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Structure of second page until the end of manuscript is as follow:

- *Introduction* Some paragraphs contain explaining the problem, literature review, object (purpose), importance and necessity of it.
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- *Conclusion* includes a summary of the problem, provide a summary of the results and overall conclusion and recommendations based on the results (policy recommendations is necessary only in applied research and, if necessary, recommendations for future research accordant with the research limitations or how development of current research;
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Editor's Note

I am pleased to announce that the Ferdowsi University of Mashhad is publishing Iranian Journal of Accounting, Auditing & Finance (IJAAF). On behalf of the board of the IJAAF and my co-editors, I am glad to present the Volume 1, Issue 1 of the journal in December 2017; the journal will publish four issues in a year. The board includes experts in the fields of accounting, finance and auditing, all of whom have proven track records of achievement in their respective disciplines. Covering various fields of accounting, *IJAAF* publishes research papers, review papers and practitioner oriented articles that address significant issues as well as those that focus on Asia in particular. Coverage includes but is not limited to:

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Yours faithfully,

Mahdi Moradi

Editor in Chief

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Content

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Research Article

The Systematic Risk Behavior in the Life Cycle Stages of Companies and the Moderating Effect of Managerial Ability

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Abstract

Firm characteristics influence systematic risk and, according to life cycle theory, these characteristics change over the life cycle following a predetermined pattern. Therefore, changes in systematic risk are expected following a predicted pattern. Given the different nature of companies and the different abilities of managers in various industries and different stages of the life cycle, it can be assumed that systematic risk in different industries and the ability to manage to affect this relationship. Therefore, the purpose of this paper is to investigate the systematic risk behavior over the life cycle and the moderating role of management ability. So, the systematic risk of 124 companies listed on the Stock Exchange during the years 2011-2017 and during different stages of the life cycle using three models of Anthony and Ramesh (1992), Dickinson (2010) and Saravia et al. (2016) and methodology Data were analyzed by simple regression and T-Student. The results show that corporate life cycle risk behaves differently in some industries such as basic steel and sugar and food industries except sugar. The management ability as a moderator relationship over the whole company rather than industry-level is effective in this relationship.

Keywords: Systematic Risk, Managerial Ability, Life Cycle, Financial Leverage.

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1. Introduction

The study of systematic risk factors (market equity beta) is one of the most important accounting and financial companies (Hong And Sarkar,2007; Schlueter and Silver, 2014). Market participants widely use market equity beta for various purposes (Graham and Harvey, 2001; Groenewold And Fraser, 2000). According to portfolio theory, the relevant risk is systematic, and investors can reduce non-systematic risk through diversification. However, this risk is affected by several factors. To date, several determinants and influences on systematic risk have been identified in the relevant literature, including the effect of operational and financial risk (Gahlon And Gentry, 1982; Hamada, 1972), the effect of intrinsic business risk (Chung, 1989; Griffin and Dugan, 2003) and the effect of default and developmental authority (Hong and Sarkar, 2007).

Based on these studies, it can be stated that beta is a function of company characteristics such as asset structure, capital structure, and other characteristics. It is reasonable to expect the beta to conform to a specific pattern throughout the life cycle. According to company life cycle theory, the structure of corporate change is following a predictable pattern. It should also be noted that companies in the industry have a different predictable pattern, so it can be argued that each company, in each industry and during each stage of the life cycle of that industry can have different systematic risk and that changes over a pattern over the life cycle of the company. The management ability and characteristics in response to the company's acceptable level of risk in the capital market have always been discussed, especially after the financial crisis in the global financial markets. The US financial crisis between 2007-20078, the recent Greek debt crisis of 2013-2010, and the financial crisis in the Iranian capital market changed attention to management and provided research area about management capabilities and provided his characteristics in dealing with company risks. A capable manager is a person who also shows his ability in terms of risk response very well. Also, to achieve the highest return during the company's life cycle, managers should have different functions and abilities during the life cycle stages. Risk has been studied in different studies, but no distinction is made between systematic and non-systematic risk. Also, in most studies that examine risk and life cycle, different industries are not considered. While in different industries, products with different technologies and competitiveness have different life cycles and risks. Due to the importance of systematic risk and lack of attention to the pattern of change during the life cycle in Iranian research, as well as different functions of managers in the life cycle and different industries, so in this research, we intend to examine the pattern of systematic risk change and the performance of managers in each industry during the life cycle of the company. In other words, this study seeks to answer the following questions

1- How to change systematic risks during the life cycle of companies

2- How to change systematic risks during the life cycle of different companies in one industry

3- The effect of different life cycle models on the above relationships

4- The moderating effect of management ability on how systematic risks change during the life cycle of companies in one industry

2. Literature Review

In the following, first, a brief explanation about systematic risk and the life cycle of the company and its models is given. Finally, the literature related to systematic risk during the life cycle of the company is reviewed.

2.1. Systematic risk

In financial knowledge and economics, the risk is divided into two categories:

systematic and non-systematic risk. Systematic risk is defined risk as a result of general market factors, and at the same time, affects the total price of securities in the financial market. One of the effective factors that create this type of risk is economical, political, and social developments such as exchange rate changes, business cycles, monetary and fiscal policies. Systematic or unavoidable risk is not specific to one or more companies. Still, it is related to the whole market, and among the factors affecting it can be macro government policies, exchange rate changes, inflation, business cycles, etc. According to the new stock portfolio theory, unsystematic risk can be eliminated, but the systemic risk remains. The beta index is an indicator for measuring systemic risk. However in studies such as Hill and Stone (1980); Mandelker And Rhee(1984); Mensah (1992); And Scotter and Sears (2014) have stated that this risk is also affected by the structure and characteristics of companies (operational, financial and inherent business risk). Companies' characteristics change during the life cycle, so we can expect that risk is related to the life cycle. First, a brief definition of the life cycle is presented, and then the relationship between these two variables is discussed.

2.2. Life cycle

One of the topics that have entered the various areas related to the company in the last decade is the life cycle of the company. According to company life cycle theory, companies' financial and other economic characteristics change over time according to a clear and predetermined pattern. This pattern was identified by leading economists such as Schumpeter (1943). The economist believes that a company starts at the beginning of its activity as an entrepreneur (in terms of innovation) and eventually ends like a company with bureaucratic management. To describe the life cycle, financial and non-financial characteristics related to the company are used, separating and classifying each stage from another stage in the company's life cycle stages. The following are four stages of a company's life cycle that are common in economic literature.

- **Startup stage**: In this stage, the young company is small, and its owner is in the founders' hands (Stepanyan, 2012). Such companies have other characteristics such as high product innovation, informal organizational structure (Moores & Yuen, 2001), low assets, low cash flows from operating activities, and profitability (Karami, and Amrani,2010).
- **Growth phase**: In this step, the company's size is more expanded than the previous phase, and revenues increase. Most financial resources are invested in productive assets, and the company is flexible in terms of liquidity. In such companies, the investment return is higher than the weighted average cost of capital (Karami and Amrani,2010).
- **Maturity stage**: The sales of companies in this stage are stable and financial resources are provided from within, and the assets are more than the growth stage. Due to sufficient liquidity, financing is done from within, and return on investment is equal to or greater than the rate of capital supply (Morse and Eun, 2001; Stepanyan, 2012).
- **Declining stage(renewal/rebirth)**: In this stage, growth opportunities are very small, profitability, liquidity, and fulfillment of obligations are declining, and the company is in a very competitive environment, and due to low liquidity, financing from external sources is common, and return on investment is lower than the rate of financing (Morse and Eun, 2001; Stepanyan, 2012).

2.2.1. Models for determining the life cycle stages of the company

In studies such as Anthony and Ramesh (1992); Thanatawee (2011); Deangelo et al.

(2006); Dickinson (2010); Chen et al. (2012); Ramalingegowda et al. (2013) were used financial variables such as age, sales growth, capital expenditures, size, growth and investment opportunities, financial leverage, profit-sharing rate, cash flow pattern and capital structure for steps classification of the life cycle. The following are two common methods used in Iranian research to determine the company's life stages and a new method proposed in 2016.

2.2.1.1. Anthony and Ramesh Method (1992)

Anthony and Ramesh (1992) use a criterion that combines the three criteria of financial statements "sales growth," "capital expenditures" and "dividend ratio" and "age" and divides the life cycle stages of companies into three stages of growth, maturity, and decline that are shown in the table below

Table 1. Anthony and Ramesh (1992) life cycle model

Life Cycle Stages	Sales Growth	Capital Expenditures	Dividend Ratio	Age
growth	high	high	low	Low(young)
Maturity	average	average	high	Average(mature)
decline	low	low	low	High(old)

In this model, the company's age is used as an indicator of the life cycle, so that it is based on the assumption that the company goes through the stages of its life cycle uniformly. Companies can still enter the life cycle stages sequentially by using different product innovation methods, entering new markets, or making structural changes. It can be claimed that the life cycle is different from the age of the company. This method also assumes that the distribution of other classified variables is also uniform, and optional breakpoints should be considered to determine the life cycle. (Azad Amir et al., 2014).

2.2.1.2. Dickinson Cash Flow Patterns Method

In 2010, Dickinson grouped the company's life cycle stages using cash flow categories (including operating activities, investment, and financing), as shown in Table 2. In this method, companies are separated into life cycle stages independently and do not have Anthony and Ramesh's (1992) method.

Table 2. Cash flow-based life cycle model - Azad Amir et al. (2014)

Cash flows	startup	Growth	Maturity	Maturity	Saturation	Saturation	Declining	Declining
The net cash flow of operating activities	-	+	+	-	+	+	-	-
The net cash flow of investment activities	-	-	-	-	+	+	+	+
The net cash flow of financing activities	+	+	-	-	+	-	+	-

2.2.1.3. Saravia et al. (2016) Life cycle model

In 2016, Saravia and colleagues introduced a new model for the life cycle. They claim

that using a firm age variable can reduce the potential impact of omitted variables on economic results. Although these variables can be a good proxy for effective components during the company's life cycle, it isn't easy to quantify them. According to the company's age, they have expressed a new proxy for the life cycle components. They stated that the age variable is a suitable proxy for the life cycle and stated that the LN(FIRMAGE) is good for the early stages of the life cycle; 1/FIRMAGE is a good proxy development stage of the life cycle, and $FIRMAGE^2$ can show the entry into decline.

2.2.2. Systematic risk throughout the life cycle of the company

Müller (1972, 2003) argued in his company life cycle theory that younger firms have better opportunities to grow and expand than mature firms. Companies usually start their life cycle with financial features such as negative free cash flow and constantly need external financing. In addition, younger companies are more likely to go bankrupt but are more likely to grow. Mature companies are characterized by a positive free cash flow that distributes their profits to their shareholders. Mature firms are more stable, diverse, with lower risk and uncertainty, indicating features such as less volatility in cash flows from operations and sales. As a result, according to this theory, mature firms are stronger than systematic shocks, and therefore their beta should be relatively low. In other studies such as Garcia et al. (2016), Saravia (2014); And Cervia and Cervia-Matos (2016) have shown that according to life cycle theory, the characteristics of younger companies are different from those of mature companies. Therefore, it is expected that young companies' beta will be different from that of mature companies. The beta of younger companies will have more beta due to the volatile growth and will gradually decrease. In other words, the beta is not stable. Beta instability over time means that retrospective market risk measures are not a good predictor of future risk. Identifying the effective relationship between accounting variables and market risk can lead to improved forecasting models for estimating future market risk. Financial models of risk (e.g., CAPM) do not consider the operational components and environmental conditions affecting risk (Alaghi, 2011). However, companies in different industries have different structures and characteristics, so it is expected that companies in different industries have different life cycles and systematic risk in different industries, and in each one of the stages of the industrial life cycle is to take different values. Therefore, the research hypothesis is expanded as follows.

Hypothesis 1: The beta level of market equity varies over the life cycle of each industry.

