their academic curriculum by introducing new training programs for students to meet the unique needs of audit firms in the digital age. Finally, the findings of this research provide critical information for auditors So that they can complement their professional knowledge and audit practices by developing a new way of thinking, analyzing information or acquiring IT skills such as big data, artificial intelligence and robotic automation of processes. The strength of auditors with specialized digital skills is that they can understand the audit tasks of companies with high digital transformation and perform them correctly. Through empirical tests, this study contributes to the existing literature on audit quality and the future of auditors in the digital age and suggests directions for future research. These findings can add to the audit quality and corporate governance literature by clarifying how external audits are evolving through digitization and the introduction of newly developed digital tools such as big data,

artificial intelligence, and robotic automation of processes. In this study, only one method of measuring audit quality was used. Audit fees alone may not provide a sufficient explanation for the choice of audit quality in all markets. Therefore, future research is recommended to consider other indicators to measure audit quality, for example, the size of the auditor or the quality of financial reporting (which is determined by accruals, accrual quality improvement, and conservatism). Also, this study used keywords related to digitization to measure a company's digital level. Future studies can use more quantitative measures to show this variable.

References

Aguirre, S., & Rodriguez, A. (2017). Automation of a business process using robotic process automation (RPA): A case study. In *Applied Computer Sciences in Engineering: 4th Workshop on Engineering Applications, WEA 2017, Cartagena, Colombia, September 27-29, 2017, Proceedings 4* (pp. 65-71). Springer International Publishing.

Alhababsah, S., & Yekini, S. (2021). Audit committee and audit quality: An empirical analysis considering industry expertise, legal expertise and gender diversity. *Journal of International Accounting, Auditing and Taxation*, *42*, 100377.

Al-Htaybat, K., & von Alberti-Alhtaybat, L. (2017). Big Data and corporate reporting: impacts and paradoxes. *Accounting, auditing & accountability journal*, *30*(4), 850-873.

Appelbaum, D., & Nehmer, R. A. (2017). Using drones in internal and external audits: An exploratory framework. *Journal of Emerging Technologies in Accounting*, *14*(1), 99-113.

Beasley, M. S., & Petroni, K. R. (2001). Board independence and audit-firm type. *Auditing: A journal of practice &* theory, 20(1), 97-114.

Beasley, M. S., & Salterio, S. E. (2001). The relationship between board characteristics and voluntary improvements in audit committee composition and experience. *Contemporary Accounting Research*, *18*(4), 539-570.

BenYoussef, N., & Drira, M. (2020). Auditor monitoring and restatement dark period. *International Journal of Accounting & Information Management*, *28*(1), 73-95.

Björkdahl, J. (2020). Strategies for digitalization in manufacturing firms. *California Management Review*, *62*(4), 17-36.

Boylan, D. H., Philipp, J. L., & Latini, M. A. (2018). PROGRESSING TECHNOLOGY AND THE OBSOLESCENCE OF ACCOUNTANTS. *International Journal of Business, Accounting and Finance*, *12*(1), 103-117.

Cao, M., Chychyla, R., & Stewart, T. (2015). Big data analytics in financial statement audits. *Accounting Horizons*, *29*(2), 423-429.

Caputo, A., Pizzi, S., Pellegrini, M. M., & Dabić, M. (2021). Digitalization and business models: Where are we going? A science map of the field. *Journal of business research*, *123*, 489-501.

Cassell, C. A., Giroux, G. A., Myers, L. A., & Omer, T. C. (2012). The effect of corporate governance on auditor-client realignments. *Auditing: A Journal of Practice & Theory*, *31*(2), 167-188.

Clifford, C. (2019). Bill gates: AI is like nuclear energy–both promising and dangerous. *CNBC, available at: www. cnbc. com/2019/03/26/bill-gates-artificial-intelligence-bothpromising-and-dangerous. html (accessed 8 October 2022)*.

Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of information systems*, *31*(3), 5-21.

DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of accounting and economics*, *58*(2-3), 275-326.

Eulerich, M., Masli, A., Pickerd, J., & Wood, D. A. (2023). The Impact of Audit Technology on

Audit Task Outcomes: Evidence for Technology-Based Audit Techniques. *Contemporary Accounting Research*, *40*(2), 981-1012.

Fähndrich, J. (2023). A literature review on the impact of digitalization on management control. *Journal of Management Control*, *34*(1), 9-65.

Fotoh, L. E., & Lorentzon, J. I. (2021). The impact of digitalization on future audits. *Journal of Emerging Technologies in Accounting*, *18*(2), 77-97.

Gao, R., Huang, S., & Wang, R. (2020). Data analytics and audit quality. *Singapore Management University School of Accountancy Research Paper*, (2022-151).

Gershman, S. J., Horvitz, E. J., & Tenenbaum, J. B. (2015). Computational rationality: A converging paradigm for intelligence in brains, minds, and machines. *Science*, *349*(6245), 273-278.

Gepp, A., Linnenluecke, M. K., O'Neill, T. J., & Smith, T. (2018). Big data techniques in auditing research and practice: Current trends and future opportunities. *Journal of Accounting Literature*, *40*(1), 102-115.

Haenlein, M., & Kaplan, A. (2019). A brief history of artificial intelligence: On the past, present, and future of artificial intelligence. *California management review*, *61*(4), 5-14.

Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. *International Journal of Accounting Information Systems*, *48*, 100598.

Huang, F., & Vasarhelyi, M. A. (2019). Applying robotic process automation (RPA) in auditing: A framework. *International Journal of Accounting Information Systems*, *35*, 100433.

Ibrahim, A. E. A., Elamer, A. A., & Ezat, A. N. (2021). The convergence of big data and accounting: innovative research opportunities. *Technological Forecasting and Social Change*, *173*, 121171.

Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. *Science*, *349*(6245), 255-260.

Kend, M., & Nguyen, L. A. (2020). Big data analytics and other emerging technologies: the impact on the Australian audit and assurance profession. *Australian Accounting Review*, *30*(4), 269-282.

Li, Y., Dai, J., & Cui, L. (2020). The impact of digital technologies on economic and environmental performance in the context of industry 4.0: A moderated mediation model. *International Journal of Production Economics*, *229*, 107777.

Littley, J. (2012). Leveraging data analytics and continuous auditing processes for improved audit planning, effectiveness, and efficiency. *KPMG White Paper*.

Lois, P., Drogalas, G., Karagiorgos, A., & Tsikalakis, K. (2020). Internal audits in the digital era: opportunities risks and challenges. *EuroMed Journal of Business*, *15*(2), 205-217.

Maghakyan, A., Jarva, H., Niemi, L., & Sihvonen, J. (2023). The effect of audit partner digitalization expertise on audit fees. *Available at SSRN 3575360*.

Manita, R., Elommal, N., Baudier, P., & Hikkerova, L. (2020). The digital transformation of external audit and its impact on corporate governance. *Technological Forecasting and Social Change*, *150*, 119751.

Moffitt, K. C., Rozario, A. M., & Vasarhelyi, M. A. (2018). Robotic process automation for auditing. *Journal of emerging technologies in accounting*, *15*(1), 1-10.

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: how to benefit from digitalization in practice. *International journal of information systems and project management*, *5*(1), 63-77.

Pizzi, S., Venturelli, A., Variale, M., & Macario, G. P. (2021). Assessing the impacts of digital transformation on internal auditing: A bibliometric analysis. *Technology in Society*, *67*, 101738.

Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard business review*, *92*(11), 64-88.

Rahman, M. J., Zhu, H., & Hossain, M. M. (2023). Auditor choice and audit fees through the lens of agency theory: evidence from Chinese family firms. *Journal of Family Business Management*.74.Rahmatullin, N.V. and Guzelbaeva, G.T. (2019), "Digital audit as a factor of business efficiency", **International**

Shahzad, F., Rehman, I. U., Hanif, W., Asim, G. A., & Baig, M. H. (2019). The influence of financial reporting quality and audit quality on investment efficiency: Evidence from Pakistan. *International Journal of Accounting & Information Management*, *27*(4), 600-614.

Singh, R. K., Mishra, R., Gupta, S., & Mukherjee, A. A. (2022). Blockchain applications for secured and resilient supply chains: A systematic literature review and future research agenda. *Computers & Industrial Engineering*, 108854.

Strüker, J., Albrecht, S., & Reichert, S. (2019). Blockchain in the energy sector. *Business Transformation through Blockchain: Volume II*, 23-51.

Watts, R., & Zimmerman, J. (1981). The markets for independence and independent auditors.

White, G. R. (2017). Future applications of blockchain in business and management: A Delphi study. *Strategic change*, *26*(5), 439-451.

Yang, H., Liang, Y., Yuan, J., Yao, Q., Yu, A., & Zhang, J. (2020). Distributed blockchain-based trusted multidomain collaboration for mobile edge computing in 5G and beyond. *IEEE Transactions on Industrial Informatics*, *16*(11), 7094-7104.

Yudowati, S. and Alamsyah, A. (2018), "Big data framework for auditing process", International Journal of Engineering and Technology, Vol. 7 No. 4.38, pp. 908-911.

Yoon, K., Hoogduin, L., & Zhang, L. (2015). Big data as complementary audit evidence. *Accounting Horizons*, *29*(2), 431-438.

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The Effect of Financial Reporting Readability on Debt Capacity of Firms Listed in Tehran Stock Exchange (TSE)

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Abstract

Objective: The purpose of this research is to track the effect of readability of financial reporting on debt capacity.
Methodology: In order to achieve the objectives of the research, 123 companies listed in Tehran Stock Exchange (TSE) during the years 2016-2022 were selected by systematic elimination model. Multiple linear regression based on consolidated data was used for hypothesis testing. the fog index was used for evaluating of readability of financial reporting and also debt capacity was measured with model developed by Frank and Goyal (2009).
Results: The finding showed positive and significant effect of readability of financial reporting on debt capacity.
Innovation: This research develops theoretical foundations of previous research by providing empirical evidence of the consequences of language style and readability of financial reporting in emerging markets such as Iran.

Keywords: Attracting Creditors' Trust, Capital Structure, Debt Capacity, Information Asymmetry, Financial Reporting Readability Criteria.

1. Introduction

By understanding the importance of the adverse consequences of the expansion and deepening of information asymmetry between the providers and users of financial information in the capital and debt markets, which by intensifying the foggy and ambiguous atmosphere on the one hand, has provided the grounds for the exit of investors and other participants in these markets, and on the other hand, By increasing the return requested by the remaining investors in order to reduce the negative effects of making harmful decisions due to lack of timely access to reliable information, they create the basis for increasing the cost of financing and capital for the companies present in these markets. The mentioned events caused the failure of the market in order to achieve its main goal, to provide a space to move the capital of the participants in the market to the plans and areas that need financial resources, along with providing the opportunity to get a suitable return for the participants in these markets, according to the amount of investment and Their risk tolerance and investment horizon will be. In order to prevent such a situation from happening in the capital markets, professional and academic authorities have made an extra effort to organize the activity of the accounting system of companies as the only official and major authority for preparing and presenting financial information about companies active in the aforementioned capital markets and with extensive support for research. professional and academic in order to lead these researches to find the holes that aggravate this information inequality, to try hard to expand the transparency of disclosure and provide assurance of timely access to reliable information to all participants in these markets in order to help them while making the right investment decisions and Credited. In this regard, it is argued that the timely disclosure of company information, along with the simplicity and higher readability of the material presented in the text of the financial statements, has led to a better understanding and interpretation of the information by the participants in the mentioned markets, which ultimately leads to an increase in the transparency of financial reporting (Li et al., 2018).

Bai et al's (2019) showed that companies that more readable reporting include a high level of information disclosure quality, which facilitates management monitoring of the company's activities by increasing the flow of transparent and high-quality information. It also provides the reduction of information inequality. Therefore, the readability of financial reports is considered an important feature of textual information (Ertugrul et al., 2017).The low quality of readability of financial reports and more complex disclosure of information by companies will increase information inequality and lack of understanding and knowledge of the future performance of the company, and companies with more ambiguous annual reports require a higher risk estimate, which ultimately leads to an increase in capital costs. It becomes them (Dadashi and Nowrozi, 2020).Transparency of financial information from external providers of capital reduces restrictions on financing. Companies that face financial constraints provide less cash at a higher cost (Salmanian et al., 2018).

Most of the foreign and domestic researches in this area, indicates that the readability has a significant impact on the stability of profit (Li, 2008), volume of transactions (De Franco et al., 2015), credit rating, cost of debt and the risk of falling stock prices (Bonsal and Miller, 2017; Ertugrul et al., 2017), stock liquidity (Hasan and Habib, 2020), cost of equity (Rjiba et al., 2021), commercial credit (Mahdavi et al., 2022), cost of capital and reporting quality Mali has (Daryaei and Amini 2023).

Considering the importance of the subject of the present research, with the aim of investigating the effect of the simplicity of presentation and textual readability of financial statements on reducing the concern and information disparity and gaining the trust of the loan and lenders, and as a result, reducing their requested return and ultimately reducing the cost of financing from debts and increasing The debt capacity of companies is done. Considering the high share of

debt financing in the capital structure of companies and the great importance of ways to reduce the cost of debt financing, and the existence of an obvious research gap in this field, the researchers of this study were convinced that the present study is necessary and worth doing and the authors of this research hope and believe that their efforts will bring the necessary knowledge increase by enriching the findings and related literature in this important field.

In the continuation of the research structure, firstly, the development of the theoretical foundations, the current experimental findings of the research and the hypothesis are presented, then the research method and the operational definitions of the research variables are presented, and finally, the findings and conclusions of the research are presented.

2. Literature Review and Theoretical Background

Readability of financial reporting and debt capacity

Financial flexibility is considered by researchers as an important component of the capital structure (Gregory, 2020) and is one of the evaluation tools of companies by investors and creditors in order to review and evaluate the current situation and predict the future situation of the business unit. It is defined as the company's ability to use a positive (negative) shock in the set of investment opportunities (Lambrinoudakis et al., 2019). According to Vol Breda (1998), internal financial flexibility can be measured through two components of debt capacity and cash retention. For this purpose, a group of managers are trying to maintain their internal financial flexibility by applying the policy of maintaining sufficient cash and another group by applying a conservative debt policy based on not taking too many loans and borrowing and maintaining excess debt capacity. In addition, financial flexibility through debt is preferable to financial flexibility through holding cash (Dennis, 2011).

For the first time, Myers (1984) raised the issue of debt capacity and assumed it as a level of borrowing that if financing from debt exceeds that amount, the market value of the company's debts will decrease. According to the theory of financial hierarchy, debt capacity is considered a kind of financial limitation. When a company uses debt, it is obliged to repay the principal and interest of the debt when it is due, which is why it is exposed to the risk of default or bankruptcy (Zhang, 2013).

Hence, it has been suggested that firms deliberately maintain unused debt capacity to maintain access to low-cost sources of external capital to avoid financial emergency costs in the face of negative shocks and in case of profitable opportunities. arise, invest (Gregory, 2020). However, companies with limited debt capacity make more efforts to maintain access to financing markets (Lemmon and Zender, 2010). In other words, financing-constrained companies quickly change their payment approaches in response to changes in profitability. This behavior leads to the reduction of information asymmetry and keeps the company's access to debt markets with lower cost (Denis, 2011). Bhat et al (2020) in a study titled "Debt capacity, debt selection and the underinvestment problem: Evidence from China" concluded that debt capacity is positively related to leverage, and debt capacity helps firms to have easy access to the credit market. have and reduce liquidity risk. Companies can reduce their capital cost by increasing their excess debt capacity (Pour Rezaei et al., 2017). On the other hand, the existence of information asymmetry allows managers to have exclusive access to a part of the company's confidential information. Managers may use confidential information for their personal interests, this will lead to an increase in the company's investment risk for investors (Ramazanpour et al., 2021). An increase in investment risk will also lead to an increase in the return requested by investors and ultimately an increase in the cost of financing. The research results of Stickney et al (2007) also showed that lenders limit the use of debt for companies that have created an information asymmetry between themselves and investors in terms of company risk. In companies with more information asymmetry and

information ambiguity, the cost of common stock capital is also higher than other companies (Peng He et al., 2013). Daryaei and Amini (2023) showed that the role of the interactive effect of financial reporting quality and readability on the cost of capital among companies with higher information asymmetry is much more important than companies with low information asymmetry. Therefore, disclosure policies can affect financing costs (Easley and O'Hara, 2004).

Information disclosure usually consists of three parts of content, timing, and presenting information way, which usefulness of each of which depends on the readability and comprehensibility of financial reports (Courtis, 2004). Therefore, readability and other textual features of financial disclosures are of high value (Ertugrul et al., 2017). In this regard, the American Securities Exchange Commission formed a study group in 1967 to provide guidelines to improve the readability and comprehensibility of companies' disclosure procedures. The results of these reports, which were published in 1969 as the Witt report, recommended that since all investors are not able to quickly understand complex reports of companies, therefore companies should avoid publishing complex, long or redundant reports (Ajina et al, 2016). Readability is the degree of complexity of the text of financial reports and their relationship with the understanding of users (Souza et al., 2019).

Empirical research shows that readability criteria provide a new way to evaluate the quality of financial reporting of companies (Berger, 2011). Ertugrul et al. (2017) also state that the readability of financial reporting can affect the quality of financial statement information; Therefore, the poor readability of financial reporting adds to the problems of the organization. In this regard, Ertugrul et al (2017) state that the lack of readability and the use of unclear language in annual financial reports weakens the credibility of the company. Xu et al. (2020) also believe that financial reporting with low readability has a high cost for the company, according to them, if a business unit is committed to the disclosure of high-quality financial reporting, it will not expose itself to risk by presenting financial statements with less readability. In addition, financial reports with difficult reading are an obstacle to the processing and analysis of company information by investors (Boubaker et al., 2019). Aghaei et al (2021) stated that higher quality accounting information reduces the risk and cost of obtaining information. Therefore, the complexity of financial reports leads to information asymmetry between company managers, creditors, and investors, resulting in conflict of interests. In this regard, some researchers studied the effect of information disclosure complexity on information asymmetry, stock liquidity, and cost of debt. As, Miller (2010) and Lawrence (2013) found that the analysis of complex reports requires spending a lot of money and time to extract useful information, therefore investors did not invest when faced with these reports and the volume of transactions decreases. De Franco et al (2015) also provided evidence that there is a positive relationship between the readability of financial reports and the volume of stock transactions. Rahmanian et al (2023) also showed that the readability of financial reporting has a negative and decreasing effect on the specific volatility of stock returns. Yin et al (2022) also showed in a research that ambiguous financial reporting leads to a fall in stock prices. Chen et al (2023) stated that the low readability of the annual report hinders efficient and accurate assimilation of information into stock prices, financial reports with low readability are associated with more stock mispricing.

Hassan and Habib (2020) showed that companies whose financial reports are less readable, maintain more cash balance and pay less dividends, and such a relationship is stronger for companies with weak corporate governance, more financial constraints and more financing risk.

In a study titled "Readability of Annual Financial Reports, Information Efficiency and Stock Liquidity," Aldosari and Meleji (2023) stated that improving the readability of annual reports, in addition to analyzing the factors affecting it and voluntary disclosure requirements, is essential in order to help users of

financial statements to understand the topic of information and facilitate decision making.

In addition, managers can influence the judgment of investors by manipulating the linguistic feeling and readability of qualitative disclosures and guide or mislead them (Elliott and Rennekamp, 2018). Companies with lower readability of annual financial reporting will have higher cost of capital (Ajina et al., 2016). Rjiba et al (2021) investigated the relationship between reporting readability and cost of equity, and found that the impact of the complexity of the annual report on the cost of equity is greater when the tone of the disclosure is more negative or ambiguous. They believe that complex reports reduce the ability of investors to process and interpret annual reports and lead to an increase in information risk and, as a result, an increase in financing costs. Mahdavi et al (2022) also investigated the impact of financial report readability on commercial credit, emphasizing the role of management ability, and showed that financial report readability has a significant direct relationship with commercial credit. In other words, companies with more readable financial reports receive more business credit from suppliers.

Ertugrul et al (2017) during a research by examining the relationship between the readability of financial reporting and the cost of financing showed that the readability of financial reporting of companies reduces their financing cost. He stated that the readability of financial reporting is related to the effort to hide bad news, which is the main determinant of borrowing costs. Bonsall and Miller (2017) also investigated the relationship between the readability of financial reporting and the cost of capital and found that the readability of financial reporting reduces the cost of debt of companies.

Ayuningtyas and Harymawan (2022) also showed that both negative tone and poor readability are positively related to the cost of debt. More intense use of negative tone or pessimistic words was associated with higher debt costs. Less (more) readable annual reports lead to higher (less) debt costs. However, the results of Daryai and Amini's research (2023) showed that the readability of financial reporting does not have a significant relationship with the cost of capital. Fang et al (2014) also stated that the readability of the annual financial report reduces the cost of information processing for creditors. As a result, more people trust the market and enter the market, in fact, the market attracts additional capital and liquidity, and the risk of liquidity and subsequently, the cost of capital of companies will decrease.

According to the literature on the subject, the mentioned research hypothesis is explained as follows:

H_1: The financial reporting's readability has significant and positive effect on debt capacity of companies listed in TSE.