2.3. Managerial ability

Companies go through three stages of growth, maturity, and decline in their life cycle. In the growth phase, despite the growth of sales and the achievement of unexpected profits, they bear a high commercial risk due to the ambiguity in the market's long-term reaction to products. The company's ability to generate cash flow and access to financial resources is required to invest in new products' research and development. At this stage, managers play an important role in achieving the company's goals by recognizing profitable investment opportunities and optimal resource allocation. In the next stage and entering the company into maturity, business risk is reduced. With the stabilization of the company's position in the market, sales stability, and cash inflows, the company's need for external financing is reduced. At this stage, the company has the appropriate investments during the growth period and responds to market needs. Technological changes and deviations from the previous year's performance are low (Nasim and Penman, 2001). At this stage, management's ability to achieve the goals by investing in projects with reasonable returns is so important. Their managers' motivations lead to

increased managerial ability, and managers with higher profit incentives will lead to greater returns for companies. (Tsui, 2018) .In the decline phase, the company faces declining sales and increased business risk, obsolescence of technology, and the companies' inability to provide New products. At this stage, if managers can maintain the efficiency of the company's processes and invest in profitable projects, the company will have to leave the industry and end operations. It should be noted that the ability of management has changed over time. In some stages of the life cycle, managers learn to increase efficiency and learning, achieve optimal ways to perform activities, and enter other stages by reducing general knowledge to destruction (Agarwal and Gort, 2002). By using their skills and abilities and being aware of the company's life cycle, management can reduce operational and financial risks. According to previous research (Mendelker and Rahi, 1984; Scotter & Severs, 2014), reducing these risks affects systematic risk. Paying attention to the life cycle makes it possible to control environmental stimuli related to the company's life stages that cause companies' same strategic reactions and separate management ability from these specific environmental factors (Hambrick and Mason, 1984). Life cycle stages describe stimuli from the external environment (such as the commodity market) and stimuli from the internal environment (such as the company's life) and include a set of features that affect The company's specific strategies (Jawaher and McLaughlin, 2001). Therefore, it is expected that the ability to manage the moderating effect on the relationship between risk and life cycle, so the research hypotheses are:

Research Hypothesis 2: Management performance moderates the relationship between systematic risk and life cycle.

3. Research Methodology

3.1. Statistical population

This research population is all stock exchange companies that are more than 5 years old, and their 60-month returns are available during the years 2011-2018. Banks, financial services and insurance companies, and intermediaries and financial companies whose fiscal year was not March 20 have been eliminated. According to the above cases, the number of companies surveyed is 864 company -year. After collecting the data, it was analyzed using Excel and Eviews software.

3.2. Research method

The present study method is inductive and post-event (using past information), and its statistical method cross-sectional. To analyze the data, first, the companies are located in 6 industries. They are classified into emergence, growth, maturity, and decline stages using differentiating variables and finally using T-STUDENT statistical methods and Simple regression tests the research hypothesis. In order to determine the life cycle stages, the three methods of Anthony and Ramesh (1992), Dickinson (2010), and Cervia et al. (2016) have been used. Cervia et al. (2016) model to investigate beta change over the life cycle is:

$$\beta_{it} = \alpha_0 + \alpha_1 firmage_{it} + \alpha_2 growth_{it} + \alpha_3 businessrisk_{it} + \alpha_4 financialleverage_{it} + \alpha_5 operatingrisk_{it} + \alpha_6 firmsize_{it} + \alpha_7 growthoptions_{it} + \sum_{t=1}^{\tau-1} \theta_t Time_{it} + \varepsilon_{1it}$$

Where:

β_{it} is the equity beta (systematic risk) derived from the market model. The first independent variable $firmage_{it}$ shows the age of the company i at time t. According to the literature review, it is predicted that systematic risk decreases over the life cycle. The

second independent is the growth variable equal to the percentage change in the company i from -1 t to t. Gahlen and Gentry (1982), decomposition of the beta model, believe that an increase in income reduces systematic risk, so systematic risk is expected to have a negative relationship with growth. The next variable $businessrisk_{it}$ represents the inherent business risk of firm i at time t and is obtained by obtaining the standard deviation of the percentage change in annual net sales during the 5 years prior to year t. According to the research literature, systematic risk increases (decreases) as business risk increases (decreases) (Chung, 1989; Scotter & Severs, 2014). The fourth explanatory variable shows the financial leverage of company i at time t. It is obtained by dividing the book value of the debt by the total market value of the equity and the debt's book value. Like the Hamada (1972) research in which researchers identified a positive relationship between the two variables, a positive relationship is expected in this article as well. The next variable of this research." $operatingrisk_{it}$" is the operational risk of a company i at time t, which is obtained through the standard deviation of the percentage of changes in operational cash 5 years before time t. The firm's operational risk increases operational cash flow volatility, leading to a higher market equity beta (systematic risk) (Chung, 1989; Schelloter & Sears, 2014). The sixth determinant of systematic risk in the model is the company's size, which is obtained through the natural logarithm of the company's sales. Larger companies have less systematic risk. The last independent variable is the growth options of the company i in year t. Hong and Sarkar (2007) showed that market equity beta is a function of increasing growth options, and therefore in this study, we consider a positive relationship between these two variables. Given that Q-Investment Theory states that investment opportunities with Q-Tobin increase (Jovanovic and Russeau, 2002) in this study, Q-Tobin is an indicator for measuring authority (options). Also, in order to control the effects of macroeconomics, which is the same for all companies, the time variable has been used.

4. Results of the research

4.1. Descriptive statistics

The table below shows the number of companies in each industry and the life cycle stages. As can be seen, the largest number of companies during the year 2011-2018 is related to the automotive industry (32 companies) and non-metallic minerals industry (21 companies). Also, the pharmaceutical industry had the lowest number of companies (12 companies).

Table 3. Descriptive statistics

	Industry	N
0	Other	11
1	automotive industry	32
2	Chemical	17
3	Medicinal	12
4	Metals	13
5	Sugar And Food Except for Sugar Industry	18
6	Non-Metallic Mineral	21
	Total	124

Table 4 - The average of variables in each industry

IND	roe	mtb	tacc	cfo	MNG	Cap	PayRatio	businessrisk	firmage	TQ	operatingrisk	firmsize
0	0.078	1.37	0.017	0.053	0.16	0.017	0.62	0.94	29.6	1.7	5.85	5.83
1	0.0472	1.7	0.019	0.056	0.26	0.017	0.41	0.38	35.4	1.3	11.12	6.2
2	0.09	1.26	0.014	0.097	0.18	0.024	0.65	0.38	38.3	1.7	8.41	6.27
3	0.147	2.18	0.085	0.083	0.19	0.018	0.74	0.28	39.5	2.11	3.35	6.1
4	0.094	1.54	0.03	0.82	0.2	0.025	0.58	0.46	37.9	1.74	4.43	6.2
5	0.054	1.74	0.005	0.07	0.13	0.03	0.44	0.54	47.9	1.96	2.89	5.81
6	0.094	2.07	-٠.003	0.1	0.15	0.03	0.65	0.35	35	1.81	2.02	5.97

The table below shows the average of each variable in each industry. The youngest companies are related to the automotive industry and non-metallic minerals (35 and 35.4 years). Therefore, it is expected that these industries' systematic risk will be higher than in other industries. Industries with larger companies are also expected to have less systematic risk because larger companies can deal with company risks rather than smaller companies. According to Table 4, the automotive industry is larger (6.24). The highest average operational risk is related to the automotive industry, and the non-metallic mineral industry has the lowest operational risk.

4.2. Inferential statistics

4.2.1. Hypothesis test No. (1)

In order to investigate the differences between systematic risk over the life cycle of each industry, three methods of Anthony and Ramesh (1992), Dickinson (2010), and Sarvia et al. (2016) have been used. According to Anthony and Ramesh (1992), there is no significant difference in various industries at different stages of the systematic risk life cycle.

In Dickinson's (2010) method, industry, the risk decreases during maturity (T-Value-2.467) in the metals industry, and there is a significant difference with the growth period in terms of systematic risk.

In the" sugar and food except for the sugar industry "industry, the risk increases during the Saturation period, and the difference with the maturity period is significant (T-Value = 17.812). According to the study of Grenold and Froster (2000) and Kim (1993), which stated that 5 years is a reasonable period for systematic risk estimation, the 5-year beta index was also used as a systematic risk index. The results show that in Anthony and Ramesh (1992) method in the non-metallic mineral industry, the systematic risk during the growth period is higher than maturity (T-Value = 1.935). According to Dickinson's (2010) method in the chemical industry, systematic risk during growth is greater than maturity (T-Value = 2.511). Sadati Meidani and Gharazi (2016) also showed in their research that the maturity and growth stage has a significant relationship with company risk, and other states do not have a significant relationship with company risk. However, they ignored the different industries (Tables 5 and 6). Sarvia et al.'s (2016) method show no significant difference between systematic risk in all other industries except the metals industry. In the metals industry, systematic risk is higher in younger companies (P-Value = 0.0245). After entering the growth stage, their risk gradually decreases (P-Value = 0.0155) and in the maturity stage(P-Value = 0.0358) and even in the decline stage of this industry(P-Value = 0.0489), the risk of companies in such industries reaches a minimum. The reduction of risk in the period of decline, which is contrary to the results of Saravia et al. (2016), is because a major part of the metals market is global markets; In other words, companies supplying metals are usually very strong exporters, and this has caused the state of global markets to affect the business situation of these companies. According to the statistics and analysis provided, it seems that an increase in prices will accompany the price of metals in 2018. This indicates that companies supplying base metals whose products are sold in foreign markets will have a reasonable increase in profitability. Therefore, it can be said that their systematic risk decreases even in the period of decline (Table 7)

4.2.2. Hypothesis test No. (2)

In this hypothesis, we want to identify the impact of managerial ability on the company's life cycle stages' systematic risk relationship. Entering the mediator variable did not affect the overall results observed before. This means that the effect of other variables on risk is more than the managerial ability. However, it can not be said that the

ability to manage does not affect this relationship, and other variables should be considered. However, when examined separately in the industry (the model was fitted at the level of all companies), it was shown that managerial ability as a moderating relationship in the early stages of a company's life is very important and has a reducing effect on the relationship.

5. Conclusions and Suggestions

This study examines the systematic risk over the company's life cycle and the role of the moderating variable of managerial ability. Past research has shown that systematic risk is a function of firm characteristics such as asset structure, capital structure, and other characteristics. Therefore it can be argued that beta changes over the life cycle of the firm. Due to the different nature of industries, this study has been conducted at the industry level and per three methods of determining the life cycle. The results showed that in Anthony and Ramesh's (1992) method and Dickinson's (2010), except for the sugar and food except for the sugar industry, the risk increases during the saturation. The difference with maturity is significant. (T-Value = 17.812), in other industries, different betas in the life cycle did not differ significantly. Sarvia et al.'s (2016) method used a different method than the previous two methods. There is no significant difference between systematic risk in all other industries except the metals industry. In domestic and foreign studies, systematic risk has not been presented separately for industries. However, in the field research, Sadati Meidani and Gharazi (2016) showed a significant relationship between company risk in the stage of maturity and growth. Finally, it was shown that the managerial ability as a moderating relationship is very important in the early stages of the company's life and has a reducing effect on the relationship while in other stages, this effect is increasing. But it does not affect the results when considered in different industries. This may be due to low companies in each industry and the lack of consideration of other variables such as risk management. Mashayekhi and Haji Azimi (2016) showed that a positive and significant relationship between managers' ability and company performance is observed only in the growth and maturity stages. This research is useful for professional activists and researchers. Corporate executives, investors, and other stakeholders often use beta estimates of market equity when making decisions to calculate the cost of capital for a particular project or valuation models calculated to buy another company. Researchers use it in event studies to measure abnormal returns and to test asset pricing models. In each of these cases, determining beta and instantaneous behavior is useful in order to modify the systematic risk assessment.

Table 5. Inferential Statistics - Systematic Risk - Anthony and Ramesh Method(1992)

5year Annual beta				Annual beta				5year Annual beta				Annual beta				
Declining	**Maturity**	**Maturity**	**Growth**	**Declining**	**Maturity**	**Maturity**	**Growth**	**Declining**	**Maturity**	**Maturity**	**Growth**	**Declining**	**Maturity**	**Maturity**	**Growth**	
Chemical								**Automotive Industry**								
0.516	0.426	0.426	0.637	0.516	0.505	0.505	0.637	0.703	0.970	0.970	0.988	1.025	1.391	1.391	1.346	Average
0.045	0.076	0.076	0.110	0.045	0.283	0.283	0.110	0.727	0.312	0.312	0.468	0.839	0.7480	0.748	1.186	Variance
7	36	36	5	7	36	36	5	6	47	47	7	6	47	47	7	N
-0.973		1.357		-0.095		0.763		0.749		0.0669		0.928		-0.104		T-Value
0.177		0.116		0.462		0.235		0.241		0.474		0.195		0.460		P-Value
1.812		2.015		1.713		1.895		1.943		1.894		1.943		1.89		d
Sugar And Food Except Sugar Industry								**Non Metallic Mineral**								
0.486	0.396	۰,۳۹۶	0.085	0.599	0.459	0.459	-0.782	0.877	1.148	1.148	1.602	1.004	1.178	1.178	1.497	Average
0.0002	0.071	0.071	0.179	0.160	0.355	0.355	2.058	0.505	0.530	0.530	0.253	0.453	0.618	0.618	0.457	Variance
2	13	13	3	2	13	13	3	7	28	28	7	7	28	28	7	N
-1.208		-1.222		-0.426		-1.469		0.897		1.935		0.589		1.078		T-Value
0.1252		0.1731		0.356		0.140		0.197		0.038		0.284		0.153		P-Value
1.782		2.920		2.920		2.919		1.833		1.771		1.796		1.812		d
								Other								
								1.079	0.922	0.922	0.459	1.454	1.069	1.069	0.926	Average
								0.059	0.115	0.115	0.346	0.192	0.467	0.467	0.962	Variance
								7	38	38	3	7	38	38	3	N
								-1.472		-1.625		-1.930		-0.249		T-Value
								0.084		0.123		0.039		0.413		P-Value
								1.796		2.920		1.782		2.220		d

Table 6- Inferential Statistics - Systematic Risk - Dickinson Method(2010)

5year Annual beta			Annual beta			5year Annual beta			Annual beta			
Saturation	Maturity	Growth	Saturation	Maturity	Growth	Saturation	Maturity	Growth	Saturation	Maturity	Growth	
Automotive Industry						**Non Metallic Mineral**						
0.271	0.216	0.370	0.373	0.1599	0.239	0.013	-0.036	0.693	-	-0.205	0.0069	Average
0.658	0.630	0.507	0.690	0.515	0.815	0.482	0.623	0.383	-	0.475	0.932	Variance
24	167	21	4	110	48	19	106	9	-	98	27	N
-0.380	-1.27		-0.610	-0.627		-0.392	-0.747		-	-0.148		T-Value
0.704	0.240		0.542	0.531		0.696	0.456		-	0.882		P-Value
0.054	-0.154		-0.213	-0.08		-0.049	-0.106		-	-0.027		d
Medicinal						**Chemical**						
-0.328	0.155	-0.229	-	-0.264	-0.116	0.124	-0.006	0.710	0.066	0.056	0.038	Average
0.738	0.349	0.325	-	0.313	0.696	0.592	0.538	0.625	0.665	0.592	0.550	Variance
10	50	19	-	40	11	124	90	5	5	65	22	N
0.728	0.830		-	-0.686		-0.720	-2.511		-0.0318	0.132		T-Value
0.469	0.409		-	0.496		0.473	0.0136		0.974	0.895		P-Value
0.173	0.074		-	-0.148		-0.129	-0.716		-0.009	0.018		d
Sugar And Food Except Sugar Industry						**Metals**						
0.071	-0.059	-0.097	-1.267	-0.071	0.071	0.013	0.1199	0.3606	-0.189	0.0499	0.378	Average
0.292	0.509	0.381	0	0.516	0.399	0.447	0.605	0.517	0	0.608	0.424	Variance
10	91	12	1	66	17	9	56	14	1	57	16	N
-1.218	0.307		17.812	-1.23		0.630	-0.150		2.976	-2.467		T-Value
0.226	0.758		0.000	0.222		0.530	0.1374		0.0043	0.017		P-Value
-0.129	0.037		1.196	-0.143		0.107	-0.240		0.239	-0.328		d
						Other						
						0.095	0.064	-0.065	-0.0457	-0.696	0.0403	Average
						0.556	0.523	0.345	0.507	0.418	0.437	Variance
						14	51	9	6	32	24	N
						-0.1801	0.956		-0.108	-0.049		T-Value
						0.857	0.342		0.914	0.348		P-Value
						-0.0298	0.130		-0.0238	-0.109		d

Table No. 7. Inferential Statistics - Saravia et al. (2016) - by industry sepration

Fourth	Third	Second	First	Fourth	Third	Second	First	Literature Review	Variables
Automotive Industry				**Other**					
			-0.000599 (0.8521)				-0.005 (0.3719)	-	FIRMAGE
		0.000 (0.8454)				-0.000 (0.3570)		+	FIRMAGE2
	1.994 (0.3561)				3.92 (0.4300)			+	1/FIRMAGE
-0.048 (0.5593)				-0.150 (0.3957)				-	LN(FIRMAGE)
0.0530 (0.0069)	0.0533 (0.0064)	0.0512 (0.0067)	0.05244 (0.0072)	0.0755 (0.1945)	0.07542 (0.1949)	0.0767 (0.1842)	0.076 (0.1901)	-	GROWTH
0.112 (0.2588)	0.113 (0.2516)	0.105 (0.3124)	-0.109 (0.2792)	-0.083 (0.1752)	-0.084 (0.1824)	-0.080 (0.1781)	-0.081 (0.1751)	+	BUSINESSRISK
0.2181 (0.2736)	0.2295 (0.2462)	0.176 (0.374)	0.197 (0.323)	0.442 (0.221)	0.435 (0.2291)	0.4496 (0.2125)	0.446 (0.2167)	+	FINANCIALLEVERAGE
-0.000871 (0.5823)	-0.000889 (0.5751)	-0.001069 (0.4920)	-0.00094 (0.5492)	0.000505 (0.9337)	0.000646 (0.9151)	0.000152 (0.9802)	0.0003 (0.9560)	+	OPERATINGRISK
0.0751 (0.1435)	0.0758 (0.1368)	0.0699 (0.1819)	0.0729 (0.1596)	0.0343 (0.6064)	0.033 (0.6203)	0.0294 (0.634)	0.0326 (0.6122)	-	FIRMSIZE
-0.0088 (0.8675)	-0.0088 (0.8586)	-0.0049 (0.9193)	-0.0069 (0.8893)	-0.0255 (0.5479)	-0.0249 (0.5605)	-0.0279 (0.634)	-0.0266 (0.527)	+	TOBINSQ
0.347	0.347	0.346	0.346	0.205	0.203	0.209	0.208	Adjusted R-squared	
1.06	1.06	1.05	1.05	1.317	1.31	1.32	1.32	Durbin-Watson stat	
Medicinal				**Chemical**					
			-0.0020 (0.5042)				-0.00096 (0.7732)	-	FIRMAGE
		-0.000 (0.1953)				-0.000 (0.4829)		+	FIRMAGE2
	-1.964 (0.4627)				-3.09 (0.2746)			+	1/FIRMAGE
0.00729 (0.9389)				0.033 (0.7569)				-	LN(FIRMAGE)
0.475 (0.0124)	0.481 (0.0124)	0.422 (0.0211)	0.455 (0.0146)	0.0833 (0.3865)	0.0966 (0.3086)	0.0699 (0.464)	0.0743 (0.44)	-	GROWTH

Table No. 7. Inferential Statistics - Saravia et al. (2016) - by industry sepration

Fourth	Third	Second	First	Fourth	Third	Second	First	Literature Review	Variables
0.0724 (0.6305)	0.045 (0.7617)	0.103 (04635)	0.0941 (0.5237)	0.1988 (05617)	0.248 (0.6612)	0.1529 (0.6559)	0.1672 (0.6267)	+	BUSINESSRISK
0.294 (0.3196)	0.3356 (0.2597)	0.2289 (0.4329)	0.2566 (0.3829)	-0.569 (00854)	-0.619 (0.0606)	-0.520 (0.1186)	-0.535 (0.1071)	+	FINANCIALLEVERAGE
0.000892 (0.8929)	-0.00279 (0.9662)	0.002791 (0.6744)	0.00203 (0.759)	-0.000144 (0.9802)	-0.000754 (0.8948)	0.000194 (0.9733)	0.000137 (0.9812)	+	OPERATINGRISK
-0.0367 (0.5502)	-0.0197 (0.9240)	-0.1310 (0.4892)	-0.1209 (0.5285)	-0.238 (0.000)	-0.287 (0.0000)	-0.272 (0.0001)	-0.277 (0.0001)	-	FIRMSIZE
-0.0391 (0.4618)	-0.0452 (0.3914)	-0.023 (0.6727)	0.031 (0.5648)	-0.146 (0.0157)	-0.148 (0.0137)	-0.148 (0.0171)	0.146 (0.0168)	+	TOBINSQ
0.19732	0.202	0.2165	0.2016	0.438	0.442	0.439	0.438	Adjusted R-squared	
1.768	1.787	1.793	1.767	1.204	1.217	1.214	1.206	Durbin-Watson stat	
Sugar And Food Except Sugar Industry				**Metals**					
			-0.003 (0.3751)				-0.011 (0.0358)	-	FIRMAGE
		-0.000 (0.4158)				-0.000142 (0.0489)		+	FIRMAGE2
	6,575 (0.2567)				16.47 (0.0155)			+	1/FIRMAGE
-0.158 (0.3083)				-0.455 (0.0245)				-	LN(FIRMAGE)
-0.02063 (0.1856)	-0.0211 (0.1696)	-0.0207 (0.1813)	-0.0205 (0.1872)	0.0067 (0.7919)	0.0067 (0.892)	0.0066 (0.896)	0.0067 (0.893)	-	GROWTH
0.01317 (0.824)	0.01416 (0.8101)	0.0085 (0.854)	0.0108 (0.855)	-0.114 (0.4484)	-0.118 (0.4303)	-0.108 (0.4758)	-0.111 (0.463)	+	BUSINESSRISK
0.129 (0.735)	0.148 (0.7004)	0.096 (0.8009)	0.110 (0.7737)	0.0512 (0.8934)	0.0667 (0.8620)	0.047 (0.9019)	0.0453 (0.9056)	+	FINANCIALLEVERAGE
0.01175 (0.2072)	0.01166 (0.2056)	0.10956 (0.2445)	0.001139 (0.2250)	-0.002731 (0.1416)	-0.002520 (0.1896)	-0.003053 (0.0866)	-0.0029 (0.1082)	+	OPERATINGRISK
-0.0614 (0.4311)	-0.0586 (0.452)	-0.070 (0.3563)	-0.066 (0.3914)	-0.03182 (0.6036)	-0.0367 (0.5502)	-0.021 (0.726)	-0.026 (0.6657)	-	FIRMSIZE
0.0417 (0.5210)	0.0470 (0.4725)	0.0335 (0.6017)	0.0368 (0.568)	-0.140 (0.0697)	-0.142 (0.0653)	-0.139 (0.0763)	-0.139 (0.0735)	+	TOBINSQ
0.193	0.199	0.186	0.188	0.439	0.433	0.433	0.436	Adjusted R-squared	
1.64	1.655	1.629	1.631	1.097	1.102	1.092	1.094	Durbin-Watson stat	
				Non Metallic Mineral					
							-0.000947 (0.759)	-	FIRMAGE
						0.000 (0.8473)		+	FIRMAGE2