3. Research Methodology, Model and Variables, Population and Sample

This research is classified in applied research in view of purpose implementation, and also is an descriptive-attributive in terms of the method of conducting research. Eviews software has been used for estimating of research model which developed by multiple regression.

Due to the ease of access and the reliability of the information of listed companies, the statistical population of the present study also consists of all the companies listed in TSE, which are systematically removed by taking into account the conditions, including the existence of complete information of each of the companies under study. The temporal scope of the research, the lack of change in the financial year during the research period, the exclusion of intermediary companies, banks, investments and holding companies due to the way of financial reporting and the different nature of income and expenses. Finally, the information of 123 companies collected for 7-year (2016-2022) .

Operational definitions of variables:

Independent variable: Debt capacity (DC)

The model Frank and Goyal (2009) was used for measuring debt capacity as follows:

Model (1)

$$LEV_{i,t} = B_0\, LEV_{i,t} + B_1\, LndLEV_{i,t} + B_2\, M/B_{i,t} + B_3\, Size_{i,t} + B_4\, Tan_{i,t} + B_5\, Profitability_{i,t} + B_6\, Inflation_{i,t} + \varepsilon_{i,t}$$

LEV: Ratio of total debt to the total assets
LndLEV: Average debt of companies in the industry.
M/B: The ratio of market value to book value, which is measured by total debt and stock market value to total assets.
Size: Logarithm of company assets.
Tan: Ratio of fixed assets to total assets.
Profitability: Profit before interest and taxes to total assets.
Inflation: Inflation rate for the year, based on the growth of the consumer index as announced by the Central Bank.

$\varepsilon_{i,t}$ **:** Other factors (the rest of the model).

And finally, in order to determine the debt capacity of the research sample companies, the regression residuals of the mentioned model were used in the research period for each company.

Independent Variable: Readability of Financial Reporting (Read)

The fog index was for used measuring independent variable (financial reporting readability).The level of financial reporting readability through the Fog index is a function of two variables of sentence length in terms of the number of words and the complexity of words (defined as the number of three or more syllable words) measured by the

Equation1:

financial reporting readability = (Total Fog Index in 100 word sample at the beginning, middle and end of the report)/3

For 100-word sampling and calculating the Fog index in each of these samples, the following is done:

1) Randomly select a 100-word sample from the beginning, middle and end of the report.
2) Count the number of sentences in each sample.
3) Specifying the average length of sentences by the number of words by dividing the number of words by the total number of sentences of each 100-word sample.
4) Count the number of words three or more syllables as an indicator of complex words in each of the one-hundred-word texts.
5) After the average number of words in each sentence and the percentage of complex words have been obtained, the Fog index for each of the 100word samples of the first, middle and end of the report is calculated through the following relationship (Safari Grilli and Rezaei Pitenoei., 2019).

Equation2:

Fog Index = 0.4 (Average length of sentence in terms of number of words + percentage of complex words)

The high and low values of the Fog index show lower readability and more financial reporting, respectively. In order to obtain a direct measure of the Fog index with the readability of financial reporting, the values of this index are multiplied by negative number 1 (-1).

Control variables of the research

In order to control the unwanted effects of some disturbing variables, several control variables that are consistent with the research objectives have been used as follows:

Independent audit quality (AQ): If company's audit was done by audit organization, the quality of the independent audit is equal to 1 and otherwise it is 0.

Internal audit quality (Inter): If audit report does not have any significant weaknesses in the company's internal control (i.e., the company's internal controls are of good quality), it is equal to 1, and otherwise (the presence of significant weaknesses in internal controls, i.e., the low quality of internal controls) is equal to 0.

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

Financial leverage (LEV): ratio of total debt to total assets.

Tangible fixed assets (Tan): ratio of tangible fixed assets to company's total assets

Sales growth (Growth): Percentage change in current year's revenue compared to the previous year's revenue.

Life of the company (Age): It has been measured by the number of years that have passed since the company's establishment to each of the studied years.

percentage of the largest shareholder (Lshare): The ratio of largest shareholder to total number of company shares.

In order to achieve the objectives of the research and test the relevant hypothesis, the mathematical model of the research is developed and presented as follows:

Model (2)

$$DC_{i,t} = B_0 + B_1\, Read_{i,t} + B_2\, AQ_{i,t} + B_3 Inter_{i,t} + B_4\, Growth_{i,t} + B_5\, Size_{i.t} + B_6\, LEV_{i,t} + B_7\, Tan_{i,t} + B_8\, Age_{i,t} + B_9\, Lshare_{i,t}$$

4. Findings

Descriptive statistics of research variables

Table (1) and (2) shows the central and dispersion indicators. The minimum of descriptive indices (debt capacity with 861 observations) is 0.0141 , maximum ,0.748, average debt capacity , 0.136 and standard deviation 0.989. based on table (2), average quality of independent audit is 0.191 ,and its standard deviation is 0.393. Also, the average quality of internal audit is 0.667 and its standard deviation is0.471.

In order to check the normality of residual sentences, the Jarque-Bera test was used. As probability of the test statistic (0.558) is greater than 5%, the regression residuals have a normal distribution. Table (3) shows the collinearity analysis. As variance of inflation factor is slightly higher than 1, a weak collinearity is between the research variables.

For ensuring the absence of heterogeneity of variance, Bartlett's test was used. According to this test, there is no heterogeneity of variance between the regression residual sentences.

Due to the mixed nature of the research data, F-Limmer and Hausman tests were used to determine the appropriate regression model for testing the hypotheses. The results show that the probability of the F test statistic is less than 5% and the use of panel data method is more appropriate. Also, the results of the Hausman test showed that the probability of the test statistic is less than the 5%, so using the fixed effects method to estimate the regression model of the research is more preferable than the fixed effects method.

The results probability of Fisher's statistic (0.000) which showed in table (4), the model is significant and the Durbin-Watson statistic, it shows the relative independence and lack of autocorrelation of the research variables. In addition, the results related to The adjusted coefficient of determination indicates that more than 54% of the changes in the dependent variable can be explained by the independent variables of the research.

As correlation coefficients between financial reporting readability and debt capacity is positive and significance level is less than 5% so research hypothesis is accepted. In other words, financial reporting readability has a positive and significant effect on debt capacity. Although coefficient of fixed assets is 0.539, so there is a positive and significant relationship between this variable and debt capacity. In this regard, coefficient of financial leverage is -0.091, so the effect of this variable on debt capacity is negative and significant. There is no significant relationship between other control variables and debt capacity.

Table 1) Descriptive statistics of quantitative research variables

Variable	Symbol	Mean	Max.	Min.	S. dev
Debt capacity	DC	0.136	0.748	0.014	0.989
Readability of Financial Reporting	Read	-17.291	-13.163	-22.010	1.458
Company size	size	14.284	19.940	10.133	1.537
Financial leverage	LEV	0.561	0.991	0.090	0.180
Life of the company	Age	37.415	67	3	14.260
Tangible fixed assets	Tan	0.260	0.850	0.002	0.180
Sales growth	Growth	1.273	4.788	0.145	0.486
percentage of the largest shareholder	Lshare	0.493	0.954	0.029	0.213

Table 2) Descriptive statistics of qualitative research variables

Variable	Symbol	Mean	Max.	Min.	S. dev
Independent audit quality	AQ	0.191	1	0	0.393
Internal audit quality	Inter	0.667	1	0	0.471

Table 3) Testing regression assumptions

Test Modle	Jarque-Bera		p-value	
	1.167		0.557	
Absence of linear dependence	Variable	Symbol	Tolerance	
			VIF	Collinearity Statistics
	Readability of Financial Reporting	Read	1.094	0.912
	Independent audit quality	AQ	1.136	0.880
	Internal audit quality	Inter	1.321	0.756
	Company size	Size	1.171	0.854
	Financial leverage	LEV	1.022	0.978
	Life of the company	Age	1.109	0.902
	Tangible fixed assets	Tan	1.738	0.646
	Sales growth	Growth	1.970	0.510
	percentage of the largest shareholder	Lshare	1.355	0.726
Bartlett	Test Statistics	p-value	Test Results	
	2.341	0.310	There is no heterogeneity of variance	
F-Limmer	2.735	0.000	Using panel data	
Hausman	9.480	0.024	Using the fixed effects method	

Table 4) Test Results of Research Hypotheses

Variable	Symbol	Coefficient	t statistic	p-value
Fixed coefficient	C	1.200	2.636	0.009
Readability of Financial Reporting	Read	0.042	2.192	0.029
Independent audit quality	AQ	0.024	1.789	0.074
Internal audit quality	Inter	-0.041	-0.692	0.495
Company size	Size	0.029	1.519	0.129
Financial leverage	LEV	-0.091	-2.908	0.004

Variable	Symbol	Coefficient	t statistic	p-value
Life of the company	Age	-0.029	-1.436	0.151
Tangible fixed assets	Tan	0.539	3.689	0.0002
Sales growth	Growth	0.082	1.355	0.176
percentage of the largest shareholder	Lshare	-0.141	-1.056	0.291
Adjusted R^2		0.54		
Durbin-Watson		1.961		
F statistic		118.245		
p-value		0.000		

5. Conclusion and suggestions

The present study was conducted with the aim of investigating the effect of financial reporting readability as a factor in reducing the information inequality between providers of accounting information and loans and creditors as one of the main groups of users of accounting information on increasing debt capacity as an indicator of gaining the trust of the said user group.

As expected, the results showed that the financial reporting readability has a positive and significant effect on debt capacity. Financial reports are the main source of information for market participants. Companies that provide more readable financial reporting, due to the transparency and high information quality about their financial status and performance, provide a basis for reducing information asymmetry between market participants and reduce the concerns of investors. and the creditors, will underestimate the crediting and investment risk of the company by reducing the requested return, and will reduce the cost of financing from the company's debt. Reducing the cost of capital also leads to an increase in the company's debt capacity. In other words, companies that provide more readable financial reporting have higher debt capacity.

These results are in accordance with the previous findings of Fang et al (2014), they showed that companies with more complex financial reports incur higher debt costs. Also, the results are consistent with Ertugrul et al (2017) who showed that the financial reporting readability is related to the effort to hide bad news and is the main determinant of the cost of borrowing, and the readability of financial reporting of companies reduces their financing costs. In addition, the findings of the research are also consistent with Ayuningtyas and Harymawan (2022), they showed that less (more) readable annual reports lead to higher (less) debt costs.

According to the results of this research, it is suggested to the compilers of accounting standards to formulate the necessary guidelines for the publication of readable financial reports for the users of financial statements. Providing simple, understandable, concise but comprehensive financial statements is expected to provide an important step to strengthen the information transparency of companies and increase the efficiency of resource allocation by investors and creditors. Investors and lenders are also suggested in order to avoid investing and crediting in companies with low debt capacity and consequently increasing the risk of capital loss, before deciding the ratio of investment in companies, and granting loans, and regarding the readability of financial reporting among others. Pay enough attention to the criteria. Considering that the ability to attract capital and provide financing for companies is one of the most important pillars needed to remain in today's competitive market, it is suggested to the managers to increase the level of readability and remove the ambiguity of the text of the financial statements, an acceptable level of borrowing capacity and flexibility. financial acceptability, in order to optimally use unexpected investment opportunities and crisis management in the face of financial emergency expenses.

In the research process, there are conditions that are beyond the researcher's control, but can potentially affect the research results. One of the limitations of measuring the financial reporting readability is that it requires the existence of financial statements in the form of text and reports, while the readability of some financial statements that lack text cannot be measured. In addition to this, there is no comprehensive, local and internal measurement standard for measuring readability and the lack of specific measurement software and the use of traditional and manual methods, which in addition to being time-consuming will also cause mistakes.

Future researchers are suggested to consider the impact of corporate governance mechanisms on the readability of financial reports and the relationship between the readability of financial reports and audit costs.

References

Aghaei, M. A., Fateri, A., & Weysihesar, S. (2021). The Effect of Political Connections with the Government on the Relationship between CEO Power and Capital Structure in Companies. *Accounting and Social Interests*, 11(3), 1-31 *(In Persian).*

Ajina, A., Danielle, S., & Lakhal, F. (2016). Corporate disclosures, information asymmetry and stock-market liquidity in France. *The Journal of Applied Business Research*, 31(4), 223-238.

Aldoseri,M. M, Melegy, M. M. A. (2023). Readability of Annual Financial Reports, Information Efficiency, andStock Liquidity: Practical Guides From the Saudi Business Environment. Information Sciences Letters An International Journal . Inf. Sci. Lett. 12, No. 2, 813-821.

Ayuningtyas, E.S., Harymawan, I. (2022). The Effect of Voluntary Risk Management Disclosure and Risk Management Committee on Firm Value . J*ournal of Theoretical and Applied Management (Jurnal Manajemen Teori dan Terapan)*, 15(3), (2022).

Bai, X., Dong, Y., & Hu, N. (2019). Financial report readability and stock return synchronicity. *Applied Economics*, 51(4), 346-363.

Berger, P. (2011). Challenges and opportunities in disclosure research: A discussion of 'the financial reporting environment: Review of the recent literature'. *Journal of Accounting and Economics*, 51(1-2), 204-218.

Bhat, K., Chen, S. Chen, Y., & Jebran, Kh. (2020). Debt capacity, debt choice, and underinvestment problem: Evidence from China. Economic Research-Ekonomska Istrazivanja , 33(1) , 267-287.

Bonsall, S.B., & Miller, B.P. (2017). The impact of narrative disclosure readability on bond ratings and the cost of debt. *Review of Accounting Studies*, 22(2), 608-643.

Boubaker, S., Gounopoulos, D., & Rjiba, H. (2019). Annual report readability and stock liquidity. *Financial Markets, Insitutions and Instruments*, 28(2), 159-186.

Chen, Ch., Hanlon, D., Khedmati, M., & Wake, J. (2023). Annual report readability and equity mispricing. J*ournal of Contemporary Accounting & Economics*, 19 (3), December 2023, 100368.

Courtis, K. (2004). Corporate annual report graphical communication in Hong Kong: Effective or misleading? *The Journal of Business Communication*, 34, 269- 288.

Dadashi, I., & M. Norouzi. (2020). Investigating the Mediating Effect of Financial Reporting Readability on the Relationship between Earnings Management and Cost of Capital. *Journal of Accounting Knowledge*, 11(1),135-157 *(In Persian).*

Daryaei, A., & Aimeni, M. (2023). Financial reporting readability and cost of capital: emphasizing the role of financial reporting quality. financial accounting Knowledge, 10 (36), 133-161. *[In Persian).*

De Franco, G., Hope, O., Vyas, D., & Zhou, Y. (2015). Analyst report readability. *Contemporary Accounting Research*, 32, 76-104.

Denis, D.J. (2011). Financial flexibility and corporate liquidity. *Journal of Corporate Finance*, 17(3), 667-674.

Easley, D., & O'Hara, M. (2004). Information and the cost of capital. *The Journal of Finance*, 59, 1553-1583.

Elliott, B., Asay, S., & Rennekamp, K. (2018). Firm performance, reporting goals and language choices in narrative disclosures. *Journal of Accounting and Economics*, 65(2), 380-398.

Ertugrul, M., Lei, J., Qiu, J., & Wan, C. (2017). Annual report readability, tone ambiguity, and the cost of borrowing. *Journal of Financial and Quantitative Analysis*, 52(2), 811-836.

Fang, X., Yutao Li., Baohua, X., & Zhang, W. (2014). The effect of annual report readability on cost of debt. Canadian academic accounting association (CAAA). Available at SSRN: *https://ssrn.com/abstract=2538251*.

Frank, M.Z., & Goyal, V.K. (2009). Capital Structure Decisions :Which Factors are Reliebly Important?. *Financial Management*, 38(1),1-37.

Gregory, R. (2020). Political Risk and Financial Flexibility in BRICS Countries. *The Quarterly Review of Economics and Finance*, 78(C), 166-174.

Hasan, M.M., & Habib, A. (2020). Readability of narrative disclosures, and corporate liquidity and payout policies. *International Review of Financial Analysis*, 68, 1-15.

Lambrinoudakis, C. Skiadopoulos, G., & Gkionis, K. (2019). Capital Structure and Financial Flexibility: Expectations of future shocks. *Journal of Banking & Finance*, 104, 1-18.

Lawrence, A. (2013). Individual investors and financial disclosure. Journal of Accounting and Economics, 56, 130–147.

Lemmon, M.L., & Zender, J.F. (2010). Debt capacity and tests of capital structure theories. *Journal of Financial and Quantitative Analysis*, 45(5), 1161-1187.

Li, F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics*, 45 (2–3), 221–247.

Li, K., Ramos, F., & Rogo, R. (2018). Earnings management and annual report readability. *Journal of Accounting and Economics*, 63, 1–25.

Mahdavi, R., Azinfar, K., Dadashei, A., & Barzegar, GH. (2022). Investigating the impact of readability of financial report on commercial credit with emphasis on the role of management ability in companies listed on Tehran Stock Exchange, Scientific Quarterly Journal of Islamic Economics and Banking, 30, 195-220 *(In Persian).*

Miller, B. (2010). The effects of reporting complexity on small and large investor trading. *Accounting Review*, 85, 2107-2143.

Myers, S. C. (1984). The capital structure puzzle. *The journal of finance*, 39(3), 574-592.

Peng He, W., Lepone, A., & Leung, H. (2013). Information asymmetry and the cost of equity capital. *International Review of Economics and Finance*, 27, 611-620.

Pourrezaei. V., Rotami. V., & Shabanzadeh, M. (2017). The effect of companies spare debt capacity on the cost of equity capital in companies Listed in Tehran Stock Exchange. *UCT Journal of Management and Accounting Studies*, 3(3), 491-500 *(In Persian).*

salmanian, M., vakili fard. H.R., hamidian. M ., sarraf. F., & darabi, R. (2018). Provide a Financial Limit Forecast Model (Case study: State Companies Accepted in Tehran Stock Exchange) . *Journal of Governmental Accounting*,4 (2), 93-104 *(In Persian).*

Rahmanian Koushkaki, A., Alahiari, A., Bagherzadeh Hooshmandi, K., & Mehravar , M. (2023). The Impact of Audit Committee on the Relationship between Financial Reporting

Readability and Specific Volatility of Stock Returns. *Journal Emerging Technologies in Accounting,* 1(1), 67-78 *(In Persian).*

Ramezanpour, S., Zolfaghari, M., & Zarei, R. (2021). The relationship between Operating Cash Flows and the Dynamic Optimal Capital Structure Spee: The Role of Corporate Governance. Accounting and Social Interests, 11(1), 61-76 *(In Persian).*

Rezaei Pitenoei, Y., & safari gerayli, M. (2019). Financial reporting readability and the likelihood of fraudulent financial reporting. *Financial accounting research,* 10(4), 43-58*(In Persian).*

Rjiba, H., Saadi, s., Boubaker, S., & Xiaoya (Sara) Ding. (2021). Annual report readability and the cost of equity capital. *Journal of Corporate Finance*, 67, 101902

Stickney. C. P., Brown, P. R., & Wahlen, J. M. (2007). Financial Reporting Financial Statement Analysis, and Valuation: A Strategic Perspective, 6 thed., Thomson South-Western, Meson, OH.

Souza, J., Rissatti, J.C., Rover, S., & Borba, J.S. (2019). The linguistic complexities of narrative accounting disclosure on financial statements: An analysis based on readability characteristics. *Research in International Businessand Finance*, 48, 59-74.

Volberda, H. W. (1998). *Building the Flexible Firm: How to Remain Competitive*. Oxford, Oxford University Press.

Xu, Q., Fernando, G., Tam, K., & Zhang, W. (2020). Financial report readability and audit fees: a simultaneous equation approach. *Managerial Auditing Journal*, 35(3), 345-372.

Yin, S, T., Chevapatrakul, K. Y. (2022). The causal effect of improved readability of financial reporting on stock price crash risk: Evidence from the Plain Writing Act of 2010. Economics Letters.https://doi.org/10.1016/j.econlet.2022.110614.Volume 216, July 2022, 110614

Zhang, Z. (2013). Tax Shield, Bankruptcy Cost and Optimal Capital Structure. *In Finance-Fundamental Problem and Solutions:*71-108.Springer Berlin Heidelberg.

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Effects of Audit Quality on the Relationship Between Audit Committee Accounting Expertise and Forward-Looking Disclosures

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Abstract

The most important and valuable financial information that disclosed on time can be effective for the users and decision makers. The forward-looking information disclosed is a kind of information that can affect users' decisions. Forward-looking information can reduce the information gap between firms and investors by improving the future anticipation of earnings and investment decisions.

Different factors such as audit committee and the audit quality, can affect the forward-looking information disclosures. The purpose of this study is to investigate the relationship between audit committee accounting expertise and forward-looking information disclosure with the emphasis on the role of audit quality of accepted firms in Tehran Exchange Stock. For this purpose, 114 firms selected as statistical sample by using the systematic sampling among firms accepted in the TSE during 2011-2017. In general 794 firm-year observations were considered to be analyzed. An OLS regression and panel data method is considered for studying the relationship between variables and testing the hypotheses. The results show that there is a positive and significant relationship between audit committee accounting expertise and forward-looking information. Also, the effect of audit quality on the relationship between audit committee accounting expertise and forward-looking information is significant too.