Table No. 7. Inferential Statistics - Saravia et al. (2016) - by industry sepration

Fourth	Third	Second	First	Fourth	Third	Second	First	Literature Review	Variables
					2.916 (0.2196)			+	1/FIRMAGE
				-0.076 (0.414)				–	LN(FIRMAGE)
				0.0942 (0.3127)	0.0953 (0.3037)	0.0917 (0.3354)	0.092 (0.3255)	–	GROWTH
				0.167 (0.2037)	0.161 (0.2184)	0.183 (0.1746)	0.174 (0.1900)	+	BUSINESSRISK
				-0.228 (0.5474)	-0.260 (0.4869)	-0.138 (0.7205)	-0.184 (0.6314)	+	FINANCIALLEVERAGE
				0.01708 (02066)	0.01744 (0.1957)	0.01852 (0.1756)	0.176 (0.8096)	+	OPERATINGRISK
				0.01688 (0.8640)	0.01851 (0.8492)	0.35300 (0.7243)	00240 (0.8096)	–	FIRMSIZE
				0.00260 (0.9955)	-0.003003 (0.9481)	0.006629 (0.8867)	0.003957 (0.9323)	+	TOBINSQ
				0.175	0.1802	0.1713	0.1717		Adjusted R-squared
				1.239	1.246	1.235	1.234		Durbin-Watson stat

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Research Article

The Relationship Financial Statements Components and Audit Fees in Developing Countries

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Abstract

The present study is concerned about the relationship between the cash flow statement and payment balance sheet of listed companies on the Iraq Stock Exchange, compared with the conducted studies on the Tehran Stock Exchange. In other words, the present study attempts to figure out whether or not the change of cash flow statement items and balance sheets can lead to an increase or decrease in the changes in audit fees.

The multivariable regression model was used for hypothesis testing. Research hypotheses were tested using a 774 firm-year sample on the Tehran Stock Exchange and 210 firm-year on the Iraq Stock exchange during 2012-2017 using multiple regression models based on the mixed data technique.

The obtained results indicate that there is a significant relationship between the change of cash flow statement items and balance sheet and audit fees, which means the relationship between changes in debts, assets, dividends, operational, investment, and financing cash flow and tenure, audit fee, and auditor change is significant. The current study is the first study that compares the relationship between cash flow statement items and balance sheet and audit fee of listed companies on the (Iran and Iraq) stock exchange, so this study contributes to the development of knowledge in this field.

Keywords: Audit Tenure, Audit Fee, Auditor Change, Cash Flow Statement.

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1. Introduction

The most important issue in every economic activity is to make wise decisions concerning reliable and fair financial information, so auditing is a part of the financial information reporting process that, through analysis, can accredit the reports and respond to the needs of users concerning the reliability and fairness of information so that they can make a decision confidently. The only way to guarantee the accreditation service presentation is to ensure that the economic resources are provided for professional services, namely auditors. Hence, studying the process related to contributing factors to audit fees is of utmost importance for presenting an appropriate audit fee model (Al-Mutairi et al., 2017). Financial reporting aims to propose financial information about the reporting firm, and financial statements are the main and central product of financial reporting. Financial statements currently aim to present pure and classified information about a business firm's financial status, performance, and flexibility, which is useful for a broad spectrum of financial statement users for making economic decisions (the International Accounting Standards Committee, 2007). On the other hand, optimal equipping and allocation of resources play a significant role in countries' economic development, and strengthening the supervisory arms is a requisite for these resources, among which auditing is the major regulatory tool. On the other hand, public accountability is a prerequisite for fulfilling the democratic process. Auditing and accountability, however, are two main tools of responsiveness. Auditing and accountability are two supervisory elements of every system. They are used extensively from the highest to the lowest level of a business firm (Yahia Kikhia, 2015) in that each system requires control and feedback to emphasize its continuity, but despite the scope of audit works and given their necessities, the manner of payment determination is not based on a scientific model in most countries. Based on a logical and defendable model, we cannot claim how much a project cost, given the firm's characteristics under study. The more accurate and clearer the audit fee, the more possible the working procedure is. One of the main questions the auditor is faced with is how to use human resources, given the available budget, indifferent project steps. Hence, if the audit fee is accurate and transparent based on a scientific and logical principle, the auditor feels less confused through the working procedure and is more confident that the project and auditing standards have the required correspondence (Daniels and Booker, 2011). The audit fee relies on different factors, and the significance of these factors is different in different countries. One of the auditing profession's main challenges is determining the minimum audit fee and dealing with some audit firms' price breaking. Considering auditing, however, as a homogenous product and defining a non-competitive price for that would endanger the dependence and quality of audit services. Among the contributing factors to audit fees, we can refer to balance sheet price and cash flow (Gnanakumar (2017). Mehrani and Jamshidi Ivanaki (2012) and Gnanakumar (2017) referred to a significant relationship between audit fees and balance sheet assets. They discovered that auditors receive higher payments from companies with a higher proportion of intangible assets in the balance sheet. Moreover, as mentioned previously, cash flow is one of the other contributing factors to the audit fee to compensate for the additional risk and auditor attempt. Since managers could invest their money in NPV positive projects and increase their wealth by exploring appropriate growth opportunities, a firm's free cash flow is of great importance for the shareholders' value creation analysis. However, regarding the theory of conflict of interests between managers and owners, managers do not necessarily invest free cash flows in NPV positive projects. According to Jensen and Meckling (1976), managers of business firms with high cash flow and low growth manage the earnings to satisfy some of their interests. The audit fee's growth is for compensating

additional risk created due to the agency problems of free cash flow. For example, the audit fee should be higher for firms with high cash flow and low growth outlook; because it is assumed that high cash flow and low growth outlook pursue the management to invest the cash illogically and to conceal such behavior by manipulating the financial statements (Choi et al., 2010). Recently, in developing countries, the market monopoly is broken up, and intense competition occurs among auditors, which occurred a long time ago in developed countries. From the early 70s to early 2000, most audit firms' focus has been on their growth than professional value. Audit firms' partners are under much pressure to find new customers, preserve the current customers, and consulting services. Any failure in implementing these developmental objectives in audit firms would have adverse consequences, including work dismissal. In other words, we could say that during the past two decades, the auditing profession has observed a dramatic change. The decrease in audit market regulations allowed the audit firms to be more concerned about economic objectives and seek for their income increase and cost reduction in every project (Healy and Palepu, 2003; Chancy et al., 2003). Under such circumstances, an auditor can have the best estimation of his/her payment, given the characteristics of the firm understudy to maintain the project quality and lower the costs. Given the facts mentioned above, the present study tries to answer whether there is a significant relationship between the cash flow statement and balance sheet and audit fees in listed companies on Iran and Iraq Stock Exchange or not. Moreover, the present study compares the relationship between cash flow statements and balance sheets and audit fees in Iran and Iraq. This paper is the first study on this topic, contributing to the development of knowledge in this area.

2. Theoretical Issues and Literature Review

Basic financial statements are the kinds of reports which are more important than other financial descriptions. Accounting can be defined as a process for recognition, measurement, classification, and reports of financial information to provide the possibility of wise judgment and to make logical decisions by financial users. The expectations, needs, and demands of users are extremely diversified. Typically, the determiner is the type of information that should be proposed to be set as a basis for judgment, evaluation, and decision-making. Financial statements are the final product of financial reporting. Each financial statement reflects some information that, in general, can present a clear image of the business unit understudy, so a major proportion of theories, studies, and accounting standards is allocated to financial statements. However, since accounting considers users' information needs, some definitions, qualitative characteristics, and guidelines could make it easier to access such objectives. Therefore, decision-making is associated with evaluating the chance of occurrence of future events. Agency problems occur as a result of a conflict of interests between managers and shareholders. Further, such a conflict of interest exists in another way between controlling shareholders of a firm (major shareholders) and minority shareholders. Such a conflict of interest would lead to the outbreak of some issues and agency problems and, finally, agency costs to the firm and beneficiaries. Given that those agency costs derived from the owners’ attempts to control the managers are most significant and remarkable. On the other hand, managers are willing to confirm that they are responsible for shareholders' interests and increase their wealth (Jensen and Meckling 1976). Hence, both groups (owners and managers) are willing to use independent audit services, so auditing is an efficient strategy for limiting managers' authority in contractual issues. The financial report aims to present financial information about the reporting firm, and financial statements are the main product of financial reporting. Presently, financial statements aim to present purified and classified

information about a business firm's financial status, financial performance, and financial flexibility to be useful for a broad spectrum of financial statement users in making economic decisions (Accounting Standards Committee, 2007). The users of financial statements deal with several major problems, including users' disability to associate the information of each financial statement and business firm evaluation independent of its financial structure and absence of a certain standard for all aspects of financial statement (International accounting standards board, 2008). On the other hand, financial statements should satisfy the needs of different groups. Hence, the best choice is to select independent and experienced auditors by general assemblies of shareholders. The gathering of expert accountants with ample experience to carry out the operation in those associations where regulating the professional code of ethics was a prerequisite has created the auditing system. The Institute of Chartered Accountants in England was the first to serve as the template for other countries (Audit Organization, 2009). On the other hand, the audit fee contributes to the auditing profession (Rajabi, 2005). The audit fee reflects the audit quality for users of financial statements outside the organization. Independent auditing constitutes a significant part of the financial reporting system. The Independent audit report indicates the fulfillment of managerial commitments to investors. The audit fees can be considered a cost incurred by the client for such commitments to the auditor. A certain amount of money should be paid as audit fees to use the audit services, which the auditor determines and his/her evaluation of the volume and risk of auditing. The more the audit fee, the more the auditor's attempt and the higher is the quality. Hence, the market shows a positive reaction to a high quality of information. In contrast, high audit fees may make them economically dependent on their clients. Such a dependency may cause the independence of the auditor’s right. In turn, the client cannot trust in secure information, which would lead to the market's negative reaction to low information quality. The auditor considers some conditions when determining the audit fee, involving the required time for planning and performing the audit process, number of required auditors and assistants, the size of the firm understudy, the difficulty level of the audit process, related complications, the fame of the firm under process, the ability to pay the audit fee, audit firm size and its reputation, number of reports required by the customer, the nature of the firm under study, and the range of its need for expertise and qualifications). Determining the audit fee is a significant issue for auditors, on the one hand, and customers, on the other hand. However, there is no scientific way to establish a fair audit fee to provide a sensible payment for the auditor's presented services and contain the required services against customers' costs at the same time. Determining the amount of audit fee at the beginning of a contract between auditor and client is even harder because the auditor is not fully aware of the nature of the firm under process, the volume of operation, and the amount of required audit procedures, duration, and required attempt for performing the process (Carcello and Nagy, 2004). Therefore, the decrease of audit fees is one of the auditing profession's contemporary challenges because customers of audit firms do not consider the nature and quality of the performed audit, so they try to replace the auditors for lower fees to save the audit fee. Such a procedure shows that such customers judge the auditing process as a legal superficial requirement, not protecting the existence and firm continuity (Abu Nassar, 1999). To prevent the influence of receivable fee on the auditor’s independence, the American Institute of Certified Public Accountants (AICPA) adopted some certain criteria, the most important of which is that the receivable fee by the auditor should not be more than 15% of the total audit fee of his/her firm and that the auditor should not express his/her opinion about the soundness of financial statements prior to receiving the payable fee of the previous year (Matar, 1989). Audit fee relies on different factors, and the range of significance of these factors

is different in different countries. One of the auditing profession's main challenges is determining the least audit fees rate and dealing with some audit firms' price breaking, but considering auditing as a homogeneous good and its non-competitive pricing would endanger the independence and quality of audit services. Moreover, it is worth mentioning that independent auditing is based on economic transparency, public trust in the capital market, and governments' accountability to the people. However, it should not be considered as a good and common service. The amount of audit fees to auditors can influence audit quality. The more audit fee being considered for an auditor, the more intense his/her attempt, and the higher the audit quality. Still, in such cases, auditors are financially dependent on customers. Hence, they may not pursue the auditing procedures appropriately not to lose the project that would bear adverse financial consequences for them (DeAngelo, 1981; Simunic, 1984). Being aware of the process of audit fee determination is important both for the client and the auditor. The amount of audit fee for auditors can affect the audit quality in two ways, the higher the defined audit fee for the auditor, the more his/her attempt and the higher the quality. Still, in such circumstances, the auditors are financially dependent on their customers and lose their independence. Audit fees should be set based on the required time for implementing the audit operation. Within a competitive market for audit services, an auditor's additional fee is for the optimum use of time for providing credit services (Houghton and Jubb, 1999). Audit operations' fast completion may incur more costs because auditors are involved in overtime or cost increase in audit opportunities (Leventis et al., 2005). However, there is a different view through which the audit fee is positively associated with a delay in presenting the audit report. With the growth of the audit fees, the number of audit tests will increase (Rubin, 1992). Further, the relationship with senior staff or negotiation with management results from the audit process increases either (Leventis et al., 2005). Hoitash et al. (2007) declare that the fees paid to auditors may affect the audit quality in two ways; first, higher-paid fees to auditors may increase their attempts, so audit quality increase, as well. In another method, the higher paid fees to auditors make them economically dependent on their clients. Since they do not want to lose their interests in the firms' understudy, they continue their high-quality activity.

Ramzy (1988) divides the contributing factors to audit fee into three groups of size, complication, and other factors as follows:

Size factors:

- Transaction volume (turnover)
- Profit before tax
- Operational profit
- Inventory and goods in process
- Accounts receivable
- Cash and bank
- Total assets
- Current debts
- Accounts payable
- Current assets
- Capital commitments
- Capital and savings

Complicating factors

- Number of satellite companies
- A number of countries where the firm is operating
- Number of production lines
- Location of the factory

- Nature of firm activity (manufacturing, finance, etc.)
- Type of industry (electronic, petrochemical, food, etc.)
- Range of centrality of financial controls
- Degree and amount of computerized accounting records
- Number of audit reports

Other factors

- Quality of internal control systems of the firm
- The amount of risk involved in the audit process
- Range of responsibility
- Data of fiscal year of the firm
- Capabilities and experience of auditors
- Competition in the audit market
- The value of providing services
- Inflation
- Chance of initiating non-audit projects

Nikkinen and Petri (2005) indicate a direct association between audit fees and risk dimensions (financial risk, operational risk, and commercial risk). According to the study's findings, agency costs, the firm's operating volume, and auditing complications can describe audit services' fees. Nazem Sha'ban Jabar (2009) illustrates that financial statements' audit process enhances their credit, and auditing can provide the required confidence about not committing illegal acts during financial statement preparation and increases such data's reliability. The auditors' report understudy did not mention that the main responsibility in providing financial statements and presenting appropriate disclosure is toward the firm's management but claimed that to reach a professional and impartial consensus about financial statements and express his/her opinion is the auditor's responsibility. He should be ensured of the range of disclosure access, the adequacy of the attached descriptions to those statements, and their inclusion for all required issues. Majeed Abd Zeid Hamad (2009) noticed that several factors, including time, profession, and firm are essential for payment determination, such that the required time for project completion and presentation date of the firm to the auditor and number of staffs are among the most important factors which should be considered in the payment determination. In the light of such results, the "Iraqi Association of Accountants" and "Secretariat of the Professional Council" should be backed to see more effective results of the adopted regulations and auditing should generally have more space in the academic studies and particular attention should be paid to the auditing profession and professional ethics. Mohamed And Har Al-Hadisi (2010) realized that the main responsibility in providing financial statements and presenting appropriate disclosure is up to managing a business unit. This is while to reach an impartial and professional opinion about financial statements and confirm the accuracy, qualification, and efficiency of the attached notes are among the auditor's responsibilities. Munsif et al. (2011) found that the payment of audit fees to firms that still have some defections in reporting related to internal auditing is low. Ulhaq and Khan Leghari (2015) assessed the contributing factors to audit fees in Pakistan and discovered that the business size, complication, international understanding, and audit firms' dependency are among the significant determining factors for audit fees. This study also shows that auditors' ignoring the risk factors may bring about a serious threat to the audit firm's reputation and credit and point to the legal system's weakness in Pakistan. Al-Hazveh (2015) considers the contributing factors in auditing costs in audit firms in Jordan and notices that the foreign auditor's received audit fees are significant factors that affect the presented services' independence. The audit fee determination is a complicated process due to various factors that influence the cost estimation. Using a set

of conventional evaluation methods, the auditor intends to reach an impartial technical view about financial statements' truth and accuracy. Castro et al. (2015) analyzed the contributing factors to audit fees in listed firms on BM & FBOVESPA Brazil. They observed a positive relationship between audit fee and measurement variables, clients' complexity, and auditor type. As for big and small customers, the auditor's perceived risk affects the fee's amount differently. As for smaller customers, lower audit fees are mainly for high-risk and influential customers, and for larger customers, stronger sovereignty is used for auditing. Yahia Kikhia (2015) concluded that some variables like auditor tenure have no significant effect on audit fees. Audit risk had a negative and significant association with audit fees, and the factor of size is also considered one of the contributing factors of external audit fees. Muzatko and Teclezion (2016) conducted a study on the relationship between audit fees and earnings quality in financial institutions. They perceived that those auditors who earn fees present high-quality audit and attempt more seriously. Moreover, auditors with higher fees are economically dependent on these fees and influence the earnings report. In general, the obtained results indicate that banking companies that pay relatively higher audit fees have lower earnings quality in terms of optional commitments. Nikbakht et al. (2016) show that managerial overconfidence has a positive effect on the audit fee. The consequences and risks of financial reporting, which is occurring due to managerial overconfidence, would create a positive relationship between managerial overconfidence and audit fees. Mashayekhi et al. (2016) analyzed the effect of internal audit quality on independent audit fees. They discovered that internal audit qualification, namely, tenure and its presence in the firm, has a negative relationship with audit fee and calculation and IT skills, professional and scientific certificates, and duration of training hours have no relationship with audit fee. Broadly, the results show that internal audit quality has no impact on independent audit fees.

Given the facts described above, the hypotheses of the study are formulated as follows:

H_1: There is a significant relationship between current asset changes and audit fees (Iran and Iraq).

H_2: There is a significant relationship between changes in noncurrent assets and audit fees (in Iran and Iraq).

H_3: There is a significant relationship between current debt changes and audit fee changes (Iran and Iraq).

H_4: There is a significant relationship between changes in noncurrent debts and audit fees (Iran and Iraq).

H_5: There is a significant relationship between changes in incomes and changes in audit fees (Iran and Iraq).

H_6: There is a significant relationship between changes in costs and audit fees (in Iran and Iraq).

3. Research Methodology

This paper is causal-correlational, and in terms of methodology, it is quasi-experimental and retrospective and counts as a type of positive accounting study with real data. In terms of nature and objectives, this project is practical. Practical studies aim to develop practical knowledge within a particular field of study. In terms of data collection and analysis, however, this paper is causal-correlational.

3.1. Statistical population

The statistical population of the present study is limited to the following firms:

1- Have no change in their fiscal year during the period of study (2012-2017) in

Iran and Iraq;
2- Their financial information is available;
3- Are not affiliated with financial companies (like banks, financial institutions), investment companies, or financial intermediaries; and,
4- Are active during the period of the study.

Considering the qualification criteria, 129 Iranian firms and 35 Iraqi firms were selected for the hypothesis testing.

Table 1. No. of firms in the statistical population by imposing the conditions to select a sample of Iranian firms

Description	Eliminated firms within the total periods	Total No. of firms
Total listed firms on the Tehran Stock Exchange		445
Eliminating financial intermediaries, financial supply, insurance, and investment firms	88	
Firms with financial yearend other than March 20th	87	
Firms with more than six months of transaction halt	112	
Eliminating firms that were not listed on the stock exchange during the period of study	4	
Elimination due to unavailability of data	25	
Statistical population		129

Table 2. No. of firms in the statistical population by imposing the conditions to select a sample of Iraqi firms

Firms affiliated with Iraq Stock Exchange	No. of firms	Eliminated firms	Selected firms
No. of banking firms	39	39	
No. of insurance firms	5	5	
No. of investment firms	9	9	
No. of service firms	10	4	6
No. of industrial firms	25	10	15
No. of hotel and tourism firms	10	2	8
No. of agricultural firms	6	0	6
Communication firms	2	2	
Financial transfer firms	17	17	
Total no. of sample firms	123	88	35

3.2. Data collection method

The required data of the study were gathered from different resources based on their types. Data related to the research literature and theoretical issues were collected from library resources, like Persian and Latin books and journals, official websites, and data related to firms (balance sheets and profit and loss statements) were used as the study tools.

Raw data and initial information were gathered for hypothesis testing from the

information bank of Tehran Stock Exchange, including Tadbir Pardaz and Rah Avard-e Novin and also from published reports of the Tehran Stock Exchange via direct access (which is done by analyzing the disclosed reports of the Codal Website and is gathered manually) to CDs provided by Tehran Stock Exchange, on the www.rdis.ir website, and other resources.

3.3. Data analysis

The data analysis method is cross-sectional and year-by-year (panel data). In this paper, the multivariable linear regression method is employed to test the hypotheses. Descriptive and inferential statistical purposes were used for analyzing the obtained data, such that the frequency distribution table is used for describing data. At the inferential level, F-Limer, Hausman, normality, and multiple linear regression tests were used for hypothesis testing.

3.4. Research model

The following multivariable regression model is used for testing the hypotheses of the study:

$$\Delta LnAfee_{it} = a_0 + a_1 VCA_{it} + a_2 VFA_{it} + a_3 VCL_{it} + a_4 VLTL_{it} + a_5 VRE_{it} + a_6 VEquity_{it} + a_7 Growth.Sales_{it} + a_8 VFCF_{it} + a_9 VCCF_{it} + a_{10} Loss_{it} + a_{11} LEV_{it} + a_{12} ROA_{it} + a_{13} ROE_{it} + a_{14} MTB_{it} + a_{15} Age_{it} + a_{16} Size_{it} + a_{17} Industry_{it} + a_{18} Year_{it+} + \varepsilon_{it}$$

Where

ΔLnAfee: audit fee changes, equal to the natural logarithm of audit fee changes.

ΔVCA: current assets changes

ΔVFA: noncurrent assets changes

ΔVCL: current liabilities changes

ΔVLTL: noncurrent liabilities changes

ΔVRE: firm revenue changes

ΔVFCF: firm free cash flow changes

ΔVCCF: firm capital cash flow changes

ΔVEquity: firm equity changes

Size: firm size, equal to the natural logarithm of firm assets

LEV: firm financial leverage, equal to total liabilities to total firm assets

ROA: return on assets, equal to net profit to total firm assets

ROE: return on equity, equal to net profit to book value of equity

Growth Sales: growth in sales, equal to sales of this year minus previous year divided by sales of the previous year

Age: firm age, equal to the time lapse between foundation date and the year understudy

Loss: firm loss, a dummy variable, which is one of the firms is losing; otherwise, it is 0

MTB: book value to firm equity market

Year: a dummy variable for year

Industry: a dummy variable for the industry

it is worth mentioning that the model mentioned above is tested once for the Iranian firms' data, and once for the Iraqi firms, the output will be compared and assessed.

3.5. Research variables

3.5.1. Dependent variables: Audit fee (AFEE)

3.5.2. Control variables: Firm size (SIZE), financial leverage (LEV), firm age (AGE)

3.5.3. Independent variables: current assets changes (VCA), noncurrent assets changes (VFA), current liabilities changes (VCL), noncurrent liabilities changes (VLTL), revenue changes (VRE), changes in cash flow equity (VECF), free cash flow changes (VFCF), capital cash flow changes (VCCF), equity changes (VEquity).