Keywords: Audit committee expertise, Audit quality, Forward-looking information.

1. Introduction

Financial reporting and disclosure are important devices for management in order to have an effective transfer of data to other people. In present literature there are many hypothesis and theories in relation to forward-looking information disclosure and economic consequences of forward-looking information disclosure and its positive effect are implicated. According to Boston (1997), forward-looking information disclosure can have a good rule in reducing the capital expense and increasing the value of company. According to signal theory, firms are in competition to accessing the limited wealth. If a company are well-known and disclose many data about its actives and has a good name in the aspect of financial reporting, it will have more ability in wealth attracting because it will attract investor's trust. The reliable and on time reports can help users to evaluate the future perspective of firms.

Preparing financial reports according to the manager's reporting decision or in other word, according to manager's voluntary and non-voluntary motivation are important areas in literature that is related to information disclosure. Hereof, experimental research about voluntary disclosure have special importance; because it shows the chance and possibility of understanding the role of accounting data in evaluating and financing of companies. Also because of factors such as estimation, allocation and judgment in using the accounting methods, the manager has an opportunity to made decisions about time of recognition and measurement of revenues and expenses. Due to this lack of information, directors can manage the earnings and because of that there will be different between reported earnings (managed earnings) and real performance result of firms (taymori and kazemi, 2017).

Information disclosure by firms is one of the important and valuable sources for making sound decision by investors, creditors and other users. Based on present literature in Iran about information disclosure, the investors, shareholders and analysts pay attention to firms information disclosure that become mandatory by accounting standards, supervisor and policy maker institutions such as Securities and Exchange Organization, and the voluntary forward-looking information disclosure by management is not more considered (rahmani and bashirymanesh, 2014).

The voluntary disclosure in the most of accepted firms on valid universal securities and exchange organization had been noticed and include other aspects like financial information, future perspective, nonfinancial information and etc. Previous researches in the recent years indicate that classical financial reporting framework doesn't have the ability to show company's activities completely and it doesn't have the ability to response correctly. The forward-looking information disclosure show gap reduction between entity and investors and one of the results of this forward-looking information disclosure is to improve the prediction of firms' future revenues and investors' decision making (Abed and Bravo, 2018).

In order to manage the firms effectively, it is necessary to consider governance mechanisms like independent member in board of directors, audit committee and the internal audit unit. Because of the recent financial bankruptcy of some firms like WorldCom and Enron in U.S and the financial crisis of Europe like the Parmalat in Italia and BBVE in Spain, the quality and the ability of financial reporting and the auditor profession has been suspicion and the rule of audit committee in the financial reporting process has been noticed by standard setting body (mohaamdzadeh kamaly and jafarzadeh, 2018).

The board of directors and its committees are relevant corporate governance mechanism in the oversight of managerial actions (Fama and Jensen, 1983) and board members have an effect on the information disclosed in annual reports (Li et al., 2008).

In recent years, academics and standard setters have called for the improvement of the configuration of the audit committee. In the USA, the independence of audit committees is required for listed companies. The US corporate governance standards establish that the audit committee must have at least one financial

expert. Yet the EU standards have chosen a narrower definition of expertise, focusing on accounting and/or auditing expertise. (Chan et al., 2013; Karamanou and Vafeas, 2005; Wang and Hussainey, 2013). In Iran, existence of audit committee is required for listed companies but, expertise of audit committee members is not mentioned.

Accounting expertise of audit committee members may be necessary for the experts to better perform their monitoring roles because the functions performed by audit committee members require having a thorough knowledge of the accounting standards, practices and procedures (Abed and Bravo, 2018).

The evidence of this study contributes to the corporate governance literature by shedding light on the role of directors' characteristics, such as accounting expertise, and audit quality in the disclosure process. This paper is the first to examine the association between the accounting expertise of audit committee members and forward looking information disclosure and the effect of audit quality on this relationship.

The paper is organized as follows. First, the literature review is described in Section 2. The research methodology that includes hypothesis development, statistical sample and research variables are provided in Section 3. Section 4 discusses the results of the empirical analysis and conclusion is provided in Section 5.

2. Literature Review

Abed and Bravo (2018) investigate the relationship between accounting expertise of the audit committee and forward-looking information disclosure of US companies. The results show that the accounting expertise of audit committee members is associated with forward-looking disclosure practices, particularly with information of a financial and strategic nature.

Se Tin and Murwaningsari (2018) investigate the effect of the audit committee on the relation of the ability of mangers on the profit quality. The studying sample include 53 producing firms during the 2014 to 2016 have showed that the ability of manger have a position and meaningful effect on the profit quality and also the existence of this accounting committee increases the influence of the ability of management on the profit quality.

Alqatamin (2018) studied the effectiveness of the audit committee and the company's operation during the 2014 to 2016. The studied sample include 165 accepted firms in the Security and Exchange Stock of Jordan. The result of research showed that the size of audit committee, independence and gender variety the positive connection with company's operation whereas there isn't a meaningful relation between the experience and the number of session with the company's operation.

Alfarih (2017) have studied the connection between the dispensation of the company and voluntary forward-looking information. The results indicate that mutual presidency the size of directorate and the dichotomy of duties have a negative relation with the voluntary forward-looking information, whereas the governmental ownership, has a positive relation with the voluntary forward-looking information athwart the unbound mangers proportion, the family members in the directorate, the existence of accounting committee and the presence of the governor family in directorate, have an non-meaningful effect on the voluntary forward-looking information process.

El-diftar and the teammates (2017) have studied the connection among the natural ownership, the voluntary forward-looking information and the transparency of the company. The experimented results have shown that the bank ownership and foreign ownership have a positive and meaningful effects on the voluntary forward-looking information and transparency. Among the four properties that have been studies just the size of firms have a positive effect on the voluntary forward-looking information.

Ahmadi and Bauri (2017) have studied the influence of some accounting quality properties (the auditor credit and the profession in audit industry) on the voluntary forward-looking information. With analyzing the panel data through the a sample of 29

accepted firms in the Security and Exchange Stock of Tunisia during the 2009 to 2011 the result posit that the profession in audit and auditor credit improve the voluntary forward-looking information.

Salehi and Shirazi (2010) in their researches indicates that the accounting committee can be encouraging factor for preparing the financial exporting data with high quality

Eazi et al. (2017) in a research studied the relation between the financial behavior of manger on the cognition psychology and the quality of the accounting data forward-looking information with the organizational equation process and the regression equation. The result have indicated that financial behavior of the mangers influenced the quality of forward-looking information of the accounting data.

Rezazade et al. (2018) have expressed the properties of audit committee and the renewed offer of the financial statement that whatever the audit committee expertise be more the renewed offer of the financial statement will be less.

Naqdi and kurdlor (2017) in a research that deal with the influence of the properties of company on the amount of optional forward-looking information of data in the TSE companies posit that just the size of company has a meaningful relation with the level of the optional forward-looking information like profit-making data. the other variables like the age of company, liquidity and the size of the company had not a meaningful connections.

Salehi et al. (2017) examined the influence of the existence of audit committee and the delay of independent auditors report. They found that the amount of the financial expertise audit committee have a negative relation with the delayed auditor reports.

Sadidi et al. (2014) in a survey studied the effective features on the effective factors on the level of the future perspective in the firms that are the members of Security and Exchange Stock of Iran and wrap up that there is a meaningful connection among the size of company, ratio of debt, the size of accounting company and the level of profit of the company with the forward-looking information.

3. Research Method

3.1. Hypotheses Development

In this study, based on literature review and theoretical basis that provided in previous section, we develop 3 hypotheses as follow:

1) There is a significant relationship between the audit committee expertise and forward-looking information disclosure.
2) Audit quality has a significant effect on the relationship between the audit committee expertise and disclose forward-looking information disclosure.

3.2. Sampling Method

Statistical population in this research includes all firms listed on the Tehran Stock Exchange (TSE) for period from 2011-2018. Systematic elimination method is used for sampling. Hence, firms must have following criteria to be considered as sample:

- Each company must have enough data through years 2011 to 2018, meaning it must be active in Tehran Stock Exchange through this period.
- Each company must be traded at least 9 months per year.
- Financial year of firms must ends in Esfand (end of Iranian fiscal year).
- Companies must not be part of financial firms (including banks), because this industry is regulated and is likely to have a fundamentally different cash flow and accrual processes.
- Financial period of firms must not be changed.

Eventually, after applying these criteria, there are 114 firms in our sample and the final sample size is 794 firm-years.

Financial and accounting data needed to estimate models are obtained from TSE reports on CDs and web.

3.2. Research Models and Variables

In our research, variables are classified into independent variable (audit committee expertise), dependent variable (Forward-looking information

disclosure), moderator variable (audit quality) and control variables (board independency, firm size, financial leverage, and ROA).

In order to testing first hypothesis, we use the following multiple regression:

$$C_{index_{it}} = \alpha + \beta_1 audit\ committee\_exp_{it} + \beta_2 Board\ independent_{i,t} + \beta_3 Size_{i,t} + \beta_4 Financial\ leverage_{i,t} + \beta_5 ROA_{i,t} + \varepsilon_{i,t}$$

For testing second hypothesis, the following multiple regression is used:

$$C_{index_{it}} = \alpha + \beta_1 audit\ committee\_exp_{it} + \beta_2 audit\ quality_{it} + \beta_3 audit\ committee\_exp_{it} * audit\ quality_{it} + \beta_4 Board\ independent_{i,t} + \beta_5 Size_{i,t} + \beta_6 Financial\ leverage_{i,t} + \beta_7 ROA_{i,t} + \varepsilon_{i,t}$$

Where:

C_index_{it} is proxy for forward-looking information disclosure. According to Abed and Bravo (2018) we measure forward-looking information disclosure by using 19 indices such as product share and market share, description of activities, innovation and production, impact of production on results, environmental actions, investment in R&D, human resources, investment in capacity, quality controls and commercial policies, company market analysis, discussion about corporate strategy, investment by segment or geographical location, risk exposure, dividends distribution, intellectual capital, profitable ratios, cash-flow and earnings, financial structure and costs distribution, shares and market capitalization. For each firm-year observation, *c_index* is measured by dividing the number of disclosed indices by total indices (19).

$audit\ committee\_exp_{it}$ is a dummy variable that is used for measuring the audit committee expertise. If in firm's audit committee there is at least one expert in the field of financial accounting, auditor or financial manager it equals one, otherwise it will be zero (Bedard and others, 2004).

$audit\ quality_{it}$ is a dummy variable that take value 1 if the financial statements audit by the Audit Organization or Mofidrahbar Audit Firm (one of the members of Iranian Association of Certified Public Accountants), or otherwise zero (Nownahal naher et al., 2013; Zalaghi et al., 2019).

$Board\ independent_{i,t}$ is measured as percentage of members on the board who are considered to be independent directors. (Barako et al, 2006; Lime et al., 2007; Abed and Bravo, 2018).

$Size_{i,t}$ represent the size of company and measured as natural logarithm of firm's total assets (Wong and Hosaini, 2003).

$Financial\ leverage_{i,t}$ is companies' leverage and measured as ratio of total liabilities to total owners' equity (Abed and Bravo, 2018; Jonson and Macling, 1976).

$ROA_{i,t}$ is returns on assets and used to measure profitability (Abed and Bravo, 2018).

4. Results

4.1. Descriptive Statistics

Information related to descriptive statistics of variables is shown in table (1) and (2). In table (1) descriptive statistics of relative variables is summarized. As shown in this table, the maximum and minimum values of forward-looking information disclosure (dependent variable) are 0.83 and 0.55 respectively.

In table (2) descriptive statistics of dummy variables (audit committee expertise and audit quality) is shown. As shown in this table, in 507 observations, there is at least one expertise member in their audit committee and in 224 observations, financial statements are audited by the Audit Organization or Mofidrahbar Audit Firm.

Table (1): descriptive statistics of relative variables

Variable	Observation	mean	median	maximum	minimum	Std-Dev
Forward-looking information disclosure	794	0.662	0.662	0.833	0.555	0.787
Board independent	794	0.245	0.400	0.800	0	0.476
Firm size	794	6.064	6.023	8.177	4.415	1.457
ROA	794	11.791	10.127	62.678	-40.386	0.875
Financial Leverage	794	1.552	1.279	25.827	-37.313	0.144

Table (2): descriptive statistics of dummy variables

Variable	Observations	Frequency
Audit committee expertise	794	507
Audit quality	794	224

4.2. Hypotheses Testing

First Hypothesis

In the first hypothesis, the relationship between accounting expertise of audit committee and forward-looking information disclosure is investigated. The results of estimation of regression model related to this hypothesis are shown in table (3).

As shown in table (3) *F*-statistic of model is 92612.65 and significant. This issue shows that this model is significant in general. Adjusted R^2 of this model is 0.999 and means that all variables of model together explain 99% of variation in forward-looking information disclosure. Variance inflation factor (VIF) for all variables are less than 10 and this means that there is no collinear between variables.

T-statistic of independent variable is 6.331 and it is statistically significant. This shows that there is significant relationship between audit committee expertise and forward-looking information disclosure. The coefficient of independent variable is positive so it could conclude that there is positive and significant relationship between audit committee expertise and forward-looking information disclosure. This result shows that the first hypothesis is confirmed.

Results of testing first hypothesis show that only one control variable (board independent) has a significant relationship with forward-looking information disclosure.

Table (3): results of testing first hypothesis

Variable	Coef.	T-Stat.	Prob.	VIF
C	0.661	3936.220	0.000	-
Audit committee expertise	0.001	6.331	0.000	2.851
Board Independent	-0.001	-6.327	0.000	2.845
Firm Size	-2.761	-0.486	0.626	1.006
ROA	1.361	1.739	0.082	1.016
Financial leverage	-1.320	-0.531	0.595	1.016
R^2	0.998			
Adjusted R^2	0.999			
F-statistic(prob)	92612.65 (0.000)			
Durbin-Watson	2.039			
$C\_index_{it} = \alpha + \beta_1 audit\ committee\_exp_{it} + \beta_2 Board\ independent_{i,t} + \beta_3 Size_{i,t} + \beta_4 Financial\ leverage_{i,t} + \beta_5 ROA_{i,t} + \varepsilon_{i,t}.$				

Second Hypothesis

In the second hypothesis, the effect of audit quality on the relationship between accounting expertise of audit committee and forward-looking information disclosure is investigated. The results of estimation of regression model related to this hypothesis are shown in table (4).

As shown in table (4), *F*-statistic of model is 167351.9 and p-value is 0.000. This issue shows that this model is significant in general. Adjusted R^2 of this model indicate that all variables of model together explain 99% of variation in forward-looking information disclosure. Variance inflation factor (VIF) for all variables are less than 10 and this means that there is no collinear between variables.

In this model, coefficient of concern variable (Audit committee*Audit quality) is positive and significant. With regard to coefficient of audit committee expertise that it is positive and significant, it could conclude that audit quality has significant effect on the relationship between accounting expertise of audit committee and forward-looking information disclosure. So, results of estimation of this model indicate that second hypothesis is confirmed.

In this model, only board independent, as a control variable, has a significant relationship with forward-looking information disclosure too.

Table (4): Results of testing second hypothesis

Variable	Coef.	T-Stat.	Prob.	VIF
c	0.661	3916.328	0.000	-
Audit committee expertise	0.003	8.708	0.000	3.056
Audit quality	0.001	-2.458	0.014	1.568
Audit committee*Audit quality	0.001	8.843	0.000	1.962
Independent board	-0.001	-8.785	0.000	2.875
Firm size	8.910	0.204	0.837	1.008
ROA	1.070	1.819	0.063	10.19
Financial leverage	-9.180	-0.297	0.766	1.16
R^2	0.998			
Adjusted R^2	0.999			
F-statistic(prob)	167351.9(0.0000)			
Durbin-Watson	2.050			
$C\_index_{it} = \alpha + \beta_1 audit\ committee\_exp_{it} + \beta_2 audit\ quality_{it} + \beta_3 audit\ committee\_exp_{it} * audit\ quality_{it} + \beta_4 Board\ independent_{i,t} + \beta_5 Size_{i,t} + \beta_6 Financial\ leverage_{i,t} + \beta_7 ROA_{i,t} + \varepsilon_{i,t}.$				

5. Conclusion

Forward-looking information disclosure can make the decision making process better and also has important role on it. In Iran there is no compulsion about forward looking information disclosure and it is voluntary disclosure. So, mechanisms such as audit committee and accounting expertise of audit committee could affect this type of disclosure. In the other hand, compulsory auditing of firms' financial statements propounds this issue that what is the role of audit quality in voluntary disclosure.

Based on this problem, in this study the relationship between accounting expertise of audit committee and forward-looking information disclosure and the effect of audit quality on this relationship is investigated. For this purpose, two hypotheses is developed.

In first hypothesis the relationship between accounting expertise of audit committee and forward-looking information disclosure is investigated. The results of testing this hypothesis show that there is positive and significant relationship between accounting expertise of audit committee and forward-

looking information disclosure. This result indicates that accounting expertise of audit committee member can increase the disclosure of forward-looking information. In other word, accounting expertise in the audit committee will improve financial reporting and disclosure. The results of testing first hypothesis is consistent with Abad and Barve (2018), Se Ting and Moraning (2018), CHiand and Lin (2012), Nasirzadeh et al. (2018), Rezazadeh et al. (2016) and Chen and Hope (2011).

In second hypothesis the effect of audit quality on the relationship between accounting expertise of audit committee and forward-looking information disclosure is investigate. The results show that audit quality can affect the positive and significant relationship between accounting expertise of audit committee and forward-looking information disclosure. This means that in the firms with high audit quality, the relationship between accounting expertise of audit committee member and disclosure of forward-looking information is stronger. In other word, quality of audit process can improve the relationship between accounting expertise in the audit committee and financial reporting and disclosure. The results of testing second hypothesis is consistent with Ahmadi and Bouri (2017), Lee. P and Taylor (2006), Poorhaidari and Badri (2013), Saemipoor et al. (2014) Liu and Tiras (2014).

The evidence documented in this study contributes to the academic debate about benefits of being financial expert in audit committee. Also, stakeholders and creditors may therefore pay more attention to the firms that have financial expert in audit committee and those that financial statements audited by the Audit Organization or Mofidrahbar Audit Firm. The main limitation of the empirical study is that the level of forward-looking information in annual reports is measured with a disclosure index. The findings of this research create opportunities for future research, such as research on this study topic by analyzing different institutional contexts or use additional measures for the disclosure of forward-looking information for example, focusing on the good news versus bad news.

References

Abad, K. and Bravo,F. (2018). "Audit committee accounting expertise and forward looking disclosures", Journal of Management Research Review, Vol. 31.

Abdulla A. R. Ali. (2014). "Corporate Governance: The Role and Effectiveness of the Audit Committee in Bahrain." International Journal of Business and Management, Volume 9, No.3, 131-137. URL: http://dx.doi.org/10.5539/ijbm.v9n3p131

Ahmadi, A., and Bouri, A.J.K.E. (2017). The Effect of Audit Quality on the Extent of Voluntary Disclosure: Companies Listed in the Tunisian Stock Exchange. Journal of the Knowledge Economy, Vol 8, Issue 32, pp: 1-15.

Alfraih, M.M., and Almutawa, A.M. (2017). Voluntary disclosure and corporate governance: empirical evidence from Kuwait. International Journal of Law and Management, Vol. 59 Issue: 2, pp.217-236.

Bedard, J,Chtoru S.M. (2014), "The effect of audit committee expertse independence and activity on aggressive earning managment ". *Auditing: A Journal of practice and theory*, , No. 2 Vol. 23.

Botosan, C. (1997). Disclosure level and the cost of equity capital, Accounting Review, Vol. 72, 323-349.

Chen. F., Hope, O.K., Li, Q., Wang, X. (2011). Financial reporting Quality and Investment Efficiency of Private Firms in Emerging Markets. The Accounting Review, 86 (4): 1255-1288.

Fama, E. & Jensen, M.(1983). «Separation of ownership and control», *Journal of Law and Economics*,Vol. 26, pp.301-326.

Lee, P.J., Taylor, S.J., and Taylor, S.L. (2006). Auditor Conservatism and Audit Quality: Evidence from IPO Earnings Forecasts', International Journal of Auditing , 10, 182-199.

El-Diftar, D., Eleri Jones, M., and Ragheb, M.S. (2017). Institutional investors and voluntary

disclosure and transparency: the case of Egypt. Corporate Governance: The International Journal of Business in Society, Vol. 17 Issue: 1, pp.134-151.

Tian, Y. & Chen, J. (2009). "Concept of Voluntary Information Disclosure and A Review of Relevant Studies". *International Journal of Economics and Finance*, Vol. 1, No. 2.

Izi, Roya & Gharkaz, Mansuor (2018). Presentation of the quality model for the disclosure of accounting information based on the analysis of financial behavior of cognitive psychological viewers". *Knowledge of accounting and auditing management*, 27(7):63-81.(In. Persian)

Rezazadeh, Javad & Abdi, Mostafa (2016). Audit committee characteristic and financial restatements. Financial Accounting Researches.Vol.9. No. 32.

Fakhari, Hossein & Rezaei, Yaser (2017). The impact of financial expertise of audit committee of the company information environment. Journal of Accounting Knowledge. Vol. 8, No. 30.

Karamanou, I. and Vafeas, N. (2005).The association between corporate boards, audit committee, and management earnings forecasts: an empirical analyses. Journal of Accounting Research. Vol. 43. No. 3, pp.453-486.

Nonahal Nahr, Aliakbar & Alinejad, Mahdi and Khezri, Parisa (2013). The impact of auditor quality on the earning management of the IPO firm. *Knowledge of accounting and auditing management*, 7(2):103-114.(In. Persian).

Rahmain, Ali and Bshirimanesh, Nazanin (2014). A review of the literature on disclosure in Iran. Journal of Research in Accounting and Auditing. Vol. …. No. 15.

Sadidi, Mahdi & Badiei, Hossen and Nabavi, Hamid. (2015). Effective factors on the level of exposition of future information in annual report of companies accepted in Tehran Stok Market. *Knowledge of accounting and auditing management*, 16(4):57-71.(In. Persian).

Wang, M. and Hussainey, K. (2013).Voluntary forward-looking statement driven by corporate governance and their value relevance. Journal of Accounting and Public Policy. Vol. 32, No. 3. Pp. 26-49.

Zalaghi, Hassan ؛ Aflatooni, Abbas and M. Barzabadi Farahani (2019), Investigation of the effect of the managing director Tenure on Auditor Tenure in Tehran Stock Exchange ,Financial Accounting and Auditing Research, Vol. 11, No. 41. Pp. 1-22.

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The Effect of Business Risk Management on the Relationship Between Operational Cash Transparency and Stock Price Crash Risk

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Abstract

Purpose: The purpose of this study is to investigate the impact of business risk management on the relationship between the lack of transparency of operating cash and the risk of falling stock prices.

Method: In this regard, a sample consisting of 131 companies accepted in the Tehran Stock Exchange during the years 2013-2022 was selected with the help of the systematic elimination model, and finally the research hypothesis was tested with the help of multiple linear regression based on panel data.

Findings: The results of the research hypothesis test show that there is a positive and significant relationship between the transparency of operating cash and the risk of falling stock prices. Also, the results showed that business risk management has a moderating role on the relationship between the lack of transparency of operating cash and the risk of falling stock prices.

Conclusion: The present study provides useful evidence for company managers and capital market agents. In other words, by properly managing the risks facing the company and forming a risk committee, it might be possible to reduce the risk of falling stock prices while monitoring the transparency of financial information.

Keywords: stock price fall risk, lack of transparency of financial information, risk management, operating cash.

1. Introduction

Various research has long looked at operational cash and more than that, capital market participants emphasize this factor more because a significant number of analysts and companies make cash flow forecasts with this factor (Defoend and Hong, 2003). Recently, studies show that the amount of operating cash flow increases over time. Given the importance of this Agent For market participants, managers have incentives to manage operational cash flow (Lee, 2012), which in turn increases the degree of blur (opacity), but many previous studies have not considered how opaque this important factor is and have only used this variable rawly. However, examples of managing operating cash flows and falling stock prices can be seen. It can be concluded that there may be a relationship between these two factors, therefore, in order to fully clarify the relationship between these two variables and to help improve the financial literature and eliminate the gap in research, we have investigated the effect of opaque operating cash flow on the risk of a company's specific stock price drop. The opacity of operating cash flows is likely to affect the risk of stock price declines, as this can facilitate the possible management of bad management news, and the divergence of operating cash flow sources, which are considered an important source of company-specific information, will inform market participants of the company's performance, and if this important factor is opaque, it will make it more difficult for market participants to understand the actual performance of the company. And this will cause dissatisfaction for investors and stakeholders; which in turn enables managers to hide bad news. When such unwelcome news is brought together for a long time and suddenly hits the market, stock price crashes occur (Hatton et al., 2009). The sudden disclosure of widespread resource divergence has the potential to cause a significant drop in stock prices. The main purpose of this research is to answer this question of whether the opaque operating cash flow can risk falling stock prices or not?

Major advances in the business environment, such as business globalization and the rapid pace of change in technology, have increased competition and management problems in organizations. In today's business climate, management and employees must be able to cope with the blurred and complex interrelationships between technology, data, tasks, activities, processes, and people. In such complex environments, organizations need managers whom be able to cope with the complexity of the business. Effective risk management based on valid conceptual principles is an important part of this decision-making process (Ghaderi and Tari Verdi, 2020). In addition to identifying risks and determining their quality, risk management systems can predict their impact on the project. Acceptance or rejection of risk usually depends on the project manager's level of tolerance. If risk management is done regularly to identify potential problems and find solutions, they will easily complete other processes such as organizing, planning, budgeting, and controlling costs. A project manager who is a pioneer in this field can greatly prevent the occurrence of unexpected events during the life of the project(Sayadi et al., 2019). Risk management is a process that aims to mitigate the harmful effects of an activity through conscious action to anticipate unintended events and plan to prevent them. In general, risk management can be considered as the process of measuring or evaluating the risk and then designing risk management strategies (Guiding Rivers et al., 1400). Therefore, the purpose of this study is to investigate whether risk managementcan affect the relationship between untransparent operating cash flow and risk of stock price collapse by creating a low-risk environment. In continuation of the structure of the research, first theoretical, empirical and hypotheses of the research and then the research method are presented. In the following we introduce and define the operational variables of the research, then the findings and finally the conclusion of the research are presented.

2. Literature Review and Theoretical Principles

A stock price crash is a phenomenon in which the value of a stock suffers from sudden and sharp drops. Many researchers believe that the fall in stock prices is due to the management of internal information. In situations where information enters the market randomly and the process of disseminating information is systematically done regardless of whether it is good or bad, it can be said that the published information has an asymmetric distribution. In other words, if managers disclose all the information quickly, it will cause stock returns to be asymmetrically distributed. This means that the average volume of positive returns on good news should be equal to the average volume of negative returns in relation to bad news. Business managers try to hide bad news as much as they want to spread good news about the company (Kothari et al., 2009). A certain set of circumstances can double the motivation of managers to hide bad news from the company. Managers are motivated to keep their jobs and achieve maximum rewards to make their financial performance good through the accumulation of bad news from investors for as long as possible (Foroughi & Mirzaei, 2011). Operating liquidity is the cash created as a result of a company's operations, usually obtained by deducting all operating expenses from revenues, but a series of adjustments to net profit. The cash flow statement prepared in accordance with accepted US accounting principles begins with after-tax profits and exceptional items, and then adjustments to the depreciation cost of fixed assets, non-operating income, Sales of fixed assets, changes in working capital, changes in interest payable and tax on income payable and investment income are made, while cash flow statements are initiated with pre-tax profits and unforeseen items and according to standards based on international accounting financial reporting standards with operating profit operating cash flow is the cash flow that the company conducts through the transaction. Establishing its own business activities, operating cash flow can be used to control the quality of corporate dividends. For example, if a company reports profits in its profit or loss statement but its operating cash flow is negative, it may have used bold accounting techniques. Free cash flow is a measure of corporate performance. Providing that the company has the necessary expenses for maintenance by developing assets (Kordestani et al., 2018). Sometimes management takes real earnings management by making operational decisions, or in other words, manipulating real activities to achieve the desired profit. The manipulation of actual activities indirectly affects the future operating performance of the company because the manager tends to sacrifice future cash flows to the current period profit. The manipulation of real activities affects operating cash flows, and It creates unusual cash flows. In studies of cash flow, most authors believe that operating cash flow is less manipulative or manageable than net profit because cash flows reflect the actual flow of cash received and paid by the entity. Hence, cash flow is more reliable than net profit; But recent studies show that managers can manage the flow of operating cash as well as profits (Fakhari and Hassani, 2013). The management of operating cash flows separates operating cash flows into normal and unusual; in other words, abnormal operating cash flows are managed cash flows. Incentives to manage cash flows from operations may be driven by low profit instability and divergence between profits and cash flows from operations (Cheng et al., 2020). Since the accumulation of unpleasant and critical news of the company, the risk of stock price collapse and operating cash flow is one of the important financial components of the company, so the lack of transparency of this factor may lead to shareholders' dissatisfaction and risk of falling stock prices in the future by publishing the news (Cheng et al., 2020). Major developments in the business environment, such as globalization and the high speed of changes in technology, have increased the competition and difficulty of management in organizations. Organizations in the business environment always face risks that are referred to in the theoretical literature as risks that include systematic and unsystematic risk. The sum of

these risks is called the risk of the whole company. In complex environments, organizations need managers who Distinguish these inherent complexities when making important decisions. Effective risk management, which is based on valid conceptual principles, is an important part of this decision-making process (Ghaderi and Tari Verdi, 2020). It can be said that risk management is the process of identifying, evaluating and taking control measures and correcting potential incidental risks that are clearly possible events, damages or non-changes in the status quo (Rostami et al., 1401). An enterprise risk management (ERM) manages risk to provide acceptable assurance for achieving the entity's objectives (Gordon Laures et al., 2009). The goal of any activity in each entity is to achieve the highest level of effectiveness and efficiency which is called performance in the term. To achieve this goal, all efforts must be put in place, one of these solutions, management. Risk is an entity (Sayadi et al., 2019). Risk management is the process of assessing risk and designing strategies for risk recognition. The researchers believe that new risk management creates a broader approach to risk management compared to its traditional aspect. By adopting a systematic approach and in accordance with the management of all the risks facing an organization, risk management is necessary to reduce the overall risk of corporate bankruptcy, increase the performance and ultimately increase the value of the organization. In today's competitive environment, the survival of firms depends on the continuous improvement performance in order to maintain and Increased competitiveness and greater profitability. This is achieved through setting objectives, planning and control, and consequently measuring performance to know the success rate in achieving the predetermined goals (Jalilvand et al., 2019). Based on the points mentioned in the statement of the problem and the theoretical and empirical foundations of research hypothesesare presented as follows:

The first hypothesis of the research is that: there is a significant relationship between transparency of operating cash and risk of stock price crash.

The second hypothesis of the research: Business risk management affects the relationship between the lack of transparency of operating cash and the risk of stock price crash.

In a study titled “producer service level and financial performance: the role of risk management”, Jette et al. (2023) stated that, given the initial and advanced classification of services, analysis shows that only advanced service delivery affects the effectiveness of risk management. In particular, the provision of advanced services reinforces the proactive dimension of risk management. Surprisingly, the analysis reveals the negative impact of proactive risk management on financial performance. However, proactive risk management indirectly enhances financial performance by supporting reactive risk management. Aprilia and Tobing (2022) in a study focusing on the impact of risk management on managerial ownership, financial leverage and firm value, stated that leverage has a negative and significant effect on the value of the companies while risk management has a positive and significant effect on the value of the companies. Risk management does not have a moderating role over the relationship between managerial ownership and company value and the relationship of financial leverage to the value of the company. Cheng et al (2020) in a study titled “transparency of operating cash flows and stock price crash risk”, stated that opacity of operating cash flows can lead to the risk of stock price collapse, and accruals management can have a significant effect on the risk of stock price drops. Hay and Ron (2018) examined the relationship between financing constraints and risk of stock price crashes in the form that increased limits on financing lead to increased risk of stock price crashes. Chen et al. (2017) examined the relationship between smoothing and risk of stock price crashes. The results showed that high levels of profit smoothing are associated with the risk of stock price crashes and such associations are more severe for companies with fewer analysts and smaller institutional shareholders as well as positive discretionary accruals. They also showed that the

smoothing of profit with significant negative returns during the three months after the profit announcement. Hutton et al (2009) examined the link between the lack of transparency of financial reporting and the risk of stock crashes. Using earnings management as a measure of lack of financial transparency, they concluded that the lack of transparency of financial information was associated with less disclosure. In addition, companies with opaque financial statements are more at risk of falling stocks. Shirbandi et al. (2023), in a study titled "the impact of cash flow riskmanagement on financial stability", stated that liquidity management is one of the biggest challenges faced by exchange companies. The main reason for this challenge is that most resources are financed from short-term deposits. In addition, the grant facilities are spent on investing in assets that have a degree of liquidity. They are relatively low. Holding insufficient amounts of liquidity puts companies at risk of failure to fulfill obligations and consequently bankruptcy. Findings of the study showed that risk management of cash flows derived from operating activities, investment activities and financing activities has a positive and significant effect on financial stability. The results also showed that cash flow risk management has a positive and significant effect on financial stability. Rostami et al. (2022), in a study titled "the impact of risk management on the pace of adjustment of financial leverage in the life cycle stages of companies", stated that the speed of adjustment of financial leverage indicates that companies are moving towards the optimal capital structure. The results showed that risk management has a direct effect on the speed of adjustment of financial leverage. Also, risk management in the growth period of companies with an increasing coefficient of direct effect on the speed of adjustment of financial leverage However, in the period of maturity, risk management does not affect the speed of adjustment of leverage. Also, risk management in the period of decline of companies with a decreasing and negative coefficient has a negative effect on the speed of adjustment of financial leverage; therefore, according to the results, in general, companies by managing the risks facing the company are able to move faster towards optimal financial leverage and this effect decreases in the transition stages of the life cycle of companies. Azadi et al. (2021) In a study titled "The Effect of Readability of Financial Statements on the Risk of Stock Price Crash and Shareholder Behavior", it states that there is a significant relationship between the readability of financial reports and risk of stock price crash as well as the behavior of shareholders, but the results of the third hypothesis test showed that legibility has no significant effect on the relationship between stock price fluctuation risk and shareholder behavior. Fakhari and Nasiri (2020) in a study titled "the impact of company performance on the risk of future stock price crash" in their research results showed that there is a negative and significant relationship between corporate performance indicators (Tobin Q index, rate of returns, market to book ratio and profit per share) and risk of stock price crash. Mehravar & Kargar (2019) in a topic titled "the moderating role of financial reporting quality on the relationship between political communication and the risk of future stock price drop", stated that companies involved in political relations experience less periods of stock price drop due to relations with the government, while the quality of financial reporting can improve the relationship between political relations and risk of stock price crashes. In this way, with improving the quality of financial reporting will certainly reduce the amount of hidden bad news and political relations and reduce the risk of collapse. Khalifeh Soltani et al. (2018) In a study titled "the effect of political communication on the risk of stock price crash under information asymmetry", they concluded that political communication has a positive and significant effect on the risk of stock price crash. This means that managers provide the company situation through storing bad news and not publishing it, and this behavior of managers leads to stock price crash in the long run.

3. Research Methodology, Model and Variables, Population and Sample:

The present study is an applied research and from the methodological point of view, it is a causal correlation. The statistical population is all the companies listed in Tehran Stock Exchange and the research period is between 2013 and 2022. Companies listed in Tehran Stock Exchange that meet the following criteria are selected as sample: For comparability of the data, the end of the financial year of the companies should be the end of Esfand (final month based of Iranian calender). During the period (10 years) the financial period has not changed. Information about the variables selected in this study is available. They are not banks, insurance or investment firms. In this study, systematic deletion method was used to reach the sample, and 131 companies were selected as the sample of the study. Data analysis was done using mixed data method and panel data approach using Eviews 12 software. Because statistical tests are resistant to variance and serial autocorrelation predictions, and in order to eliminate these two statistical assumptions, in the first model test, according to the latest researches, strong standard expression and GLS command in Eviews 12 software have been used.

Regression model

Model (1)

$$NCSKEW_{it} = \beta_0 + \beta_1 OCFOPQ_{it-1} + \beta_2 ERM_{it-1} + \beta_3 (OCFOPQ_{it-1} \times ERM_{it-1}) + \beta_4 SIZE_{it-1} + \beta_5 ROA_{it-1} + \beta_6 MB_{it-1} + \beta_7 LEV_{it-1} + \beta_{10} RET_{it-1} + \varepsilon_{it}$$

Operational Definitions of Research Variables

Independent Variable: Lack of transparency of operating cash ($OCFOPQ_{i\ t-1}$). To measure the degree of intransparency of operating cash flows, according to Dycho (1998) and Li (2012) model and Cheng et al. (2020) model that measures abnormal operating cash flow, the remaining absolute value of the model indicates the opacity or lack of transparency of operating cash flow. The larger this number is, there is less transparency. This model measures the degree of lack of transparency in a year, and in order to specify a specific procedure in operating cash management that reflects continuous management of operating cash flows, the total absolute value of the remaining model (3) has been used over the past three years (Cheng et al., 2020).

Model (3)

$OCFt / TAt\text{-}1 = \lambda_0 + \lambda_1 (1/TAt\text{-}1) + \lambda_2 (SALEt/TAt\text{-}1) + \lambda_3 (\Delta SALEt/TAt\text{-}1) + \varepsilon_{it}$

The introduction of model components No. (3) is presented in Table (1).

Table 1: Introducing the Model of Measurement of Operational Cash Transparency

Symbol	Description
OCF	Operating cash flow is period t
TA	The total asset is the T-1 period
SALE	Sales are in period t
Δ SALEt	Changes in sales are during the period t . (Sale period – Sold out before)

The lack of transparency of operating cash flows is therefore equal to the model (4):

Model (4)

$OCFOPQ_{i,t} = Abs(OCFOPQ_{i,t-1}) + Abs(OCFOPQ_{i,t-2}) + Abs(OCFOPQ_{i,t-3})$

Dependent Variable: Stock Price Crash Risk

To measure the risk of future drop in stock prices similar to Cheng et al. (2020), the negative coefficient of skew (NCSKEW) is used.

To measure this criterion, the negative coefficient model of skewness of Chen et al. (2001) and Cheng (2020) is used as follows. The higher the negative coefficient of skewness, the more the company is at risk of falling stock prices.

$NCSKEWi,t=-[n(n-1)^{3/2}(wj,t3]/(n-1)(n-2)((wj,t2)^{3/2})$

NCSKEW: Negative Skew Specific Monthly Returns of the Company i per month t during the fiscal year
Wi,t: The company's specific month returns i in week t.
N: The number of months whose returns are calculated.

Modification Variable: Risk Management (ERM)

To measure risk management in accordance with Ghaderi and Tari Verdi (2020) and Rostami et al. (2022), the Gordon et al. model (2009) was used. These factors are identified based on their ability to achieve the goals set by the companies and are as follows:

$ERMIi,t = \beta 0 + \beta 1EUit + \beta_{2CIit} + \beta 3FSit + \beta_{4FCit} + \beta 5MBDit + \varepsilon_{it}$

In the above model, ERMI (Risk Management Indicators), EU (Environmental Uncertainty), CI (Industry Competitiveness), FS (Company Size), FC (Company Complexity) and MBD (Board Oversight). In the above model, Ɛ is a component of the model error, which indicates deviation from the best model proposed by Gordon et al. (2009), so that the lower the error component of the model indicates the high risk management of the company, and on the contrary. For this reason, the error of the absolute value model is multiplied by negative number and defined as risk management.

Risk Management Indicators (ERMI)

In 2004, the Committee to Protect Organizations at the Treaddo Commission known as COSO used the following four indicators for organizational risk management, internal control to improve organizational performance and better governance and reduce the rate of fraud in organizations.

$$ERM_I = \sum_{k=1}^{2} Strategy + \sum_{k=1}^{2} Operation + \sum_{k=1}^{2} reporting + \sum_{k=1}^{2} Compliance$$

Strategy (Strategy)

Refers to the strategies adopted by companies in order to stay competitive in the market. In this case, the company tries to maintain its competitive status over other companies in this field. To measure the strategy of competition, two relations can be used *which are calculated as follows:*

$$Strategy_1 = \frac{Sales_{it} - \mu Sales}{\sigma Sales}$$

In the above model, sales (sales of the company), (the average sales of the industry) and (the sales criteria of companies in the industry).μSalesσSales

$$\text{Strategy}_2 = \frac{\Delta\beta - \mu\Delta\beta}{\sigma\Delta\beta}$$

In the above model, Δβ (the company's beta in the year t-minus the beta of the company in the year t-1), (the average industry beta)μΔβ and σΔβ (standard deviation of the total companies in the industry).Δβ

Efficiency (Operation)

Productivity is measured as the relationship between the company's inputs and outputs in the company's operations process. Any size of the company's outputs at a certain level of inputs will indicate better performance of the company. To measure productivity the following two relationships can be used:

$$Operation_1 = \frac{Sales}{Total\ Assets}$$

In the above model, sales is the sum of the company's assets.Total Assets

$$Operation_2 = \frac{Sales}{Number\ of\ Employees}$$

In the above model, sales is (number of company personnel).Number of Employees

Managing Reporting Risks

Following Gordon et al. (2009), reporting refers to the degree of trust in company reporting, because proper reporting ensures the survival and success of the organization. To measure this factor, Jones Modified Model is used to measure the full value of optional and non-optional accruals. The reason for using both accruals (optional and non-optional) is because both items can be negative, so their relative strength is more dependable.

$$Reporting1 = \frac{\text{Absolute value of discretionary accruals}}{\text{Absolute value of non} - \text{discretionary accrual items} + \text{Absolute value of discretionary accruals}}$$

In this model, first the total accruals are calculated (net profit minus operating cash) and after calculating the total accruals, the parameters α1, α2 and α3 in order to determine the total of non-optional accruals are continued through the following model:

TAi,t /Ai,t-1 = α1(1/Ai,t-1)+α2(ΔREVi,t - ΔRECi,t) /Ai,t-1 +α3(PPEi,t/Ai,t-1)+εi,t

In the above model, TA (total accruals), ΔREVi, t (change in current period sales revenue relative to the previous period), ΔRECi, t (change in accounts receivable from the previous period), PPEi, t (gross property, plant and equipment), Ai, t-1 (the book-value of assets of the previous period) and εi,t (uncertain effects of the company's random factors). After calculating the parameters α1, α2 and α3 Through the least squares method, non-optional accruals (NDAs) are determined as follows:

NDAi,t = α1(1/Ai,t-1)+α2(ΔREVi,t - ΔRECi,t) /Ai,t-1 +α3(PPEi,t/Ai,t-1)+εi,t

And finally, the optional accruals (DAs) are calculated after determining the NDA as follows:

DAi,t = (DAi,t /Ai,t-1) - NDAi,t

Reporting2= (Material Weakness) + (Auditor Opinion) + (Restatment)

In the above model, Material Weakness (equal to the number of clauses stated in the independent auditor's report), Auditor Opinion (if the sensitive report is acceptable, the number will be 1 and otherwise zero), and Restatement (re-presentation of financial statements (in case of renewal the number would be 1 and otherwise zero).