4. Data Analysis

Table 3. Descriptive statistics of variables for Iran

Symbol	Variable	No. of observation	Total mean	Std. dv.	Min.	Max.
$\Delta Afee$	Changes in audit fee	645	0.0080	0.0596	-0.5129	0.6122
VCA_{Δ}	Changes in current assets	645	0.05023	0.2833	1.62	3.09
VFA_{Δ}	Changes in noncurrent assets	645	0.3113	1.4937	-5.1340	1.81
VCL_{Δ}	Changes in current liabilities	645	0.5618	3.6947	-2.45	5.51
$VLTL_{\Delta}$	Changes in noncurrent liabilities	645	0.0927	0.9099	-4.7225	1.51
VRE_{Δ}	Change of firm revenues	645	0.6927	6.1855	-3.69	1.02
$VFCF_{\Delta}$	Changes in free cash flow of the firm	645	0.1565	3.5027	-1.72	5.68
$VCCF_{\Delta}$	Changes in investment cash flow of firm	645	-0.0238	1.2614	-1.34	5.2597
$VEquity_{\Delta}$	Changes in firm equity	645	0.3999	2.0338	-9.9397	1.76
$Size$	Firm size	645	14.2004	1.1576	10.5330	19.1500
LEV	Financial leverage	645	0.6023	0.2268	0.0902	2.3152
ROA	Return on assets	645	0.1112	0.1513	-0.7896	0.6313
ROE	Return on equity	645	0.2564	0.9418	-16.8456	6.8885
$Gross.Sale$	Sales growth	645	0.2079	0.5455	-0.8453	7.7053
Age	Firm age	645	38.0310	12.8016	10.0000	65.0000
$Loos$	Firm loss	645	0.1256	0.3316	0.0000	1.0000
MTB	Book value to market equity of the firm	645	0.3760	3.2859	-3.2859	1.9061

Resource: databank of the study

4.1. Results of unit root test of variables

By evaluating unit root for Iranian data, we observed that all variables are mostly at the non-unit root level (stationary). The obtained LM statistic for each variable is

reported in Table 5. Only the variables of VCL_{it} VRE_{it}, and Age_{it} are at the unit root level. The obtained LM statistic for the unit root test of these variables rejects the null hypothesis concerning the absence of unit root at the 99% probability level for variables of VCL_{it} and Age_{it} and the 90% probability level for the variable of VRE_{it}. By differentiating for only one time, the variables of VRE_{it}, and Age_{it} have not unit root. Moreover, the second-order differentiation of the variable VCL_{it} also has no unit root.

By evaluating unit root for Iraqi data, we observed that all variables are mostly at the non-unit root level (stationary). The obtained LM statistic for each variable is reported in Table 5. Only the variables of VFA_{it} are at the unit root level. The obtained LM statistic for this variable's unit root test rejects the null hypothesis concerning the absence of unit root at the 99% probability level. By differentiating for only one time, this variable still has a unit root. The second-order differentiation of the variable of VFA_{it} has no unit root.

Table 4. Descriptive statistics of variables for Iraq

Symbol	Variable	No. of observation	Total mean	Std. dv.	Min.	Max.
$\Delta Afee$	Changes in audit fee	95	1.9561	8.4607	1.08	6.53
$VCA\ \Delta$	Changes in current assets	174	7.64	7.35	3.78	7.22
$VFA\ \Delta$	Changes in noncurrent assets	174	8.07	5.85	-2.13	7.45
$VCL\ \Delta$	Changes in current liabilities	174	8.10	6.10	-7.06	6.99
$VLTL\ \Delta$	Changes in noncurrent liabilities	175	2.08	1.46	-5.00	8.95
$VRE\ \Delta$	Change of firm revenues	158	1.03	1.06	-1.80	1.24
$VFCF\ \Delta$	Changes in free cash flow of the firm	113	4.82	7.26	-2.36	3.96
$VCCF\ \Delta$	Changes in investment cash flow of the firm	123	-5.14	8.40	-6.61	3.42
$VEquity\ \Delta$	Changes in firm equity	174	4.99	7.87	-5.32	5.08
$Size$	Firm size	174	22.3749	1.3127	19.2560	26.2976
LEV	Financial leverage	174	0.4318	0.6082	0.0029	4.0694
ROA	Return on assets	174	-0.0387	0.3183	-3.1817	0.3377
ROE	Return on equity	173	-0.1715	3.0238	-38.6741	2.7860
$Gross.Sale$	Sales growth	164	3.3030	36.0296	-5.5062	459.7828
Age	Firm age	175	31.4571	13.3139	11.0000	70.0000
$Loos$	Firm loss	175	0.3657	0.4830	0.0000	1.0000
MTB	Book value to market equity of the firm	175	0.6606	1.1544	-1.6325	9.8113

Resource: databank of the study

As can be seen in these tables, the results of the robust model estimation are reported. In this panel data model, four classic econometric hypotheses are analyzed, and the reliable results will be reported. These four hypotheses include variable linearity, exogeneity of explanatory variables, homogeneity variance, and absence of serial autocorrelation among disruptive components.

Given the used regressions, the intercept of the first model is not significant for Iranian firms. The intercept of this model is -7.3512, which is significant at the 95% level. For Iraqi firms, the intercept of the first model is significant. The intercept of this model is 3.44e+07, respectively, which is significant at the 99% level.

Table 5. The results of the Hadri unit root test for the Iranian data

Variable	Level	First-order difference	Second-order difference	Variable	Level	First-order difference
$\Delta Afee$	0.9942			$VEquity_{\Delta}$	0.9864	
Loos	0.9153			*Size*	0.5917	
MTB	0.6690			*LEV*	0.7314	
VCA_{Δ}	0.9891			*ROA*	0.9824	
VFA_{Δ}	0.9917			*ROE*	0.7792	
VCL_{Δ}	0.0000	0.0030	0.9997	*Gross Sale*	0.9533	
$VLTL_{\Delta}$	0.9999			*Age*	0.0000	0.5164
VRE_{Δ}	0.0983	1.0000				
$VFCF_{\Delta}$	0.9973					
$VCCF_{\Delta}$	0.9998					

Note. The null hypothesis is the absence of unit root for variables. The LM statistic is reported. *** and * show significance at 99 and 95% level.

Table 6. The results of the Hadri unit root test for the Iraqi data

Variable	Level	First-order difference	Second-order difference	Variable	Level	First-order difference
$\Delta Afee$	0.7943			$VEquity_{\Delta}$	0.4298	
Loos	0.2487			*Size*	0.3984	
MTB	0.9940			*LEV*	0.7651	
VCA_{Δ}	0.8615			*ROA*	0.8958	
VFA_{Δ}	0.0000	0.0012	0.8795	*ROE*	0.2549	
VCL	0.8451			*Gross Sale*	0.8754	
$VLTL_{\Delta}$	0.2591			*Age*	0.2936	
VRE_{Δ}	0.2758					
$VFCF_{\Delta}$	0.6203					
$VCCF_{\Delta}$	0.7637					

Note. The null hypothesis is the absence of unit root for variables. The LM statistic is reported. *** shows significance at the 99% level. The study models' estimation results are depicted in tables 7 and 8 for the Iranian and Iraqi firms. The first column of these tables

illustrates the name of contributing variables to the above dependent variables.

By considering model 1 estimation for the Iranian and Iraqi firms, the impact of current assets changes (VCA) on audit fee changes is negative for the Iranian data. It is significant at the 99 % level. In contrast, the effect of changes in current assets on audit fee changes is positive for the Iraqi data and is significant at the 99% level. By a 1% increase in current assets changes, the Iranian firms' audit fees decrease by -0.0107, and changes in audit fees of the Iraqi firms increase by 0.0036.

Table 7. The results of model estimation for the Iranian firms

Variable	Model 1 Coefficient (standard error)
Constant	-37328.15 (29321.2)
$VCA_{it}\ \Delta$	-0.0107*** (0.0022)
$VFA_{it}\ \Delta\Delta$	-0.0187*** (0.0037)
$VCL_{it}\ \Delta$	0.009*** (0.0018)
$VLTL_{it}\ \Delta$	0.0219*** (0.0032)
$VRE_{it}\ \Delta$	0.0024*** (0.0007)
$VFCF_{it}\ \Delta$	-0.0035*** (0.0012)
$VCCF_{it}\ \Delta$	-0.0112*** (0.0026)
$VEquity_{it}\ \Delta$	0.0092*** (0.0022)
$Size_{it}$	2987.198* (2028.151)
LEV_{it}	-20226.05* (12018.33)
ROA_{it}	-32393.18* (24913.48)
ROE_{it}	-4651.829 (4088.84)
$Gross.Sale_{it}$	655.1433 (4057.504)
Age_{it}	264.7858* (184.0248)
$Loos_{it}$	-13234.36* (8645.26)
MTB_{it}	27435.95** (12906.66)
Number of obs.	382
Adj. R-squared	0.4121

Note. ***, **, and * show significance at 99, 95, and 90% level.
Resource: research variables

The changes in noncurrent assets (VFA) cause a decrease in Iran's audit fee changes and an increase in Iraq's audit fee changes. By a 1% increase of the VFA variable, the changes in audit fees at the 99% level for the Iranian firms decrease by -0.0187% and increase by 0.0038% of the Iraqi firms. Changes in current liabilities (VCL) would increase Iran's audit fee changes and decrease Iraq's audit fee changes. This variable's coefficient in the first model for Iran and Iraq at 99% confidence level is 0.0099 and -0.0035, respectively (except for the coefficient of changes in current liabilities for auditor change in Iran, which is significant at 95% confidence level). The changes in noncurrent liabilities (VLTL) would increase audit fee changes in Iran and Iraq. By a 1% increase in the VLTL variable, the changes in audit fees will increase in Iran and Iraq, at 99 and 95% level, by 0.0219 and 0.0048%, respectively. The changes in firm revenues (VRE) would increase Iran's audit fee changes and decrease Iraq's audit fee changes. By a 1% increase of the VRE variable, the Iranian firms' audit fees' changes will increase by 0.0024% (at 99% confidence level). The changes in Iraqi firms' audit fees will decrease by -0.0006% (at 95% confidence level).

Table 8. The results of model estimation for the Iraqi firms

Variable	Model 1
	Coefficient (standard error)
Constant	0.0036*** (0.0004)
$VCA_{it}\ \Delta$	0.0038*** (0.0004)
$VFA_{it}\ \Delta$	-0.0035*** (0.0003)
$VCL_{it}\ \Delta$	0.0048** (0.0022)
$VLTL_{it}\ \Delta$	-0.0006** (0.0003)
$VRE_{it}\ \Delta$	-0.0014*** (0.0002)
$VFCF_{it}\ \Delta$	-0.0006*** (0.0002)
$VCCF_{it}\ \Delta$	-0.0005*** (0.0001)
$VEquity_{it}\ \Delta$	-1501219*** (585806.3)
$Size_{it}$	-1.34e+07*** (4105863)
LEV_{it}	-2.09e+08*** (3.54+e07)
ROA_{it}	1.85+e08*** (2.61e+07)
ROE_{it}	-405403.8** (182775.5)
$Gross.Sale_{it}$	-2451751* ((51856.03)
Age_{it}	-2451751 (1832397)
$Loos_{it}$	2399927*** (627126)

MTB_{it}	3.44e+07*** (1.31e+07)
Number of obs.	72
Adj. R - squared	0.9901

Note. ***, **, and * show significance at 99, 95, and 90% level. Resource: research variables

The changes in the firm's free cash flow (VFCF) would cause a decrease in audit fee changes in both countries. This variable's coefficient in the first model is 0.0035 and -0.0014, respectively, which is significant at the 99% level. The firm's capital cash flow (VCCF) decreases audit fee changes in both countries. This variable's coefficient in the first two models for Iran and Iraq is -0.0112 and -0.00006, respectively, significant at the 99% level. The changes in firm equity (V Equity) would increase Iran's audit fee changes and decrease Iraq's audit fee changes. This variable's coefficient in the first two models for Iran and Iraq is 0.0092 and -0.0005, respectively, significant at the 99% level. In the second model, the V Equity variable's coefficient for both countries at the 99% level of significance is -2.60e-07 and -9.14e-12, respectively. The coefficient of firm equity changes in the third model for Iran and Iraq is -4.57e-08 at the 95% level of significance and -1.22e-11 at the 90% level of significance.