Compliance (compliance)

Increased compliance with laws and regulations reduces risk and increases the value of the company. Compliance with accepted audit standards will require the cost of the audit. According to the research (Gordon et al. 2009), two relationships can be used to measure the variable of conformity (the audit costs are extracted from the company's profit statement):

$$\text{Compliance1} = \frac{\text{Audit fees}}{\text{Total Assets}}$$

$$\text{Compliance2} = \frac{\text{Net profit (loss).}}{\text{Total Assets}}$$

Environmental Uncertainty Factor (EU)

Environmental uncertainty can be seen as an increase in future unpredictable events. This uncertainty can cause a lot of problems for organizations. In fact, financial reporting and performance measurement are more complicated in companies with variable and volatile business operations (Ghaderi and Tari Verdi,

2020). The purpose of risk management as a subset of management control system is to identify and manage future uncertain events in companies. Therefore, environmental uncertainty can be a factor in risk management (Gordon et al., 2009).

Three parameters are used to measure this factor:
a) The coefficient of change in sales ((Sit)CN), (b) the coefficient of changes in capital expenditure, and (c) is the coefficient of changes in the net profit before tax ((Iit)CV), and the IIT is the company's pre-tax net profit in year t . *Using the above three parameters, environmental uncertainty is obtained as follows:*

$$EU = Log\ (\sum_{k=1}^{3} CV(X_k))$$

$$CV(X_k) = \frac{\sqrt{\frac{\sum_{t=1}^{11}(Z_{k,t} - \bar{Z}_k)}{n}}}{|\bar{Z}_k|}$$

In the above relationship**,** CV(Xk) (coefficient of changes in uncertainty), t (years of research), Xkt (uncertainty k per year t) and Zk (average uncertainty change k over n years).
3, 2 and 1 = K for uncertainty

1) Factor of sales change
2) Coefficient of changes in capital expenditure
3) Coefficient of changes in net profit before tax.

To calculate the cost of capital, the weighted average cost of capital will be used.

$$WACC = \left(\left(\frac{E_M}{E_M + D_M}\right)K_S + \left(\frac{D_M}{E_M + D_M}\right)K_D\right)$$

In the above model, DM (equal to total book value of liabilities), EM (market value of equity), KD (cost rate of debt after tax) is considered the minimum expected interest rate of facility in partnership contracts published by the central bank in the time domain of research. KS (Shareholder Fee Rate) is used to calculate the expected cost rate of common stock from the Gordon model, whose formula is as follows:

$$K_S = \frac{D_0(1+g)}{P_0} + g$$

In the above model, D_0 (equal to cash profit per share in the current period), P_0 (share price at the beginning of the year) and g (rate of dividend growth).

Industry Competitiveness (CI): Industry competitiveness measures the concentration of the industry, which means high competitiveness. Due to fierce competition between competing firms, each company tries to adopt a suitable strategy to outperform other competitors, so there is always a risk of unsustainable profitability for the companies (Gordon et al., 2009).

$$CI = 1 - \sum_{i=1}^{n}\left(\frac{S_{it}}{TotalS_{st}}\right)^2$$

In the above model are CI (market share), S_{it} (sales per company in year t) and S_{st} (industry sales in year t).

Company Size (FS): The relationship between company size and organizational structure has been considered in the organizational theory literature. To measure this factor, the natural logarithm of total assets is used.

Corporate complexity (FC): The complexity of the company reduces the integrity of information and further problems in the internal control system, so to reduce complexity requires strong organizational risk management (Gordon et al., 2009). Cost complexity is defined as the breadth of covering costs with revenues. In organizations with less cost complexity, the cost moves proportionately as profits. It is easily determined by projected changes in revenues. If the cost doesn't change proportionally to the income, then understanding the things that lead to earnings forecasts won't help forecast profits. As a result, performance prediction is likely to be affected by cost complexity if other items are not changed; therefore, cost complexity is measured through the relationship between earnings and earnings before interest and tax (Ghaderi and Tari Verdi, 2020).

FC =-1* CORREL(revenues & earnings)

Board Supervision (MBD**):** The variable of board supervision is calculated and measured by dividing the number of board members by the logarithm of sales.

Control variables of research

ROAit-1 :To calculate this variable, net profit is divided by total assets .

SIZE $_{it-1}$:To calculate this variable, the natural logarithm of the sum of assets is used.

LEV $_{it-1}$: To calculate this variable, the sum of the total liabilities divided by the sum of the total assets.

MB $_{it-1}$: To calculate this variable, the division of the market value of capital by the book value of capital is used at the end of the fiscal year.

RET $_{it-1:}$ (stock price - previous period of stock price + dividend)/ (previous period stock price).

4. Findings:

Table 2 shows descriptive statistics of quantitative variables. The main central index is mean, which represents the equilibrium point and center of gravity of the distribution and is a good indicator to indicate the centrality of the data. For example, the mean value for the financial leverage variable of the sample companies is (0.57), which shows that most of the data is centered around this point. In general, scattering parameters are a criterion for determining the amount of dispersion from Together, or in the same way, they are dissimilar to each other. One of the most important parameters of dispersion is standard deviation. The value of this parameter for growth opportunity (market to book value) is (2.32) and the return on assets is (0.14), indicating that these two variables have the highest and lowest standard deviations respectively. The minimum and maximum also show the lowest and the highest in each variable. For example, the largest amount of leverage is (1.13).

According to the results obtained in Table 3, it is observed that the significant level of variables in the stability test was less than 5% and indicates the stability of the variables.

According to the results obtained in Fig. 4, it is observed that the F-Limer test with a significant level of 5% (0.95) confirmed the pattern with common effects (integrative). Variance heterogeneity test with a significance level higher than 5% indicates the absence of variance in the components of the research model. Meanwhile, serial autocorrelation test with a significance level below 5% indicates the existence of serial autocorrelation between the remaining components of the model. In the final estimation by using the tools of standard error of Eviews software this problem resolved (Aflatooni, 2018).

Test results of research hypotheses

The results of Table 8 show that the variable of transparent operating cash with a positive coefficient (0.76) and a significance level of less than 5% (0.000) has a significant correlation with the risk of falling stock prices because in statistical relationships in regression, if the significance level of the test is below the standard value of 5%, the relationship is confirmed. Regression coefficient is a positive number in the statistical test and there is a direct and significant relationship between independent and dependent variables of the research. In fact, as the lack of transparency of operating liquidity increases, the risk of falling stock prices increases, and vice versa. Also, the interactive coefficient of transparency of operational cash and risk management with a positive coefficient (0.94) and a significance level below 5% (0.0000) affect the relationship between transparency of operational cash and risk of stock price crash. The coefficient of determination is equal to 25%, which indicates that the independent and control variables in the model have been able to explain 25% of the variation in dependent variables. The test statistic is equal to 22.39 and its significance level is less than 5%, so it can be said that the fitted model has sufficient validity. Durbin-Watson's test value is also 1.87, which indicates that there is no serial autocorrelation between variables.

5. Conclusion and suggestions:

The main purpose of this research is to investigate the relationship between operating cash and risk of stock price crash**.** The important and special purpose of financial reporting is to provide a wide range of users with transparent and timely information about the financial performance of the entity. Many investors believe that investors place more value on companies that have fixed profits and do not want to lose their shares in this situation. To gain the trust of such investors, the company prefers to hide the unpleasant news of the company. Managing and manipulating the accounts lead to bankruptcy and a decline in the value of the company's shares in the future. Cash flow is very important for evaluating the performance of a company. In accounting standards, it is recommended to pay special attention to this factor, because it can be used to identify the amount of accruals allowed and estimated by the managers. In this research, the studied population of the listed companies in Tehran Stock Exchange from 2014 to 2019. In fact, all companies accepted in the stock exchange were selected as the population and then 131 eligible companies were considered as the sample by applying conditions and restrictions. The lack of transparency of operating liquidity shows a direct and significant relationship with the risk of falling stock prices, and in fact, it can be argued that as the operating cash flow moves toward lack of transparency, in the same direction the risk of future stock price drop will increase because this lack of transparency will be kept to a certain point of secrecy. And when this information is communicated to the market, the company will certainly not respond to the investors and sentiments of the group, and the stock price will fall suddenly. Also, business risk management by reducing risks and planning principles can affect this relationship. The results of the research hypothesis test are in accordance with the research of Fakhari and Hassani (2013) and Cheng et al. (2020), which found that lack of profit transparency and operating cash flows have a significant and positive effect on the risk of falling stock prices of companies. Also the results are in accordance with the research of Cheng et al. (2012), Hutton et al. (2009) and Foroughi et al. (2011) whom found that lack of profit transparency and financial reporting has a positive and significant relationship with the risk of future stock price decline.

References

Azadi, Keyhan; Azizmohammadlou, H.; Tesadi Kari, M.J.; Khezmatgozar, H. (2021) The effect of financial statements on stock price crash risk and shareholder behavior. Knowledge of Financial Accounting Spring 1400 - Issue 39. pp. 122-144.

Khalifeh Soltani, S.A.; Rahnama, M., Koyasi, F., (2018) The Effect of Political Communication on the Risk of Stock Price Crash under Information Asymmetry Conditions of Audit Knowledge Journal, Vol. 9, No. 4, pp. 11-128. (in Persian).

Rostami, Vahab, Mehravar, M., Kargar, H. (2022) The Effect of Risk Management on the Pace of Adjustment of Financial Leverage in the Life Cycle Stages of Companies, Accounting Advances, Shiraz University, Vol. 14, No. (1), pp. 59-88. (in Persian).

Shirbandi, H.; Khaloti, Shakour; Farmani, A.(2023) The Effect of Cash Flow RiskManagement on Financial Stability. Research in Accounting and Economic Sciences, Vol. (7), No. (1), pp. 91-104.

Fakhari, H.; Hassani, M. (2013) The relationship between operating cash flows, lack of profit transparency and risk of stock price crash. Journal of Applied Research in Financial Reporting, Successive 2. pp. 63.88.

Fakhari, H.; Mohammadi, J.; Hassan Tavajal-kordi, Mohsen (2017) The Effect of Abnormal Operating Cash Flows on Earnings Sustainability in Listed Companies in Tehran Stock Exchange. Journal of Economics and Business. Vol. 8, No. 16, pp. 69-78.

Fakhari, H.; Nasiri, M. (2020) The Impact of Company Performance on the Risk of Future Stock Price

Crash. Journal of Financial Management Strategy, Vol. 8, No. 30. pp. 43-62.

Foroughi, D., Amiri, H., Mirzaei, M., (2011) The effect of untransparent financial information on the risk of future stock price crash in companies accepted in the stock exchange. Journal of Financial Accounting Research, 3rd Year, No. 4.

Kamyabi, Y., Shahsavari, M., Salmani, R. (2016) The Effect of Accrual Earnings Management on the Relationship between Real Earnings Management and Capital Expenditure. Accounting and Audit Studies, Tehran University of Management, Vol. 22, No. 1, pp. 19-38

Kordestani, Gholamreza, Rezazadeh, Javad, Mohammadi, Vahid (2018) Investigating the Temporal and Economic Factors Affecting the Relationship between Accruals and Operating Cash Flow. Journal of Empirical Accounting Studies. Volume 15, Issue 60. pp. 33-59.

Shame, Beauty, Goodness , Goodness. (2016) The Relationship between Real Profit Management and Accrual Earnings Management in Firms Suspected of Fraud in Tehran Stock Exchange. Journal of Empirical Studies of Financial Accounting Vol. 12, No. 49, pp. 29-52. (in Persian).

Mehravar, M.; Kargar, H. (2019) The moderating role of financial reporting quality on the relationship between political communication and risk of future stock price decline. 17th Iranian National Accounting Congress. Qom.

Chen, Ch. Kim. J.B. and Yao, L. (2017). “Earnings Smoothing: Does it 13.Exacerbate or Constrain Stock Price Crash Risk?” Journal of Corporate Finance, 42 (C): 36-54

Chen, J. Chan, kam. Dong, Wang. & Zhang, F, (2017), "Internal Control and Stock Price Crash Risk: Evidence from China", European Accounting Review,26 (1), PP. 125-152.

DeFond, M. Hung, M. 2003. An empirical analysis of analysts’ cash flow forecasts. J. Accounting Econ. 356(1), 95-101.

He, G. Ren, H. (2017). Financial constraints and future stock price crashrisk. The Review of Financial Studies, 16: 487- 525.

Hutton, A.P. Marcus, A. J. & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. Journal of Financial Economics, 94, 67-86.

Kothari, S. P. Shu, S. & Wysocki, P. D. (2009). Do managers withhold bad news? Journal of Accounting Research, 47, 241-27.

Lee, L.F. 2012. Incentives to inflate reported cash from operations using classification and timing. AccountingRev.87(1),1–33.

C. S. Agnes Cheng, S. Li and (2020) Operating cash flow opacity and stock price crash risk, J. Account. Public Policy,https://doi.org/10.1016/j.jaccpubpol.2020.106717

Jat, M.N., Jajja, M.S.S., Shah, S.A.A. and Farooq, S. (2023), "Manufacturer's servitization level and financial performance: the role of risk management", Journal of Manufacturing Technology Management, Vol. 34 No. 1, pp. 122-146. https://doi.org/10.1108/JMTM-12-2021-0503.

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Reasons for Dysfunctional Audit Behavior in Implementing Business Processes

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Abstract

Objective: This study addresses the impact of the Business Process Cycle (BPC hereafter) (including design and modeling, execution and implementation, control and governance, analysis and optimization) on risk management and auditor professional judgment to achieve economic efficiency. Therefore, the audit's reputation will be boosted. Also, this study ascertains why auditors do not implement Business processes (BP) at functional processes.

Methodology: The study's statistical population includes all the incumbent auditors, and 197 questionnaires have been collected over three months. Smart Pls is used for testing the hypotheses test.

Results: Results revealed a positive and significant relationship between dysfunctional audit behavior and each component of BP, including design and modeling, execution and implementation, control and governance, analysis, and optimization.

Innovation: Due to the growing competition in the market, precious human resources are among companies' competitive advantages. Hence, managers can considerably advance their employees' knowledge and assemble more cooperative teams in audit projects by investing in educational courses. Senior managers' support is necessary for expanding the capabilities and determining the culture. This research is the first study to address the impact of dysfunctional audit behavior (with eight components) on BP (with four components).

Keywords: Business Process, Design and Modeling, Execution and Implementation, Control and Governance, Dysfunctional Audit Behavior.

1. Introduction

BP provides patterns to establish a unified framework and proposes feasible solutions for organizational issues through established guidelines. BP boosts the activities' efficiency and effectiveness. BP is applied in a four-stage cycle, including A) design and modeling, B) execution and implementation, C) control and governance, and D) analysis and optimization (Vom Brocke, Zelt, Schmiedel, 2015; Malinova and Mendeling, 2018).

Work Flow Management Coalition (WFMC) provides a comprehensive definition of business processing. BP is a collection of linked activities that realize a business aim or policy objective within an organizational structure, defining the fundamental and operational relationships (WFMC).

BP analyzes executive operations at all managerial levels, including an audit firm's high-, middle, and low-rank managers. BP classifies the auditor activities systematically, analyzes the collected data, organizes auditors' executive operations, and delivers the applicable procedures to audit firm managers. Finally, BP streamlines the audit procedures through a consistent analysis (Zelt et al., 2019; Ferraris et al., 2018).

BP is the science of creating the standard structure and classifying the standardized designs. BP enables the modifications (based on the operation types and the current knowledge) to be conceptually designed and undertaken. The designed processes require the professionals' constant evaluation. The professionals then adapt the designed models through periodic planning. Therefore, high-rank managers can detect malfunctions and rectify them. Administrators in the functional units constantly correct malfunctions in audit procedures. Managers implement the successor designs at the right time by consulting the professionals. Therefore, these modifications to the infrastructure of the audit procedure will foster the audit firm's development (Lehnert et al., 2017; Lagos et al., 2018; Rumble and Mangematin, 2015). Processing enables supervisors to check the functional audit procedures thoroughly. Processing uncovers the matters and remediates them via refining the models. Therefore, the audit firm will accomplish its objectives in the determined period (Pattanayak and Roy, 2015). Audit firms require up-to-date and practical knowledge to provide excellent services, analyze their procedures more rapidly and enhance the executive processes. New knowledge is acquired via collecting the documented audit procedures and analyzing the data. Therefore, audit procedures will be more optimal (Paschek et al., 2018). All auditors must regularly supervise and evaluate their unit's operations to prevent probable errors and manage the audit risk considerably. Audit firm managers must identify the dysfunctional audit factors in applying the knowledge of the processing cycle (including design and modeling, execution and implantation, control and governance, and analysis and optimization). Therefore, they can mitigate the risks and raise quality.

This study ascertains why auditors disregard the BPC in audit projects.

2. Theoretical Background and Literature Review

2.1. BP

The quantitative management school has evolved since 1938. Managers in this school document organizational behavior and predict executive operations. BPC is a science that has emerged following technological developments and the organizations' procedural evolution. Dumas et al. (2013) refer to BP as the art and science of monitoring how an organization works to ensure consistent results and development opportunities are grasped. BP is a novel managerial approach versus its traditional one. BP records the strategies, objectives, and policies based on their connection and provides the executive managers with the right solutions to bridge the gaps (Zelt et al., 2019). Processing is a cycle that converts data into information. Processing enables professionals to re-process the information and re-use them as data. The functional BP models are precisely defined and described in the tables and graphs. Hence, staff can fully comprehend the whole process. BP enables the

micro-and macro-level governance and control for managers. Therefore, activities' efficiency and effectiveness will be significantly promoted due to the previous and during work education. The execution and implementation of the models are viable by the trained parties familiar with models and processes (Enríquez de Salamanca Ros, Troyano Jiménez and Romero Moreno, 2019; VomBrocke et al., 2014). Implementing the models is beneficial for the whole organization sector. Among the benefits are the mutual understanding between employees and customers. Boosting the staff's efficiency is essential for organizations concerning human resources. Staff efficiency is increased by relieving stress and bolstering confidence. Organizations can assign duties and consistently improve teamwork through a developed plan (Pulmberg, 2010). BP is a continuum of control, perception, and strategies that optimize goal achievement via changing performance. The leading organizations applying the BP knowledge have a more favorable situation than their rivals. BP application is accomplished at four stages, namely A) design and modeling, B) execution and implementation, C) control and governance, and D) analysis and optimization. Recently confirmed by ISO1, BP is a systematic approach to identifying, documenting, designing, conducting, controlling, governing and measuring functional operations according to standard indexes. BP is also an evaluation criterion to ensure goal achievement and check business strategies. Therefore, this knowledge can facilitate communication and cooperation. Hence, the reliability and stability will be maximized. BP is classified in a four-stage cycle as follows.

1) Design and modeling,
2) Execution and implementation,
3) Control and governance, and
4) Analysis and optimization.

2.2. Dysfunctional audit behavior (DAB)

The outcome of an individual's behaviors and mental patterns will enhance or impair any profession, including audit procedures. Following the code of professional conduct is the fundamental requirement of audit quality, and infringing on them will impair the auditor's efficiency and effectiveness. Hence, auditors will have dysfunctional behavior (Paino et al., 2010). The determinants of dysfunctional audit behavior include self-assessment, performance monitoring, and auditor turnover. Such dysfunctional behaviors will be controlled and modified by making a sound plan, alleviating the time budget pressure, and creating a culture of commitment. Therefore, audit firm efficiency will be enhanced (Espinosa and Barrainkua, 2016). Audit quality has multiple concepts comprised of numerous components in an audit cycle. The most crucial feature is Intellectual Capital (IC) since an audit firm's personnel have a pivotal role in each project (Ahmadzadeh et al., 2018). This study investigates several indexes that affect dysfunctional audit behavior, including 1- Auditor independence, 2- Client importance, 3- Ethical behavior, 4- Organizational commitment, 5- Time budget pressure, 6- Insufficient audit evidence, and 7- Consciousness. These indexes will compromise the audit quality and lead to dysfunctional audit behavior.

2.1.1. Auditor independence

Auditor independence is defined as auditors' relief of pressure and other factors affecting their impartial decision-making. Auditors must manage the client-posed stress to prevent a material impact on audit judgments (Oranefo, 2022). Financial statement users expect auditors to alleviate and reduce the communicational pressures. Auditors must be independent of their client firms to issue audit opinions free from auditor-client involvement. Auditors must give the shareholders an impartial opinion concerning financial statements (Tiranda and Juliarto, 2021).

2.1.2. Client Importance

Auditing is a profession that involves judgment. Judging the client's importance is among the most crucial levels of audit risk assessments. Hence, the client's importance must be evaluated before undertaking the job. A re-evaluation must be performed during the course (Pamungkas and Gantyowati, 2021; Baatwah and Aljaaid, 2021).

2.1.3. Ethical climate

Conduct is a set of principles and values that directly affect individuals' behavior. It is the central feature of communicational patterns among individuals and is better perceived in mass communication. Individuals uphold certain bedrock principles (Cohen, 2007). Therefore, auditors must have due care while performing their duties and create a balance between their four following responsibilities. These responsibilities are 1- Societal responsibility, 2- Client responsibility, 3- Profession responsibility, and 4- Self-responsibility.

2.1.4. Organizational commitment

Following the constant management changes, scholars have recognized the importance of competitive advantage and its fundamental feature, human capital. Organizational commitment is an attitude representing individuals' loyalty to an organization. Organizational commitment is a dynamic and continuous process based on moral principles implying the staff's interest in the organization's success (Sinambela and Mardikaningsih, 2021). Auditors are responsible to the client and the public. To enhance audit quality, they must perform their duties with integration and honesty (Khalil et al., 2021).

2.1.5. Locus of Control (LOC)

Locus of Control (LOC) means how much an individual considers their behavior to affect their life and the individuals' extent of control over their behavior (Rotter, 1966). LOC is a continuum between internal and external. Individuals with internal LOC believe that their manners affect their surroundings. External individuals consider fate and others the reason for their current situation. Internal individuals believe they control their destiny and have accepted their life's responsibility. In contrast, external individuals believe that success results from external factors and is out of control (Akkaya and Akyol, 2016). According to Rotter (1966), individuals with internal control have higher confidence and satisfaction than externals (Al-Shbiel, 2016). Auditors are also affected by internal (personal) and external (organizational) factors, and identifying these factors will considerably boost the operations' efficiency (Babalola, 2016).

2.1.6. Time Budget Pressure

Time budget pressure (TBP) refers to the mental pressure due to a prolonged project. TBP is among the primary reasons for fraudulent financial reporting and impaired judgment (Wahyuni and Isniawati, 2021). TBP hastens the process and compromises performance accuracy. Therefore, auditors present the material weaknesses as immaterial to prevent time pressure and deadline. Since this behavior has been widespread among staff, the quality of audit reports and the users' trust have been severely undermined (Yessie, 2021).

2.1.7. Insufficient audit evidence

According to the audit standards of the Iranian Audit Organization, audit evidence refers to the information utilized by auditors in obtaining results to present an audit report. Audit evidence is obtained from auditing annals and forms the basis of audit reports. Audit reports must follow the information quality and quantity indexes. Auditors ascertain the reliability and efficiency of the evidence to detect a material risk (Goenawan and Indarto, 2021).

2.1.8. Consciousness

Consciousness refers to an individual's decision to perform their duties and make tremendous progress in their profession. Consciousness is the individuals' commitment, satisfaction, and obligations in carrying out duties by a team. Hence, even in the absence of observers and supervisors, the responsibilities are thoroughly performed (Goenawan and Indarto, 2021). Job consciousness results from responsibility, need for progress, and orderliness; its salient feature is dutifulness. This practical index predicts job performance and future duties (Alsughayer, 2021).

2.2. Hypothesis development

2.2.1. The impact of design and modelling on BP in the audit profession

BP is a novel approach to the survival and development of a profession. Designing and modelling clarify audit procedure via a dynamic processing cycle. The BPC model provides supervisors and senior auditors with a framework to apply the standards and review the operations. Documented models are concrete evidence for supervisors and senior auditors to prove that a professional code of conduct is carried out and professional behavior is performed based on audit standards (Kochetova-Kozloski., Kozloski and Messier, 2013).

Form Beratz, Karnagan, and Alnecker (2014), first realized the audit business model was driven by audit standards and then easily identified the higher risk accounts by discerning the existing patterns. Meidan et al. (2017) studied the significance of processes as an asset. They believed that BP guides the organization towards optimal and maximum performance. Lagos et al. (2018) addressed a particular BP modeling and completed the definitions of functional operations. They built a central model to cover all organizational aspects and found that information asymmetry degrades service quality. The first hypothesis is as follows:

H1: There is a significant relationship between dysfunctional audit behavior and the design and modeling of BP in the Iranian Association of Auditors.

2.2.2. BP execution and implementation impact on the audit profession

Auditors execute and implement the recorded principles in the models and patterns. They perform the projects with higher quality and more accuracy by BPC. Executing and implementing the documented models designed regarding the audit project's size, risk, and importance will identify the operation's gaps and issues. It will also assist supervisors in judgment according to ethical principles (Alles et al., 2006; Lehnert et al., 2017; Kozloski and Messier, 2013). Alles et al. (2006) constantly supervised the functional models to enhance efficiency and increase education. Vom Brocke et al. (2014) found that the cycle's implementation affects organizational success. They also found that a comprehensive system is required for a successful implementation. Rumble and Mangematin (2015) found that properly implementing models and patterns is essential for survival and progress. The model implementation provides supervisors with a sophisticated understanding of the operations. Hence, supervisors can make the right decisions in a short time. Rumble and Mangematin (2015), analyzing a complex model of managers' power, found that organizational culture must be consistent with its approaches. Because this science highly depends on its staff's knowledge and capabilities. The second hypothesis is as follows:

H2: There is a significant relationship between dysfunctional audit behavior and BP implementation and execution in the Iranian Association of Auditors.

2.2.3. BP Control and governance impact the audit profession

Supervisors constantly evaluate and re-check the cycle of implemented results. They also find the reasons for the malfunctions according to the determined frameworks. Therefore, constant control and governance minimize the operation risk, and a continuous review boosts the added value (Pradabwong et al., 2017; Rumble and Mangematin, 2015).

Harmon (2010), analyzing re-engineering process on the functional processes, found that changes and alternations must be made at various time intervals and at the underlying layers of an organization to achieve progress.

Dunn et al. (2017) offered viable solutions for eliminating the errors of functional graphs. They found that trained staff can properly execute and implement the documented models. They also found that implementing these models provides a better understanding at a lower cost. Lehnert et al. (2017) analyzed the results of implementing the models and frameworks. Therefore, they consistently re-

implemented the process according to the organization's culture to optimize the audit procedure. The operation can be controlled and governed by unavoidable restrictions to identify strengths and enhance efficiency. Malinova and Mendling (2018) stated that the applicable procedures have been ineffective. Hence, they provided a comprehensive and coherent framework for detecting errors and issues concerning the documented BP. The third hypothesis is as follows:

H3: There is a significant relationship between dysfunctional audit behavior and BP control and governance in the Iranian Association of Auditors.

2.2.4. BP analysis and optimization impact on the audit profession

By applying the BPC, the efficiency and effectiveness of audit operations are evaluated more quickly and facilely. The cycle will be re-implanted if re-evaluation is required. Hence, applying the documented processes and models enhances professional judgment quality. Education and teamwork relationships will also be promoted (Boritz et al., 2014). Kochetova-Kozloski et al. (2013) realized the positive impact of the documented models on the manner of audit risk evaluation. They also found that analyzing the models in the dynamic BPC will enhance audit quality and considerably improve efficiency. Nadarajah and Kadir (2014) found that BP orientation and innovation analysis aids the dynamic BP models, including a) process management and b) operation development. Rosing et al. (2015) found that aligning BP with robust management strategies will elevate executive operations. Its prerequisite is analyzing, supporting, and updating. After analysing the IT mechanised models, Ferraris et al. (2018) found a positive and significant relationship between BP and efficiency in most professions. Majeed et al. (2018) provided a framework for analyzing and enhancing functional operations. They obtained mechanized models with the highest profit and the lowest cost. Other advantages include reducing consumed energy, raising service quality, increasing efficiency, and reducing processing time. Chountalas and Lagodimos (2018) found the impact of BP characteristics and its dynamic effect on implementing the operations in getting documented models, including process quality evaluation, re-engineering processes, and systems mechanising. They also considered BP inseparable from management at all organisational levels. The fourth hypothesis is as follows:

H4: There is a significant relationship between dysfunctional audit behavior and BP analysis and optimization in the Iranian Association of Auditors.

3. Research methodology

The five-degree Likert scale (1 to 5) collects the data. The questionnaires and their items are as follows: questionnaire for client importance, Shafer and Wang's (2010) questionnaire for ethical climate, Mowday et al. (1979) questionnaire for organizational commitment, Spector (1988) modified questionnaire for LOC, Kelly and Margheim (1990) questionnaire for time budget pressure, Donnelly et al. (2003) questionnaire for insufficient evidence, Costa and Mc Crae (1992) for consciousness has been used in the study. Four constituents have been used for the dependent BP variable: modeling, implementation, control, and optimization. The final questionnaire was designed after consulting auditing professors and consultants.

3.1. Statistical population

The statistical population includes all the incumbent individuals in the audit profession and members of the Iranian Association of Certified Public Accountants (2020). This population equals 9030 since analyzing the whole population was impossible; the sample was obtained by the Cochran formula and equals 368 individuals. The 197 questionnaires were completed and analyzed.

4. Findings

4.1. Descriptive-statistical analyses

This section explores how statistical variables (gender, age, education, job level, and work experience) are distributed. Male respondents answered more questions (53.8%) than female ones (46.2%). Most respondents (55.3%) were aged from 30 to 39. The majority of them (44.7%) have an MS degree. Regarding job level, 42.1% of respondents were auditors. Individuals with 6 to 10 years of experience (42.6%) had the highest work experience.

4.2. Hypotheses testing

4.2.1. Cronbach's alpha coefficient, combined reliability, and convergent validity

Cronbach's alpha coefficient is a classic measure of reliability (internal consistency). Measurement models are among the measurements of internal consistency. Internal consistency indicates the consistency between a construct and its indexes. The error measurement for each index indicates a high internal consistency. Cronbach's alpha coefficient measures the reliability (internal consistency). Cronbach's Alpha value higher than 0.7 indicates acceptable reliability (Cronbach, 1951). Moss et al. (1998) proposed 0.6 as the Cronbach's Alpha coefficient threshold for variables with fewer questions. In the combined reliability, the constructs' reliability is calculated according to their constructs' consistency with each other, not as an absolute value. Therefore, these measurements are used to better evaluate the PLS method's reliability.

Convergent validity is the second criterion to measure the model's Goodness of Fit (GOF). AVE indicates the common variance between each construct and its indexes. Convergent validity indicates the positive correlation between an item and other items in a latent variable. The Average Variance Extracted (AVE) is used to evaluate the convergent reliability of a latent variable (Hair et al., 2019). The AVE shows the correlation of a construct with its indexes. The higher the index, the greater the measurement of Fit (Barclay et al., 1995).

The proper values for each index are as follows: these values for the Cronbach's alpha coefficient equals 0.7 (Cronbach, 1951), for the combined reliability equals 0.7 (Fornell and Larcker, 1981), and for the common values equals 0.5. However, Magner et al. (1996) consider values higher than 0.4 the proper value for AVE. According to Table 2, all these values have the proper amounts concerning the latent variables.

4.2.2. Factor loading matrix for four hypotheses

This method compares the construct's correlation with itself and the correlation between a construct and other constructs. If the correlation between an index and another is higher than its correlation with its construct, the divergent validity will be questionable (Henseler et al., 2009). The rows indicate its indexes in this matrix, and the columns show its constructs. Values in the matrix indicate the correlation between the indexes and constructs. Hence, the factor loading items (from the Smart PLS software output) is as follows:

As the matrixes in Tables 3, 4, 5, and 6 demonstrate, the correlation between an index and its constructs is higher than the correlation between an index and different constructs. Therefore, the divergent validity in this model is adequate.

4.2.3. Fornel Larcker's discriminant or divergent validity matrix for the four hypotheses

Insert Table 7 here

As demonstrated in Table 7, the correlation between the execution and implementation of AVE square root is higher than the correlation of dysfunctional audit behavior. We can infer that the model's constructs (latent variables) correlate more with their indexes than others. Therefore, the model's divergent validity is adequate.

4.2.4. The significant values or T-values for the four hypotheses

According to Table 8 and Figures 1,2,3 and 4, the coefficient values for dysfunctional audit behavior and

four variables of design and modeling, execution and implementation, control and governance, and analysis and optimization are as follows: dysfunctional audit behavior and design and modeling value is (38.468), DAB and execution and implementation value equal (29.840), DAB and control and governance are (23.680), and DAB and analysis and optimization value are (33.783). Since all values are higher than 1.96, the measurement model is appropriate, and the path coefficient is significant.

4.2.5. R-Squares or R^2

R-Square is a criterion that attaches the measurement and the structural part in structural equations. R^2 indicates the impact of an exogenous variable on the indigenous variable. Three values of 0.19, 0.33, and 0.67 are proposed as the weak, medium, and strong values of R^2. R^2 values are calculated for indigenous (dependent) variables, and for the exogenous variables, this criterion is zero.

The R^2 values for each variable, according to Table 9, are as follows. The R^2 value for design and modeling is 0.748, R^2 for execution and implementation is 0.665, R^2 for control and governance is 0.619, and R^2 for analysis and optimization is 0.737. Therefore, the GOF for the construct of design and modeling is strong and confirmed.

4.2.6. The effect size criterion (F2)

According to Table 10, the effect size for the dysfunctional audit behavior and constructs of design and modeling, execution and implementation, control and governance, and analysis and optimization are 0.985, 0.988, 0.628, and 0.796. Therefore, the effect size is large, and other matrix cells equal zero.

4.2.7. The predictive validity of a structural model or (Q^2)

As demonstrated in Table 11, the software's outputs of the cross validity redundancy index (Q2) for research variables are as follows: The Q2 for design and modeling is 0.237, Q2 for execution and implementation equals 0.182, Q2 for control and governance equals 0.178, and Q2 for analysis and optimization equals 0.233. Since Q2 values are medium, the conceptual research framework has sufficient predictive power.

4.3. The goodness of fit (GOF)

4.3.1. The goodness of fit (GOF) for the first hypothesis

The commonality values are obtained from the constructs of dysfunctional audit behavior and the design and modeling values.

$\overline{Communality}$= (0.518+0.505)/2= 0.511

$\bar{R}$= 0.748

GOF=$\sqrt{0.511 * 0.748} = 0.535$

The higher the GOF index, the better the model's overall fitness. Since the model's GOF equals 0.535 and has a strong value, the GOF is confirmed.

4.3.2. The goodness of fit (GOF) for the second hypothesis

The commonality values are obtained from the constructs of dysfunctional audit behavior and the execution and implementing values.

$\overline{Communality}$= (0.460+0.502)/2= 0.481

$\bar{R}$= 0.665

GOF=$\sqrt{0.481 * 0.665} = 0.461$

The higher the GOF index, the better the model's overall fitness. Since the model's GOF equals 0.461 and has a strong value, the GOF is confirmed.

4.3.3. The goodness of fit (GOF) for the third hypothesis

The commonality values are obtained from the constructs of dysfunctional audit behavior and the control and governance values.

$\overline{Communality}$= (0.500+0.505)/2= 0.502

$\bar{R}$= 0.619

GOF=$\sqrt{0.502 * 0.619} = 0.438$

The higher the GOF index, the better the model's overall fitness. Since the model's GOF equals 0.438 and has a strong value, the GOF is confirmed.

4.3.4. The goodness of fit (GOF) for the fourth hypothesis

The commonality values are obtained from the constructs of dysfunctional audit behavior and the analysis and optimization values.

$\overline{Communality}$= (0.449+0.502)/2= 0.475

$\bar{R}$= 0.737

GOF=$\sqrt{0.475 * 0.737} = 0.507$

The higher the GOF index, the better the model's overall fitness. Since the model's GOF equals 0/507 and has a strong value, the GOF is confirmed.

5. Discussion and Conclusion

This is the first study addressing the impact of dysfunctional audit behavior with eight components on the four components of BP. We found a positive and significant relationship between dysfunctional audit behavior and each component of BP, including 1- design and modeling, 2- execution and implementation, 3- control and governance, and 4- analysis and optimization. Four constituents have been used for BP, including modeling, implementation, control, and optimization. The final questionnaire was designed after consulting auditing professors and consultants. Then the questionnaires were distributed among the Certified auditors. The 197 questionnaires were completed, and the Smart PLS software was used for data analysis. Results showed a positive and significant relationship between dysfunctional audit behavior and design and modeling in BP. A positive and significant relationship exists between dysfunctional audit behavior and BP execution and implementation. The relationship between dysfunctional audit behavior and BP control and governance is positive and significant. A positive and significant relationship exists between dysfunctional audit behavior and BP analysis and optimization.

Hypothesis1 addresses the impact of dysfunctional audit behavior and BP design and modeling among the Iranian Association of Auditors. Analysis results of this hypothesis showed a positive and significant relationship between dysfunctional audit behavior and BP design and modeling. Therefore, dysfunctional audit behavior significantly determines the changes in design and modeling. Modeling helps decide which activity must be implemented and how to implement it. Accordingly, specialists conceptually prioritize the functional models. Hence, each activity's efficiency and effectiveness regarding the right time and place will be determined, and efficiency will be enhanced (Lagos et al., 2018). BP modeling provides administrators and senior auditors with a framework to implement the determined criteria and re-check the operations. The documented models also provide administrators with solid evidence proving that professional codes of conduct are applied according to audit standards. Lagos et al. (2018) addressed a particular BP modeling and completed the definitions of functional operations. They built a central model to cover all organizational aspects. Finally, BP could transform the functional models into meaningful models. Hence, information asymmetry issues will be reduced. Hypothesis 2 addresses the impact of dysfunctional audit behavior and BP execution and implementation among the Iranian Association of Auditors. Analysis results of this hypothesis showed a

positive and significant relationship between dysfunctional audit behavior and BP execution and implementation. Therefore, this hypothesis is confirmed. Auditors execute and implement the recorded principles in the models and patterns. They perform the projects with higher quality and more accuracy by BPC. Therefore, wasting organizational resources (i.e., human, material, and spiritual resources) will be prevented. Implementing the models is beneficial for the whole organization sector. Among the benefits are the mutual understanding between employees and customers. Boosting the staff's efficiency is essential for organizations concerning human resources. Staff efficiency is increased by relieving stress and bolstering confidence. Organizations can assign duties and consistently improve teamwork through a developed plan (Pulmberg, 2010). Alles et al. (2006) constantly supervised the functional models to enhance efficiency and increase education. Scholars found that implementing the models and documented patterns will boost efficiency and economic saving in the inner layers of an organization. Gaining managerial support is among the pressing issues in the BPC. Administrators cannot implement the models widely without the managers' support. Hypothesis 3 addresses the impact of dysfunctional audit behavior and BP control and governance among the Iranian Association of Auditors. Analysis results of this hypothesis showed a positive and significant relationship between dysfunctional audit behavior and BP control and governance. Therefore, this hypothesis is confirmed. Supervisors constantly evaluate and re-check the cycle's implemented results. They also find the reasons for the malfunctions according to the determined frameworks. Therefore, constant control and governance minimize the operation risk, and a continuous review boosts the added value (Pradabwong et al., 2017; Rumble and Mangematin, 2015). Lehnert et al. (2017) analyzed the results of implementing the models and frameworks. Therefore, they consistently re-implemented the process according to the organization's culture to optimize the audit procedure. The operation can be controlled and governed by unavoidable restrictions to identify strengths and enhance efficiency. Lehnert et al. (2017) method asks about the mono-process and analyzes the mono-portfolio. Research methods aid the identification, creation, and classification of various projects. Scholars described the factors using literature and classified structures. They concluded that the operation could be controlled and governed regarding unavoidable restrictions to identify strengths and significantly enhance efficiency.

Hypothesis 4 addresses the impact of dysfunctional audit behavior and BP analysis and optimization among the Iranian Association of Auditors. Analysis results of this hypothesis showed a positive and significant relationship between dysfunctional audit behavior and BP analysis and optimization. Therefore, this hypothesis is confirmed. Nadarajah and Kadir (2014) addressed the BP orientation and analyzed the innovations to enhance functional operations. Their study provided a measurement method for BP. Nadarajah and Kadir's (2014) method used qualitative survey instruments, and their questions were provided using the Likert scale. They found that BP components assist process management and development. They also found that the BPC is dynamic and affects the process's efficiency.