5. Conclusion

The present study is concerned about the relationship between cash flow statements and balance sheets and audit fees in Iran and Iraq. The hypothesis testing results indicate a significant relationship between cash flow and balance sheet and audit fees in Iran and Iraq. In other words, the study posits that the impact of changes in current assets on changes in audit fees is negative for Iran and positive in Iraq. This means that with a 1% increase in the changes in current assets, the changes in Iranian firms' audit fees drop, and the changes in audit fees of the Iraqi firms will go up. Moreover, the present study analyzes the relationship between changes in noncurrent assets and changes in audit fees in an Iranian and an Iraqi firm, which means the changes in noncurrent assets cause a decrease in Iran's audit fees and an increase in changes in audit fees in Iraq. By 1% growth of the variable, the changes in audit fees will go down for the Iranian firms and enhance the Iraqi firms. These findings confirm with that of the Majeed Abd Zeid Hamad (2009), Castro et al. (2015), Munsif et al. (2011), Ramzy (1988), Brinn et al. (1994), Francis and Wilson (1988), Chen et al. (1993), Lyer and Lyer (1996), Johnson et al. (1995), DeFond et al. (2002), and Mehrani and Jamshidi Ivanaki (2011) who declare that changes in current and noncurrent assets are significantly associated with the changes in audit fees and the results are in contrast with that of the Nikbakht and Tanani (2009). They argue that there is no relationship between current asset changes and changes in audit fees in firms. The changes in current debts would increase Iran's audit fees and decrease Iraq's audit fees changes. By a 1% increase in the variable, the Iranian and Iraqi firms' changes in audit fees will increase. This result is in line with that of Naser and Al-Khatib (2000), Majeed Abd Zeid Hamad (2009), Castro et al. (2015), who claim that the changes in debts would lead to an increase in the changes in audit fees.

The changes in firm revenues would increase Iran's audit fees and decrease audit fees in Iraq. By a 1% increase in this variable, the changes in the Iranian firms' audit fees will increase, and the Iraqi firms will decrease. This finding is in line with the results of Moutinho et al. (2012), who express that there is a significant relationship between the operational earnings of firms and audit fees. The firm's free cash flow changes would decrease the changes in audit fees in both countries, which means there is a negative relationship between changes in the firm's free cash flow and changes in audit fees. This result is in contrast with that of Mousavi, and Daroghe Hazrati (2011) and Hejazi et al.

(2012), who posit that firms with high free cash flow have more audit fee and firms with free cash flow, debt level, dividends, and sales have higher audit fee. The changes in a firm's capital cash flow are factors for the decline of audit fee changes in both countries. There is a negative and significant relationship between capital cash flow changes in a firm and audit fee changes in both countries. This finding contrasts with that of Hejazi et al. (2012), who declare that cash flow changes positively and significantly affect audit fees.

Further, this result is also in contrast with that of Munsif et al. (2011), who argue that there is no association between these two variables. Changes in firm equity would cause an increase in changes in audit fees in Iran and a decrease in audit fees in Iraq, which show there is a positive relationship between change in equity and changes in audit fees in the Iranian firms and a negative and significant relationship for the Iraqi firms. This means that the increase in the Iranian firms' equity changes would increase audit fees and the Iraqi firms, causing a decrease in audit fees. This finding is in line with that of Fernando et al. (2010). They claim a negative and significant relationship between qualitative characteristics of auditing (including audit firm size, expertise, tenure, and audit fee) and cost of equity.

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Research Article

Developing the Audit Quality Measurement Model Using Structural Equation Modeling

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Abstract

The purpose of the present study is to investigate the factors affecting audit quality. For this purpose, the concepts of audit quality were extracted using the proposed conceptual model. The factors affecting audit quality, including policy-making, supervision, and operations (including the categories of input, process, and output), were identified by a systematic approach. The dimensions of supreme council independence, financial reporting requirements, audit institutions' size, industry auditor, audit fees, corporate governance system, stockbrokers or non-stockholders, thought-based auditing, formulating various industry guidelines, auditors' perceptions of governance, the use of information technology, and the establishment of a professional supervisory body constitute the conceptual model of audit quality.

After identifying and designing the primary model, a questionnaire was developed and distributed among the audit firm's partners. The audit quality measurement model was designed using Structural Equation Modeling, and the research hypotheses were identified.

According to the research results, the audit quality has a moderate positive and significant relationship with the audit profession's policy-making factors and a strong positive and significant relationship with the audit operations. Also, in terms of the operational factors, the audit quality has a strong positive significant relationship with the input, and a strong positive significant relationship with processes, and a moderately significant positive relationship with the output; finally, the audit quality has a moderately positive and significant relationship supervisory factors.

To date, the empirical evidence that justifies the validity of the influence of the factors such as policy making, supervision, and operations (including the categories of input, process, and output) all together on the development of the audit quality measurement model in Iran has not yet to be found.

Keywords: Audit Quality, Corporate Governance, Internal Controls, Audit Fee, Supervisory Body, Policy-Making

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1. Introduction

The developments over the last decade, especially in regulations, have influenced the audit profession. From relying solely on dispersed and discretionary regulations in 2002, auditing has become a highly regulated profession by the government and independent legislators. An examination of these developments can show many issues about the motivation for regulation and, in addition, it can indicate the capacities (deficiencies) of the regulation of audit quality. According to the legal developments over the past decade, we can expect that the existing legal environment has unintended consequences which, though difficult to predict, there are many indications to confirm them.

There is still no consensus on the definitions, components, and metrics of auditing quality across multiple research and legislators, investors, and researchers, despite the importance of audit quality for the stability of capital markets (Bedard, Johnston & Smith 2010). By defining and measuring audit quality, stakeholders can determine whether the audit quality is improving over time, identify quality audits' weaknesses, and provide incentives for the audit firms to invest in audit quality improvement projects. To this end, the projects are on the agenda in the International Auditing and Assurance Standards Board (IAASB, 2013), Public Company Accounting Oversight Board (PCAOB, 2012, 2013, 2014), American Institute of Certified Public Accountants (AICPA, 2014), and Center for Audit Quality (CAQ, 2012, 2013, 2014) as well as the audit firms themselves (KPMG, 2011; PwC, 2014) seeking to define, measure, and evaluate audit quality and demonstrate a broad interest in understanding audit quality; however, they are still in the early stages of development. We contribute to this subject by understanding investors and auditing professionals (as the two key groups interested in the financial reporting and auditing process) about audit quality and their measurement criteria.

Most of the previous studies on the quality of audits are mostly conducted in the advanced countries that may bring their own culture and country's economic system to the research result. In addition, those researches have used several factors affecting the audit quality, including; the number of professional staff, the audit firm's age, audit fee, the application of quality control standards, and the audit firms' size. However, so far, the empirical evidence that justifies the validity of the influence of the factors such as policy making, supervision, and operations (including the categories of input, process, and output) all together on the development of the audit quality measurement model in Iran has not yet to be found. This research is conducted to extract audit quality concepts using the proposed conceptual model and identify the factors affecting audit quality through a systematic approach.

2. Problem Statement

Over the past decades, criticism by prominent auditing associations about the importance of credible and quality financial reporting has been increased following the global financial crisis and other turbulent events in the international economy. These associations also addressed the role and importance of the audit services quality in a new and innovative way, and considered the quality of the financial reporting and the audit process subjected to achieving the audit process quality and in general, the accuracy of the cycles as one of the factors affecting the supply chain of financial reporting. Audit quality is a measure based on the different people's tastes and perspectives on various variables. Hence, the society seeks to know "whether audit services are of required quality" and "what are the dimensions of criteria for evaluating audit quality?".

Although audit quality is no longer a new concept in auditing, there is still no single

universal definition that individuals can reach unanimously to date.

The International Association of Auditing and Assurance Standards (2011) defines audit quality as follows: "Audit quality can be viewed as a triangular system with inputs, outputs, and process factors at three angles." According to this definition, the audit quality can be influenced by resources such as the auditor's skill and experience, ethical values, and the approval process that an audit team has adopted; it is also clear that a rigorous legal environment and good corporate governance can positively correlate with audit quality.

International Auditing and Assurance Standards Board (IAASB, 2014) Framework on Independent Audit Quality includes inputs, processes, outputs, and interactions between corporate governance bodies, management, auditors, users, legislators and contextual factors (rules and financial reporting regulations, business practices, business law, financial reporting frameworks, information systems, corporate governance, cultural factors, auditing laws, legal environments, talent acquisition, financial reporting timelines, and cultural factors). The Public Company Accounting Oversight Board (PCAOB, 2013) framework is also similar to this framework.

Although several attempts have been made to define audit quality so far, none have led to the definition accepted by professional associations and the community of accountants or recognized by the international community. Because audit quality is one-dimensional, and at the same time, a complex and multi-faceted concept in essence, and many factors, directly and indirectly, affect audit quality. However, some factors that may have a direct impact on audit quality may be important. However, this view is only sufficient to address whether auditing quality can be achieved in a broader context.

Perceptions of the audit conceptual quality and the actual audit quality are different concepts. Although it is important to consider the actual audit quality rather than the perception of the actual audit quality, it is not easy to measure the actual audit quality because the actual audit quality is invisible and can only be observed after the audit. The uses legal claims against auditors to measure the actual audit quality. Sepasi et al. (2016) reported measuring the actual audit quality report of non-compliance with accepted accounting standards in audited financial statements (Murat, 2018).

Audit quality generally has three aspects of input, output, and environmental factors. Inputs affecting audit quality include auditing standards, individual characteristics (such as ability, experience, ethical values, and auditor's thinking), the right methodology of audit processes, effectiveness of tools, and adequate techniques. Outputs affecting audit quality are audit reporting and meeting community needs. Therefore, according to the research done and issues affecting the audit quality, this question is raised: Which of the following models can be considered an effective factor for measuring audit quality? And when all audit quality models are measured from a different perspective and with different variables, how can we determine which model is optimal and appropriate? Therefore, the researcher seeks to identify the factors affecting the audit quality in firms listed in the Iranian Association of Certified Public Accountants based on the literature.

Audit quality is undoubtedly one of the most important accounting and auditing research areas evaluated both academically and professionally. The strong dependence of the auditing profession on the academy requires mutual consultation and the university's integrity. This indicates that the auditing profession requires academic research and utilizing the research in accounting and auditing. Therefore, it is necessary for the researcher to establish a continuum and a turning chain between the research on audit quality and linking the assumptions of audit quality research together to take a fundamental step in the country's audit field.

3. Research Background

Much research has been done regarding the audit quality inside and outside the country that some have addressed in this research.

Research conducted by Mohamed et al. (2019) emphasizes the importance of prior ideas on auditor-client compatibility. According to their findings, high compatibility between the client and the auditor is generally characterized by high efficiency in the audit process. In other words, the audit effort effectively affects audit quality. According to their findings, the highest compatibility ensures the best outcome for the audit process. However, from an earlier perspective, auditor-client compatibility is known for the market members such as investors, client companies as well as market auditors. According to their model, poorly adapted auditors can improve auditing with more specific compatibility. So, suppose the independent auditor's audit plays a relatively moderate role. In that case, auditors with poorer compatibility have stronger incentives to exert effort and are expected to produce higher audit quality and audit added value.