6. Further to the study

Since BP is a continuous and four-sided cycle, each research hypothesis completes one side of audit procedures, and each part is necessary for the next cycle. Regarding the first hypothesis, auditors can design and frame the structured algorithms via systems. Therefore, audit procedures will be constantly and closely supervised. For the second hypothesis, auditors can perform the procedures faster with fewer workers by executing and implementing the designed algorithms. Therefore, the operation will not cease during staff transfer, and audit procedures will progress from the same point. The third hypothesis highlights the importance of cross-sectional and panel

data analysis. Senior managers and administrators will control and govern the operations whenever necessary. Hence, the designed models and modern structures will provide users with the governance ability to ensure evidence sufficiency. The fourth hypothesis highlights the importance of constant development. Since higher-ranked managers need professionals' assistance to survive and review the organization's activity, managers can re-correct and develop the models and re-use them in the cycle. Therefore, the errors will be reduced, and models can be optimized.

7. Research limitations

The number of questionnaire items (87) might make respondents bored. The research method is cross-sectional regarding the time. Hence, it is not as robust as the continual studies analyzing causal relationships. Since the questionnaire was distributed online and in-person and the employees were partly present at their jobs due to the Coronavirus, only 197 questionnaires were completed from the 368 determined samples based on the Cochran formula.

References

Ahmadzadeh, T., Kheirollahi, F., Shahveisi, F. and Taherabadi, A. (2018). Investigating the Relationship between Personality Dimensions and Gender with Reduced Audit Quality Behaviors. *Journal of Health Accounting*, 6(2), 1-23. https://doi.org/١٠.30476/jha.2018.39380

Akkaya,R. and Akyol, B. (2016). The Relationship Between Teachers' Locus Of Control and Job Satisfaction: A Mixed Method Study.*International Online Journal of Educational Sciences*. 8(3), 71-82. https://doi.org/10.15345/iojes.2016.03.008

Alles, M. Brennan, G. Alexander Kogan, A. and Vasarhelyi, M, A.(2006). Continuous monitoring of business process controls: A pilot implementation of a continuous auditing system at Siemens. *International Journal of Accounting Information Systems*. 7(1), 137-161. https://doi.org/10.1108/978-178743-413-420181010

Al-Shbiel, S. O. (2016). An examination the factors influence on unethical behaviour among Jordanian external auditors: Job satisfaction as a mediator. International Journal of Academic Research in Accounting, *Finance and Management Sciences*, 6(3), 285-296.

Alsughayer, S. A. (2021). Impact of auditor competence, integrity, and ethics on audit quality in Saudi Arabia. *Open Journal of Accounting*, 10(4), 125-140. https://doi.org/10.4236/ojacct.2021.104011

Baatwah, S,R. and Aljaaid, Kh,S. (2021). Dataset for audit dimensions in an emerging market:Developing a panel database of audit effectiveness and efficiency. *Data in Brief*, 36(1), 1-5, https://doi.org/10.1016/j.dib.2021.107061

Babalola, S. S. (2016). The effect of leadership style, job satisfaction and employee-supervisor relationship on job performance and organizational commitment. *Journal of Applied Business Research (JABR)*, 32(3), 935-946. https://doi.org/10.19030/jabr.v32i3.9667

Barclay, D., Higgins, C. and Thompson, R. (1995). The partial least squares (PLS) approach to causal modelling: Personal computer adoption and use as an illustration. *Technology Studies (Special Issue on Research Methodology)*, 2(2), 285–309.

Boritz, J. E., Carnaghan, C. and Alencar, P. S. (2014). Business modeling to improve auditor risk assessment: An investigation of alternative representations. *Journal of Information Systems*, 28(2), 231-256. https://doi.org/10.2308/isys-50809

Chountalas, P.T. and Lagodimos, A.G. (2019), Paradigms in business process management specifications: a critical overview, *Business Process Management Journal*, 25(5), 1040-

1069. https://doi.org/10.1108/BPMJ-01-2018-0023

Cohen, A. (2007). One nation, many cultures: A cross-cultural study of the relationship between personal cultural values and commitment in the workplace to in-role performance and organizational citizenship behavior. *Cross-cultural research*, 41(3), 273-300.

Cronbach, L. J. (1951)."Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.

Costa, P. and Mc Crae, R. R. (1992). Revised Neo personality inventory and Neofive factor inventory professional manual. Odessa, FL: psychological assessment resources.

Donnelly, D.P., Bryan, D.O. and Quirin, J.J. (2003), Auditor acceptance of dysfunctional audit behaviour: an explanatory model using personal characteristics, *Behavioural Research in Accounting*, 15(4), 87-110.

Dumas, M., La Rosa, M., Mendling, J. and Reijers, H. A. (2013). Fundamentals of business process management. Heidelberg. USA

Dunn, C. L., Gerard, G. J., Grabski, S. V., and Boss, S. R. (2017). Asymmetry in Identification of Multiplicity Errors in Conceptual Models of Business Processes. *Journal of Information Systems*, 31(1), 21-39. https://doi.org/10.2308/isys-51581

Enríquez de Salamanca Ros, F., Troyano Jiménez, J. A., and Romero Moreno, L. M. (2019). Using a business process management system to model dynamic teaching methods. *The Journal of Strategic Information Systems*, 28(3), 275-291. https://doi.org/10.1016/j.jsis.2018.07.002

Espinosa-Pike, M. and Barrainkua, I. (2016). An exploratory study of the pressures and ethical dilemmas in the audit conflict. *Revista de contabilidad*, 19(1), 10-20. https://doi.org/10.1016/j.rcsar.2014.10.001

Ferraris, A., Monge, F. and Mueller, J. (2018), Ambidextrous IT capabilities and business process performance: an empirical analysis, *Business Process Management Journal*, 24(5), 1077-1090. https://doi.org/10.1108/BPMJ-07-2017-0201

Fornell, C. and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50

Goenawan,C,M. Indarto,S,L (2021). Organizational Commitments and ITS Role In Moderating Factors of Audit Disfunctional Behavior. *International Journal of Business and Economy* . 3(4), 252-264

Hair, J.P., Black, J.P., Babin, J.P. and Anderson, R.E. (2019). Multivariate Data Analysis, Eighth Edition. Harlow: Cengage Learning, United Kingdom.

Harmon,P. (2010). The Scope and Evolution of Business Process Management. Handbook on Business Process Management 1, International Handbooks on Information Systems. Business Process Trends, San Francisco, CA, USA. https://doi.org/10.1007/978-3-642-00416-2_3

Henseler, J., Ringle, C. M. and Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20(1), 277–320.

Khalil, H. T., Khalaf, A. F. and Al-Jassam, N. N. H. (2021). The Role of External Auditng in Sustainability of The Company in The Shadow of The Concept of Accounting Security. *Academy of Strategic Management Journal*, 20(1), 1-8

Kelly, T. and Margheim, L. (1990). The Impact of Time Budget Pressure. Personality, and Leadership. *auditing a journal of practice & theory*, 9(2), 21-42.

Kochetova-Kozloski, N., Kozloski, T. M., and Messier Jr, W. F. (2013). Auditor Business Process Analysis and Linkages among Auditor Risk Judgments. *Auditing: A Journal of Practice and Theory*. 32(3), 123–139. https://doi.org/10.2308/ajpt-50413

Lagos, N., Mos, A. and Cortes-cornax, M. (2018), Towards semantically-aided domain specific business process modeling, *Data Technologies and Applications*, 52(4), 463-481. https://doi.org/10.1108/DTA-01-2018-0007

Lehnert, M., Linhart, A. and Roeglinger, M. (2017), Exploring the intersection of business process improvement and BPM capability development: A research agenda, *Business Process Management Journal*, 23(2), 275-292. https://doi.org/10.1108/BPMJ-05-2016-0095

Majeed, A., Lv, J. and Peng, T. (2019), A framework for big data driven process analysis and optimization for additive manufacturing, *Rapid Prototyping Journal*, 25(2), 308-321. https://doi.org/10.1108/RPJ-04-2017-0075

Malinova, M. and Mendling, J. (2018), Identifying do's and don'ts using the integrated business process management framework, *Business Process Management Journal*, 24(4), 882-899. https://doi.org/10.1108/BPMJ-10-2016-0214

Magner, N. Welker, R.B. and Campbell, T.L. (1996). Testing a model of cognitive budgetary participation- processes in a latent variable structural equations framework. *Accounting and Business Research*, 27(1), 41-51

Meidan, A., García-García, J. A., Escalona, M. J. and Ramos, I. (2017). A survey on business processes management suites. *Computer Standards & Interfaces*, 51(8), 71-86. https://doi.org/10.1016/j.csi.2016.06.003

Moss, E., Rousseau, D., Parent, S., St-Laurent, D. and Saintonge, J. (1998). Correlates of attachment at school age: Maternal reported stress, mother-child interaction, and behavior problems. *Child development*, 69(5), 1390-1405.

Mowday, R. T., Steers, R. M. and Porter, L. W. (1979). The measurement of organizational commitment. *Journal of vocational behavior*, 14(2), 224-247. https://doi.org/10.1016/0001-8791(79)90072-1

Nadarajah, D. and Syed A. Kadir, S.L. (2016), Measuring Business Process Management using business process orientation and process improvement initiatives, *Business Process Management Journal*, 22(6), 1069-1078. https://doi.org/10.1108/BPMJ-01-2014-0001

Oranefo, P,Ch (2022). *Auditors independence: It's Effect on non Audit Services (Case of South-Eset Zone) Nigeria*. Nnamdi Azikiwe University ,NIGERIA

Paino, H., Ismail, Z. and Smith, M. (2010), Dysfunctional audit behaviour: an exploratory study in Malaysia, *Asian Review of Accounting*, 18(2), 162-173. https://doi.org/10.1108/13217341011059417

Pamungkas, W. A. P. and Gantyowati, E. (2021). The Affecting Factors of Audit Quality with Earnings Surprise Benchmark Approach as a Measure of Audit Quality. *European Journal of Business and Management Research*, 6(4), 230-236. https://doi.org/10.24018/ejbmr.2021.6.4.983

Pulmberg, K. (2010). Experiences of implementing process management: a multiple-case study. *Business Process Management Journal*, 16(1), 93-113.

Paschek, D., Ivascu, L. and Draghici, A. (2018). Knowledge management–the foundation for a successful business process management. *Procedia-Social and Behavioral Sciences*, 238(22), 182-191. https://doi.org/10.1016/j.sbspro.2018.03.022

Pattanayak, S. and Roy, S. (2015). Synergizing business process reengineering with enterprise resource planning system in capital goods industry. *Procedia-Social and Behavioral Sciences*, 189(52), 471-487. https://doi.org/10.1016/j.sbspro.2015.03.194

Pradabwong, J., Braziotis, C., Tannock, J.D.T. and Pawar, K.S. (2017), Business process management and supply chain collaboration: effects on performance and competitiveness,

Supply Chain Management, 22(2), 107-121. https://doi.org/10.1108/SCM-01-2017-0008

Rosing, M. V., Scheel, H. V. and Scheer, A. W. (2014). *The Complete Business Process Handbook*. Denmark

Rotter, JB. (1966). Generalization expectation for internal versus external of reinforce psychological monograph. *Journal of research in personality*, (18), 609-625

Rumble, R. and Mangematin, V. (2015), Business Model Implementation: The Antecedents of Multi-Sidedness, *Business Models and Modelling (Advances in Strategic Management)*, 33, (Emerald Group Publishing Limited, Bingley), 97-131. https://doi.org/10.1108/S0742-332220150000033021

Shafer, W.E. and Wang, Z. (2010), Effects of ethical context on conflict and commitment among Chinese accountants, *Managerial Auditing Journal*, 25(4), 377-400. https://doi.org/10.1108/02686901011034180

Sinambela, E. A., and Mardikaningsih, R. (2021). Integritas Auditor dan Peranannya Terhadap Pembentukan Komitmen Organisasi. *Jurnal Simki Economic*, 4(2), 112-120. https://doi.org/10.29407/jse.v4i2.100

Spector, P. E. (1988). Development of the work locus of control scale. *Journal of occupational psychology*, 61(4), 335-340. https://doi.org/10.1111/j.2044-8325.1988.tb00470.x

Tiranda, I. S. A. and Juliarto, A. (2022). Safeguarding Auditors' Independence When Performing Audit and Non-Audit Services: Evidence from Indonesian Audit Firm. *Diponegoro Journal of Accounting*, 10(4), 2337-3806

Vom Brocke, J., Schmiedel, T., Recker, J., Trkman, P., Mertens, W. and Viaene, S. (2014), Ten principles of good business process management, *Business Process Management Journal*, 20(4), 530-548. https://doi.org/10.1108/BPMJ-06-2013-0074

Wahyuni, N. and Isniawati, A. (2021). Analisis faktor-faktor kemampuan auditor mendeteksi kecurangan dengan memoderasi etika profesi. *Journal of Business and Information Systems*, 3(2), 75-86.

Yessie, A. (2021). Dysfunctional Audit Behavior Determinants. *International Journal of Environmental, Sustainability, and Social Sciences*, 2(3), 318-327

Zelt, S., Recker, J., Schmiedel, T. and vom Brocke, J. (2019), A theory of contingent business process management, *Business Process Management Journal*, 25(6), 1291-1316. https://doi.org/10.1108/BPMJ-05-2018-0129

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Do Real Options of Cash Holdings Matter? Evidence from Tehran Stock Exchange

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Abstract

Subject and purpose: This paper investigates the relationship between the real option component of cash holding and stock excess return on the Tehran Stock Exchange. The real option component of cash holding indicates the amount of retained cash not affected by the market and other variables and optionally managed by the management.

Methodology: Two hypotheses were developed and tested, one at the stock level and another at the portfolio level. A sample of 121 companies on the Tehran Stock Exchange for 10 years from 2012 to 2021 was selected and a multivariate regression model was used to analyze the gathered data.

Findings: Findings showed a positive relationship between the real option component of cash holding and stocks' excess return. however, this relationship is stronger in portfolios with a lower real option component of cash holding.

Conclusion: Managers can gain excess return by holding more cash than their operational and investment needs, but this has a reverse effect as the component reaches higher levels.

Keywords: Stock Return, Excess Return, Cash Holding, Real option component of cash holding, Real Options Model.

1. Introduction

One of the questions which is in the attention of company managers almost every day is the level of cash retention. Cash retention strategies of companies express management concerns and determine the future of companies. In inefficient markets, companies tend to hold cash for future transactions and avoid risk. Maintaining large amounts of cash, on the one hand, increases opportunity costs and leads to a decrease in shareholders' wealth due to the rejection of projects with positive net present value, and on the other hand, keeping less than the optimal amount may also cause disruption in the operating cycle and business of the company. The optimal level of cash holding indicates a balance between the costs and benefits of holding cash. Firms determine the optimum level of cash holding to achieve many benefits that are positively reflected in the reputation and financial position of enterprise, which may gain the confidence of shareholders, investors, and other stakeholders, and thus be reflected in shareholders' share value and wealth (Ye, 2018). The investigations show that cash held in the world's prominent stock exchanges after the recent financial crisis. (Chen, Jia, and Sun, 2016) Companies maintain cash for two purposes: firstly, they hold cash for their daily operations with different motives of transactional, precautionary, tax, and agency. (Bates, Kahle, and Stulz, 2009) They also hold cash to invest in projects with positive net present value. Companies often invest their cash in various projects to obtain higher returns. Hence, cash holdings are like real options for enterprises to remain in the market or expand when profitable projects emerge. Therefore, the real option component of corporate cash holdings provides the enterprises with the flexibility to avoid operational distress or to expand operations when appropriate. Kisser (2013) presents an explicit valuation framework of cash holdings and show cash has a real option value. The real option component of cash holding is the amount of cash holding that is not affected by the market and other operational variables and is hold selectively and voluntarily by the management. Hence, it can represent the management's attitude towards the future economic situation. (Chen et al, 2016)

Real options are not directly observable and previous studies have provided several real option proxies. Chen et al (2016) Bates et al (2009) and Zhang (2005) argue that book to market ratio significantly explain cash holdings. Cao, Simin, and Zhao (2008) showed a relationship between corporate growth options and idiosyncratic volatility. In this study to extract the real option component of corporate cash holdings, we used the method developed by Da, Guo, and Jagannathan (2012). Specifically, we regressed each enterprises cash holdings on three proxies of book to market ratio, idiosyncratic volatility, and return on assets without the intercept to extract the real option component of cash holdings.

Previous studies have shown noticeable increase in the level of cash holding in many countries. Cash holding in stock market listed companies in 45 countries has risen approximately from 9% in 1995 to more than 37% in 2017 (Rashed and Ghoniem, 2022). Meanwhile, the average cash holdings among Iranian listed companies is in a lower levels compared to other countries. Companies listed in the Tehran Stock Exchange maintain on average about 6.7% of their assets in form of cash and equivalents such as short-term investments. While this figure is equal to 8.1% of total assets in American companies and 9.9% of total assets in British companies. (Agayi et al, 2009)

Therefore, our research question is first of all to measure the real option component of cash holdings in Tehran Stock Exchange, and second, to test the Tehran Stock Exchange listed companies' managers' perceptions about the future economic situation and whether they can achieve the additional returns by holding extra cash. In order to increase the power of the test, we also investigated the research question by developing homogeneous portfolios in terms of cash holdings.

Our study is different in investigating the relationship between cash holdings and stock returns from previous studies carried out on the Tehran Stock Exchange listed companies in two ways: first, we

attempt to measure excess cash holdings of companies using a novel method developed by Da et al (2012); second, we attempt to further investigate the relationship by developing portfolios of homogeneous companies.

Literature Review

Three theoretical models have been proposed in literature for corporate cash holding decisions: Trade-off theory, Pecking order theory and Free-cash flow theory. These theories have been described as follow.

The trade-off theory identifies two costs of holding cash. Assuming management maximizes shareholder value, the main cost that holding cash bears is the opportunity cost (Ferreira & Vilela, 2004). This cost is the difference between the return on cash and the interest that would have to be paid to finance an additional dollar of cash (Dittmar, Mahrt-Smith, and Servaes, 2003). The second cost, is agency cost of holding cash. Assuming managers don't maximize shareholders' value, they increase their cash holdings in order to be able to increase their discretion. In this way, cash is worth less when agency problems between insiders and outside shareholders are greater. Therefore, companies that do not protect the rights of shareholders well, maintain more (Dittmar and Mahrt-Smith, 2007; Pinkowitz, Stulz, and Williamson, 2006).

The holding cash has benefits due to two motives of transaction and precautionary. The main advantage of holding cash is that when payments due, the firm does not have to liquidate assets. Therefore, firms will increase cash holdings when liquidating assets will bear more costs and will tend to maintain lower amount of cash when its opportunity costs are high (Bates et al., 2009, Dittmar et al., 2003, Baumol, 1952, Miller and Orr, 1966).

According to the pecking order theory (Myers, 1984, Myers and Majluf, 1984) firms in order to minimize financing costs, should finance investments in the following order: first with retained earnings, second with safe debt, third with risky debt, and finally with equity. So, based on this theory, there is no optimal amount of cash for firms, and just investment needs alongside with retained earnings would determine suitable cash level.

Free-cash flow theory (Jensen, 1986) states when investment opportunities are few, managers would maintain cash instead of paying it out to shareholders. By retaining free cash flow, managers reduce their need to the capital markets and would be free of capital markets monitoring and restrictions.

Cash Holding Determinants

Meanwhile many studies have investigated the relationships that several characteristics of corporations have with cash holdings such as sales growth, firm size, financial leverage, and etc.

Firm size: Some argue that there is a negative relationship between firm size and cash holding, since some enterprises especially small ones are more exposed to irregular risks and borrowing restrictions, and therefore managers tend to maintain a higher level of cash (Maheshwari and Rao, 2018). On the other hand, some argue that firm size has a positive relationship with the level of cash holding due to agency problems, since it would increase the management discretion (Opler, Pinkowitz, Stulz, and Williamson, 1999).

Dividend Payments: the relationship between dividend payments and cash should be negative, since firms that currently pay dividends can raise funds at low cost by reducing their dividend payments (Al-Najjar & Belghitar, 2011, Opler et al., 1999), Drobetz and Grüninger, 2007).

Cash flow volatility: based on previous empirical research, there is a positive relationship between cash holdings and cash flow uncertainty (Bates et al., 2009; Saddour, 2006; Ferreira and Vilela, 2004; Opler et al., 1999).

Net working capital: net working capital mainly consists of liquid asset that substitute for cash. The more these liquid assets, the less need of firms to rely on capital markets to finance funds (Al-Najjar, 2013, Bates et al., 2009, Ferreira and Vilela, 2004).

Capital expenditures: according to *Bates et al.(2009):* "*if capital expenditures create assets that*

can be used as collateral, capital expenditures could increase debt capacity and reduce the demand for cash".

Financial leverage: empirical evidence on the relationship between cash holdings and financial leverage is mixed. Some evidence show that they have negative relationships (Ozkan & Ozkan, 2004, Al-Najjar and Belghitar, 2011, Opler et al., 1999), and some show a positive relationship between them (Bates et al., 2009). In line with the transaction cost theory, highly levered firms have high cost of money and therefore hold less cash (Ferreira and Vilela, 2004, Kim, Mauer, & Sherman, 1998).

Growth opportunities: according to the trade-off theory, the relationship between cash holding and growth opportunities is positive. Since firms with high investment opportunities have a more uncertainty about future cash flows , they maintain more cash to make sure that the enterprise will be able to finance its investment needs when the internal retained cash is at low levels (Kim, 2015; Chung, Kim, Kim, & Zhang, 2015; Chen et al., 2018).

Profitability: empirical research findings show an association between firm profitability and cash holding. In line with pecking order theory, firms with higher financial results retain higher levels of liquidity to internally finance their future needs (Opler et al., 1999, Ferreira and Vilela, 2004, Al-Najjar and Clark, 2017).

Overall, while literature shows an association between cash holding with some of its determinants, there is a mixed evidence on another part of determinants of cash holdings. No doubt that for-profit enterprises seek profitable investment opportunities in order to maximize their shareholder value and cash is an essential factor for their success in taking the opportunities. Hence, many studies have been done to investigate whether companies with cash holdings have been successful in fulfilling their mission of value creation or there is no difference between them and those companies that have not reserved cash. Some of them and their findings are as follow.

Chen et al (2016) examined the relationship between the amount of cash held and stock returns in companies listed on the American Stock Exchange. Based on three empirical indicators (the ratio of book value to the market value of equity, specific volatility of stock returns, and return on assets), they extracted the part of real option component of cash holding. The results of their research indicate that this part of cash decreases with the increase of GDP and decreases with its increase. Also, companies with real option component of cash holding will earn more returns in the future. This result shows that generally, investors in unfavorable economic conditions prefer companies that keep more cash.

Rashid (2016) examined the relationship between cash holding and stock returns at the level of small and large companies and finally came to the conclusion that small companies hold more cash due to their weak credit status and lack of ease of access to capital markets, and this has a positive effect on their stock returns. In the case of large companies, this negative relationship was observed but it was insignificant.

Chuan et al. (2019) examined the relationship between cash holdings and average stock returns in NYSE. They empirically verified that the relationship was positive and robust to the adjustment of risk, the construction of cash holdings portfolios, and the weighting scheme of portfolio returns. Overall, their results indicated that the cash holding effect did not present a new asset-pricing regularity, but that it was a manifestation of existing anomalies closely related to mispricing.

Garavito and Chion (2021) examined the relationship between cash holdings and expected equity returns in Pacific alliance countries and found that there was a positive relationship between them. Their findings suggested that corporate liquidity contains underlying information that contributes to explain the expected equity return, which, if ignored, can produce quite misleading results.

Rashed and Ghoniem (2022) explored the impact of cash holdings on stock returns in small and medium enterprises on Egyptian Stock Exchange and showed a

statistically significant and negative effect of cash holding on stock returns in small and medium enterprises on the Egyptian Nile Exchange. Further, the evidence shows that firms with higher levels of cash holding have higher investment alternatives and then lower stock returns.

According to above mentioned literature, we developed two hypotheses to test the relationship between real option component of cash holding by companies and their stocks' excess returns as follow:

H1: The real option component of cash holding has a significant positive relationship with excess stock return.

H2: Real option component of cash holding have a significant positive relationship with excess stock returns in portfolios with different sizes in terms of real option component of cash holding.

Methodology

The sample consists of 121 listed companies on the Tehran Stock Exchange for a period of 10 years from 2012 to 2021, with a total number of 1210 observations. From the original data, some companies were excluded because their activity are in the service sector, and some of them has a fiscal year other than the end of Esfand (Final month based on Iranian calendar).

The required data was collected from the Tehran Stock Exchange official sites including TSETMC.com and Codal.ir. Panel data analysis via OLS and GMM was used to analyze data.

In order to test the second hypothesis, first, the sample companies were divided into 5 portfolios (portfolio number 1 with the lowest amount and portfolio number 5 with the highest amount) based on the ratio of the real option component of cash holding to their assets and then the relationship between this variable and the additional returns of stocks was investigated by comparing the first and fifth baskets.

The model used to test the first hypothesis is as follows: (Chen et al, 2016)

$$R_{it} - R_{ft} = \alpha_{it} + \beta_{i,t}\, ROCH_{i,t} + \varepsilon_{i,t} \quad (1)$$

in which:

R_{it}: Stock rate of return, and is calculated by the following formula:

$$R_{it} = \frac{(1+\alpha_{it})\times P_{it} - P_{i\,(t-1)} + D_{it} - M}{P_{i\,(t-1)}} \quad (2)$$

P_{it}: Stock price

D_{it}: Dividend

M: Cash contribution of stockholders

$\propto_{it}$: Capital increase ratio

R_{ft}: The risk-free rate of return, which is considered as equivalent to the interest rate of the central bank's bonds.

$\boldsymbol{ROCH_{i,t}}$: Real option component of cash holding, which is calculated by using three empirical indicators (the ratio of book value to the market value of equity, special volatility of stock returns and return on assets). In order to measure this variable, regression model (3) was first estimated. (Da et al, 2012)

$$\mathrm{CH_{i,t}} = \beta_1 \mathrm{BM_{i-M,it}} + \beta_2 \mathrm{IVOL_{i-M,it}} + \beta_3 \mathrm{ROA_{i-M,it}} + \varepsilon_i \quad (3)$$

$\mathrm{CH_{i,t}}$: Cash holding; which is the ratio of cash and short-term investments to total assets.

$\mathrm{BM_{i-M,it}}$: The difference between the ratio of the book value to the market value of the company's equity and the market.

$\mathrm{ROA_{i-M,it}}$: The difference between the rate of return on company assets (the ratio of net profit to total assets at the beginning of the period) and the rate of return on market assets

$\mathrm{IVOL_{i-M,it}}$: The difference between the specific fluctuations of the company's stock return and the specific fluctuations of the market return, which was measured using the three-factor model of Fama and French (1993) as described in relation (4):

$r_{i,t} - r_{m,t} = \alpha_{i,t} + \beta_{MRKTit}MRKT_t + \beta_{SMB,it}SMB_{i,t} + \beta_{HML,it}HML_{i,t}$

(4)

in which:

$r_{i,t}$: Monthly stock returns of company i

$r_{m,t}$: Monthly stock return of market

$MRKT_t$: Capital market risk premium, which is the difference between the market return and the risk-free return (rate of return on the central bank's bonds considered as the risk-free rate of return).

$SMB_{p,t}$: Size factor which is the difference between the return of portfolio consisting of stocks of large companies and portfolio consisting of stocks of small companies and was measured using the following relationship:

$$SMB = \frac{(S/L + S/M + S/H)}{3} - \frac{(B/L + B/M + B/H)}{3}$$

(5)

$HML_{i,t}$: Value factor, which is the difference between the return of the portfolio consisting of shares of highly capitalized (book value to market value ratio) and portfolio of shares of low capitalized companies and was calculated using the following relationship:

$$HML = \frac{(S/H + B/H)}{2} - \frac{(S/L + B/L)}{2}$$

(6)

The variance of the remaining values of model (4) ($Var\varepsilon_{i,t}$) represents the risk of specific fluctuations in the company's stock returns ($IVOL_{i-M,it}$).

It should be noted that the variables related to the market were calculated based on the weighted average according to the value of the companies. After determining the coefficients and estimating the model (3), the value of the real option component of cash holding (ROCH) was obtained through the following relation:

$$ROCH_{i,t} = \overline{\beta_1}BM_{i-M,it} + \overline{\beta_2}IVOL_{i-M,it} + \overline{\beta_3}ROA_{i-M,it}$$

(7)

And the model used to test the second hypothesis of the research, was the three-factor model of Fama and French (1993), along with the effects related to the real option component of cash holding, as follows:

$$R_{p,t} - R_{ft} = \alpha_{p,t} + \beta_{1,pt}MRKT_t + \beta_{2,pt}SMB_t + \beta_{3,pt}HML_t + \beta_{4,pt}\,ROCH_t + \varepsilon_{p,t}$$

(8)

in which:

$R_{p,t}$: Portfolio return in the period t, (sample was divided into 5 portfolios according to their real option component of cash holdings level).

Findings

The summary of descriptive statistics of research variables is as follows.

As can be seen in the table above, the average abnormal stock return is equal to 0.284 and it indicates an annual return of 28% in excess of the risk-free annual return. The values of skewness coefficient (1.606) and kurtosis coefficient (1.415) of this variable indicate the normality of the distribution of this variable. The obtained results show that the average real option component of cash holding is equal to approximately 3% of the total assets of the sample companies.

Table (2) shows the results of diagnostic test to select appropriate regression model. Panel data, and fixed effects model are the most appropriate.

Table (3) represents the regression model analysis for the first hypothesis.

It is noted that the coefficient related to the variable of real option component of cash holding is equal to 5.359 and it is statistically significant (t=3.519), which means a positive relationship between this variable and the dependent variable of excess stock returns. Therefore, the first hypothesis of the research is not rejected.

According to the value of t-statistics of different portfolios and the level of significance obtained, it can be seen that there is a positive and significant

relationship between the real option component of cash holding and the additional return of stocks in different portfolios.

However, the comparison of the relationship between real option component of cash holding and the abnormal stock return in the portfolios with the lowest and highest cash holding is considerable. The value of the t-test is 2.415 and the significance level obtained is less than 5%, shows that the difference of relationships between these portfolios are meaningful. In other words, the relationship between research variables in the first basket is more than the fifth basket. Therefore, the second research hypothesis is rejected at the 95% confidence level.

Table (1): Descriptive Statistics

Var.	Ave.	Med.	Std.	Skew.	Kurt.	Min.	Max.
Ri_Rf	0.284	0.109	1.324	1.606	1.415	-0.658	5.668
ROCH	0.029	0.024	0.032	0.832	1.173	-0.035	0.127
MRKT	0.114	0.000	0.403	0.456	-0.940	-0.409	0.857
SMB	0.053	0.057	0.298	0.458	0.246	-0.464	0.697
HML	-0.509	-0.353	0.387	-0.993	-0.127	-1.360	-0.081

Table (2): Diagnostic Tests

Test	Value	P-Value	Result
F Limer	***2.282	0.000	Panel Data
Hausman	***13.627	0.004	Fixed Effects Model

Table (3): Regression Model

Variable	Coefficient	t-statistic	P value
C	0.406	5.104	0.000
ROCH	5.359	3.159	0.000
F	*** 4.149	R2	0.530

Table (4): Portfolios Regression Models

Portf.	a	MRKT	SMB	HML	ROCH	R^2
1	0.493 20.147 ***	0.241 6.140 ***	0.009 1.807 ***	-0.050 -1.284	3.543 6.033 ***	0.619
2	0.575 22.276 ***	0.173 4.151 ***	0.032 1.652 *	0.058 1.450	4.271 6.453 ***	0.519
3	0.579 22.320 ***	0.205 4.809 ***	0.082 1.391	0.084 2.124 *	2.810 5.044 ***	0.553
4	0.559 19.549 ***	0.234 5.227 ***	0.098 1.580	0.045 1.038	2.446 3.780 ***	0.448
5	0.514 20.603 ***	0.258 6.392 ***	0.079 1.377	-0.023 -0.600	2.625 5.313 ***	0.598
1-5	0.021 0.606	0.017 0.304	-0.020 0.252	0.027 0.490	-0.918 2.415 ***	

Robustness test

To examine the robustness of the relationship, we used two approaches. First, we used portfolio analysis (Tze Chuan et al, 2019). We examined the relationship by developing homogeneous portfolios based on their real option cash holdings size, as presented through second hypothesis above. Second, we substituted the

robustness of the cash holding effect can be checked by replacing the real option component of cash holdings (ROCH) value with an alternative measure, that is the ratio of the real option component of cash holdings to total assets (ROCHtA) (Thakur & Kannadhasan, 2019; Shehata & Rashed, 2021; Rashed & Ghoniem, 2022). Statistical findings in table (5) restates the relationship between real option component of cash holdings and stocks' excess return.

Table (5): Regression Model -Robustness Check

Variable	Coefficient	t-statistic	P value
C	0.297	3.985	0.005
ROCHtA	3.301	2.044	0.003
F statistic	***3.001	R2	0.421

Conclusion

In this research, an attempt was made to investigate the relationship between the independent variable of the real option component of cash holding and the dependent variable of the additional return on shares of companies listed in Tehran Stock Exchange at two levels of stocks and stock portfolios. Based on the findings, it was observed that there is a relationship between the two mentioned variables at the stock level and with 95% confidence. In other words, at the 95% confidence level, it can be claimed that companies that keep more discretionary cash earn more additional returns. This research finding is consistent with the findings of Chen et al. (2016).

But at the level of the stock portfolio, to some extent other findings were obtained. It was observed that there is a relatively stronger positive relationship between the research variables in the portfolios with less real option component of cash holding. In other words, in companies with a higher real option component of cash holding, there is a weaker relationship between real option component of cash holding and excess return, and it seems that high retention levels have a negative and reducing effect on excess stock return.

The research findings are partially consistent with the findings of Azimi and Sabbagh (2013) that holding excess cash despite the current levels of cash in the company has a negative relationship with the value of the company. This compliance is due to the fact that a downward but not negative relationship was observed between the real option component of cash holdin and additional returns. Also, VakiliFard and SoroushYar (2013) found that keeping surplus funds improves the company's performance, but the market is unable to reflect it, and the findings of the current research are compatible with their findings only in baskets with high real options to keep cash funds. It can be imagined to some extent that they show relatively lower additional efficiency. Therefore, it seems that the findings are converging regarding the real option of cash holding at high levels and its minimal or low relationship with excess stock returns, but divergence is observed regarding the relationship between the two variables at lower levels.

But at the same time, it seems to be consistent with the findings of Rashid (2016). His study led to the conclusion that in small companies due to their weaker credit status, keeping cash has a positive and significant effect on stock returns, but such an effect is not observed in large companies. Although the amount of real options to hold cash is not necessarily the same as that of small companies, we will probably see lower amounts of cash in small companies.

The findings of the research re-emphasize the real options of cash holding in order to use opportunities and deal with crises and increase additional returns for managers, and in addition, it is suggested that they pay attention to the additional returns due to the decreasing effect of the real option component of cash holding.

According to the findings of the research, the real cash holding has a positive relationship with excess stock returns, but this relationship is stronger in lower values than in high values. It seems that there is an optimal point for the amount of cash holding in which the additional efficiency reaches its maximum level, so it is suggested to carry out research to identify the optimum point and the factors affecting it.

References

Agayi, MohammadAli; Nezafat, AhmadReza; Nazemi Ardakani, Mahdi; & Javan, Ali Akbar (2009) "Factors Affecting the maintenance of Cash Balances in Tehran Stock Exchange Listed Companies" Financial Accounting Researches, Issue 1 and 2, 53-70.

Al-Najjar, B. (2013). The financial determinants of corporate cash holdings: Evidence from some emerging markets. International Business Review, 22(1), 77-88.

Al-Najjar, B.; Belghitar, Y. (2011) Corporate cash holdings and dividend payments: Evidence from simultaneous analysis, Managerial and Decision Economics, 32 (2011), pp. 231-241

Al-Najjar, B.; Clarck, E. (2017) Corporate governance and cash holdings in MENA: Evidence from internal and external governance practices, Research in International Business and Finance, 39 (2017), pp. 1-12

Azimi, Majid; Sabbagh, Manije (2014) "Value Connection of Cash Holding in Tehran Stock Exchange Companies" Financial Accounting Quarterly Journal, Issue 21, 129-152.

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to? The Journal of Finance, 64(5), 1985-2021.

Baumol, W. (1952) The transactions demand for cash: An inventory theoretic approach, Quarterly Journal of Economics, 66 (1952), pp. 545-556.

Charles Cao, Timothy Simin and Jing Zhao (2008) Can Growth Options Explain the Trend in Idiosyncratic Risk?, The Review of Financial Studies , Vol. 21, No. 6, pp. 2599-2633.

Chen, Jiun-Lin., Jia, Zi., Sun, Ping-Wen. (2016). Real option component of cash holding, business cycle, and stock returns. International Review of Financial Analysis. Volume 45, Pages 97–106.

Chung, K. H., Kim, J. C., Kim, Y. S., & Zhang, H. (2015). Information asymmetry and corporate cash holdings. Journal of Business Finance & Accounting, 42(9-10), 1341-1377

Da, Z., Guo, R.J., Jagannathan. R., (2012). CAPM for estimating the cost of equity capital: interpreting the empirical evidence. Journal of Financial Economics 103 (1), 204–220

Dittmar, A.; & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. Journal of Financial Economics, 83(3), 599-634.

Dittmar, A.; Mahrt-Smith, J.; & Servaes, H. (2003). International Corporate Governance and Corporate Cash Holding, Journal of Financial and Quantitative Analysis, 38, 111–133.

Drobetz, W.; Grüninger, M.C. (2007) Corporate cash holdings; Evidence from Switzerland, Financial Markets Portfolio Management, 21 (2007), pp. 293-324.

Fama, E.F., French. K.R., (1993). Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33 (1), 3–56.

Ferreira, M. A., & Vilela, A. S. (2004). Why do firms hold cash? Evidence from EMU countries. European Financial Management, 10(2), 295-319.

Garavito, Judith Vergara; Chion, Sergio J. (2021) "Relationship between cash holdings and expected equity returns: evidence from Pacific alliance countries" Journal of Economics, Finance and Administrative Science, vol.26 no.51.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. The American Economic Review, 76(2), 323-329.

Kim, H. (2015). Contemporary Financial Profile and Its Implications on the Level of Corporate Cash Holdings for Korean Chaebol Firms. Journal of the Korea Academia-Industrial Cooperation Society, 16(6), 3870-3881.

Kim, C.; Mauer, D.C.; Sherman, A.E. (1998) The determinants of corporate liquidity: Theory and evidence, Journal of financial and Quantitative Analysis, 33 (1998), pp. 335-358

Kisser, M., (2013). The real option value of cash. Review of Finance 17 (5), 1649-1697.

Maheshwari, Y., & Rao, K. V. (2017). Determinants of corporate cash holdings. Global Business Review, 18(2), 416-427

Miller, Merton H.; Orr, Daniel (1966) A Model of Demand for Money by Firms. Quarterly Journal of Economics, Vol. 80: 413-435.

Myers S (1984) The Capital Structure Puzzle, Journal of Finance, Vol. 39: 572-592.

Myers, Stewart C.; Majluf, Nicholas S. (1984) Corporate financing and investment decisions when firms have information that investors do not have, Journal of Financial Economics, Volume 13, Issue 2, 187-221.

Opler, Tim; Pinkowitz, Lee; Stulz, ReneH; Williamson, Rohan (1999). The Determinants and Implications of Corporate Cash Holding, Journal of Financial Economics 52, 3-46.

Ozkan, Aydin; Ozkan Neslihan, (2004). Corporate Cash Holding: An Empirical Investigation of UK Companies, Journal of Banking & Finance, 28, 2103–2134.

Pinkowitz, Le; Stulz, René; Williamson, Rohan (2006) "Does the Contribution of Corporate Cash Holdings and Dividends to Firm Value Depend on Governance? A Cross-country Analysis", Journal of Finance, vol. 61, issue 6, 2725-2751

Rahimian, Nezam-o-Aldin; Gorbani, Mahmud; Shabani, Keyvan (2013) "Relationship between Holding Surplus Cash and Stock Value in Tehran Stock Exchange" Financial Accounting Empirical Researches, Issue 40, 151-175.

Rashed, Ahmed; Ghoniem, Waleed (2022). "The impact of cash holding on stock returns in small and medium enterprises on the Egyptian Nile Stock Exchange" Investment Management and Financial Innovations, 19(3), 83-92.

Rashid, Muhammad Khalil, (2016) The Effect of Corporate Cash Holding on Stock Return. Available at SSRN: https://ssrn.com/abstract=276188592

Shehata, W., & Rashed, A. (2021). Accounting Conservatism, Information Asymmetry and Cash Holdings. Journal of Accounting, Business and Management (JABM), 28(1), 63-72.

Thakur, B. P. S., & Kannadhasan, M. (2019). Corruption and cash holdings: Evidence from emerging market economies. Emerging Markets Review, 38, 1-17

Tze Chuan 'Chewie' Ang, F.Y. Eric C. Lam, Tai Ma, Shujing Wang, K.C. John Wei, (2019) "What is the real relationship between cash holdings and stock returns?" International Review of Economics & Finance, volume 64, 513-528,

VakiliFard, Hamid Reza; SorushYar, Afsane (2012) "Evaluation of Effect of diversion from Optimal level of Cash Holding on Performance and Future Return in Tehran Stock Exchange Companies" Financial Accounting Quarterly Journal, Issue 15, 117-133.

Ye, Y. (2018). A literature review on the cash holding issues. Modern Economy, 9(6), 1054-1064.

Zhang, L. (2005) The value premium, Journal of Finance 60 (1), 67–103