In a study conducted by David et al. (2019), the important inputs for auditing and analyzing audit quality determinants based on PCAOB indices and their benefits are examined. According to their research results, the audit team's composition is the most important factor in audit quality. Their findings also indicate that the division of labor between audit staff, audit executives, and audit partners, and the interaction between the audit team and senior audit executives, expands the empirical relationship between them and improves audit quality. They also found that auditors allocate most of their time to submit audit files to PCAOB inspectors, which indicates an increase in audit quality because the items evaluated by PCAOB inspectors shows the audit quality improvement.

Research conducted by Mohamed et al. (2019) has addressed the impact of disclosing significant audit issues and auditors' confidence in investors' decisions based on PCAOB requirements. According to their findings, one of the key issues in improving the audit quality is the auditors' requirement to report important audit issues that have been required recently by the Public Accounting Oversight Board. Their research concluded that the need to report important audit issues causes investors to respond to reported information, thus providing a proper report. The impact of the information contained therein makes auditors more sensitive to reporting. As a result, they provide better quality audits.

Murat (2018) investigated the impact of reporting weaknesses in internal controls following PCAOB requirements on audit quality. Using accruals anomaly and the probability of identifying material weaknesses in internal control, they found that if auditors had to report internal controls' weaknesses, they had to perform a better quality audit to report weaknesses in internal controls. This causes companies to be sensitive to this issue and respond to establishing appropriate internal controls, which reduces abnormal accruals and improves financial reporting quality.

In a study using audit market analysis, Adam et al. (2018) examined audit quality and audit pricing's structural features in the US audit market. In this study, using modeling of the audit quality structural characteristics, they surveyed audit pricing and the audit market in 138 areas between 2004 and 2016. Their research shows a positive (negative) relationship between audit focus and audit quality (audit pricing). However, there has been less improvement in audit quality in large markets, with institutions having a larger number of clients, even when the focus is low. Given the pricing of audit services, more focus leads to improving the competitive cost (lower audit costs) because of the economy scale improvement. However, this is only when the audit markets are small. When markets are large and centralized, the audit market's greater focus is

associated with higher audit costs (monopoly). This shows that trade is between economies of scale and market domination.

Fung, Raman, and Zoo (2017) looked at the effects of PCAOB surveillance indices in countries outside the US and evaluated 55 countries in their research. In their research, they examined the impact of PCAOB standards and indicators on improving audit quality in other countries. According to their results, the use of the PCAOB International Audit Program will improve the audit quality in these countries.

Chen and Hsu (2010) examined the relationship between audit firm size, audit quality, and audit fees with a large sample of audit firms from 2000 to 2005. According to the results of their research, the audit firm size is positively correlated with audit quality. The larger audit firm is less financially dependent on a particular auditor, and therefore better able to resist the auditors' pressures in issuing biased reporting. By examining the relationship between audit firm size and audit report quality in China, Constantinos and Clive (2008) found a significant relationship between audit firm size and reports quality.

The research conducted by Nikbakht and Khoshrow (2017) examined the factors affecting the audit quality in Iran, according to the PCAOB Accounting Audit Board Indicators. According to their findings, average work experience, industry expertise, affiliate scheduling, and workflows, managers and quality audit to total audit work, independence-related indicators and observance of indices, financial restatements and its impact on the market, partners and staff workload and the frequent relocation of partners and senior executives of the institution have the most impact on audit quality. These eight indicators account for about 80% of the cumulative percentage of the current study's indices.

Mohammad Rezaei and Yaghoub Nejad (2017) criticized the theory and method of previous internal research based on audit firm size theory between 2006 and 2015. According to their findings, the audit organization lacks most of a large auditor's characteristics according to the audit firm size theory. Also, criticism of the research methodology indicates that Iranian researchers do not control auditors' endogenous selection. The endogenous variable is a variable affected by one other variable in the designed model or pattern. When the independent variable is endogenous, it presents major statistical problems in model estimation. Their research addresses the theoretical research problem in Iran and proposes two contradictory theories of "audit fee pressure" and "public auditor and auditee".

Investigating the factors affecting the audit quality in audit firms of the Iranian Association of Certified Public Accountants has been addressed in Alavi et al. (2015). This study showed a significant positive relationship between the variables of audit quality, including the number of certified auditors employed, the number of professional staff and the age of the audit firm with audit quality control score, and the significant negative relationship between the variables of the number of partners and the number of audit firm's work with audit quality control score. According to their findings, there is no significant relationship between the audit firm's annual earnings and audit quality control score.

3.1. Research objectives and questions:

The objectives of the present study are:

- Providing a conceptual model of audit quality in the Iranian Association of Certified Public Accountants
- Identifying the factors affecting the Audit quality in Iranian Association of Certified Public Accountants
- Identifying the relationship between different factors in audit quality in the Iranian

Association of Certified Public Accountants

Then, according to the stated research objectives, the research questions are as follows:

1) What model does the Iranian Association of Certified Public Accountants follow to measure audit quality?
2) What are the factors affecting the audit quality in Iran?
3) How is the relationship between the factors affecting the audit quality in the country?

3.2. The conceptual model

This section addresses whether a final and comprehensive model can be presented of the factors affecting audit quality. In this regard, by reviewing the research background and interviewing experts in the audit profession, the identified factors were divided into three main categories: policy, operational, and regulatory factors. This study's independent variables are classified into six categories, and the dependent variable is audit quality. Table 1 provides the sub-construct of each independent variable, and then the research model is formulated:

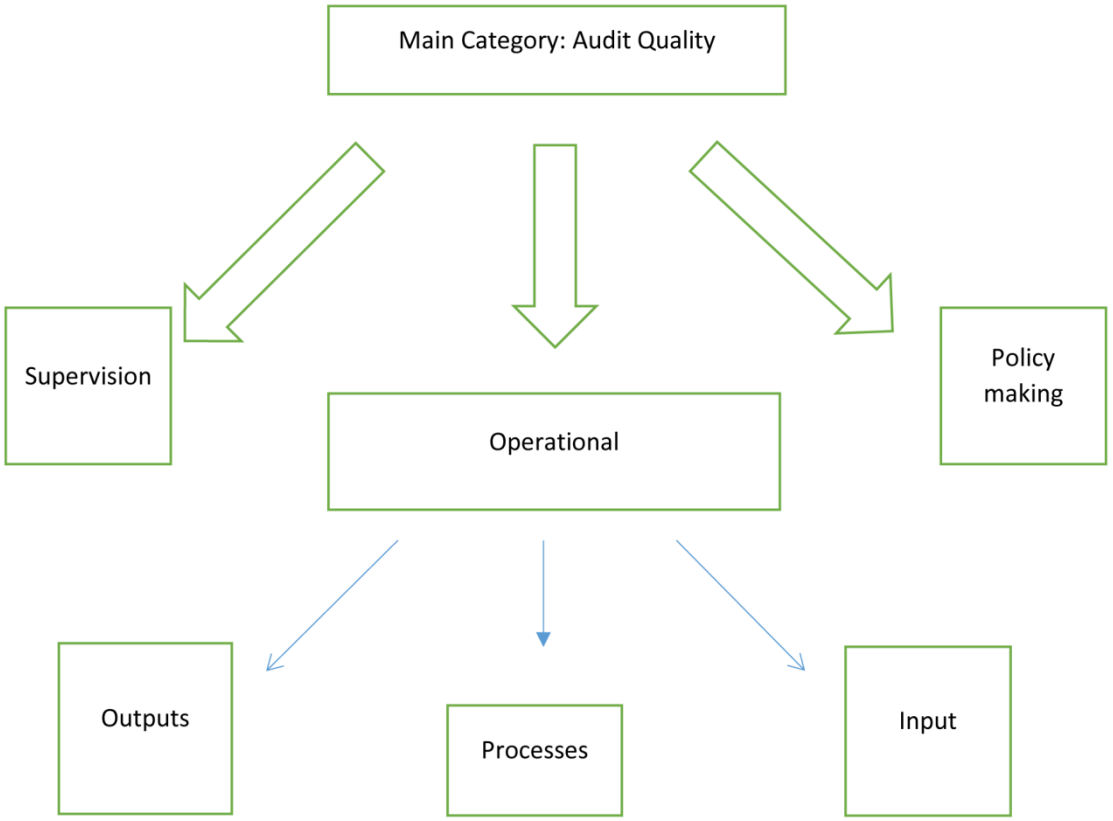
Table 1. sub-construct of each independent variable

Theme analysis	Conceptual category		Theme
P1,P3,O1,Q2,Q3,Q4,B1,B3,B5	Supreme Council Independence		policy
P1,P2,P3,O2,Q1,Q2,Q4,B2,B4,B3,E2,E3	Financial reporting requirement		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q5,B2,B3,B4,B5,E1,E2	Financial transparency requirement		
P1,P3,Q2,Q3,Q4,B1,B4,B5,E2,E3	The partnership of audit firms with international audit firms		
P,2,P3,O1,O2,Q1,Q2,Q3,Q4,T1,B3,B4	Academic syllabuses modification		
P1,P2,P3,O1,O2,Q1,Q2,Q4,Q5,B1,B3,B4,B5,E1,E2	Linking the audit industry with university		
P1,P3,O1,O2,Q1,Q2,Q4,Q5,B1,B4,B5,E1,E2,E3	Professional juvenility and career creation for young people		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q4,Q5	Mandatory provisions for the better observance of the Code of Professional Conduct		
P1,P2,P3,O1,O2,Q1,Q2,Q4,Q5,B1,B3,B4,B5	Elitism in auditing and elaborating elite maintenance conditions		
T1,T2,B1,B2,B4,E2,E3,E4	Audit firm size	Input	Operational
P1,O2,Q3,Q4,T1,T2,B2,B3,B4,E1,E2,E3	Auditor tenure		
P1,P2,P3,O2,Q2,Q3,Q5,T23,B2,B3,B5,E1,E4	Industry auditor		
P1,P2,P3,O2,Q1,Q2,Q4,Q5,T3,B2,B4,E1,E3,E4	Audit fee		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q5,B2,B3,B4,B5,E1,E2	Governance mechanisms		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q4,Q5,B1,B2,B3,B4,B5,E1,E4	Operational Management of Audit Institutions in Controlled Oversight		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q4,T1,T3,B1,B2,B3,B4,B5,E1,E2	Identification of the auditor client		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q4,T1,T3	Thought-based audit	process	

P1,P2,O1,O2,Q1,Q2,Q3,Q5,T1,T2,T3,B1,B2,B3,B4,B5,E1,E4	Increase auditors' knowledge skills		
P1,P2,O1,O2,Q1,Q2,Q4,Q5,T1,T2,T3,B1,B2,B3,B4,B5,E1,E4	Proper supervision of audit team		
P1,P2,O1,O2,Q1,Q2,Q3,Q4,Q5,T1,T2,T3,B1,B2,B3,B4,B5,E1,E4	Increase the skill level of fraud detection based audit		
P1,P2,O1,O2,Q1,Q2,Q3,Q5,T1,T2,T3,B1,B2,B3,B4,B5,E1,E2,E3,E4	Increase auditors' skills in-laws and regulations and formulating various industry guidelines		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q5,T1,T2,T3,B1,B2,B3,B4,B5,E1,E2,E3,E4	Auditors' understanding of corporate governance and internal controls		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q5	Use of IT in auditing		
P1,P2,P3,O2,Q2,Q3,Q5,T23,B2,B3,B5,E1,E4	Improving auditing courses in various fields with an industry approach		
P1,O2,Q3,T1,T3,B2,B5,E2,E3,E4	Practical and non-audit financial experience		
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q4,Q5,T2,T3,B3,B5	Quality control before issuing an audit report	output	
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q4,Q5,T2,T3,B3,B5	Increase the skill level of the quality control team at the audit firm level before reporting		
Q1,Q3,Q5,B2,B4	Paying more attention to audit reports on specific items or future financial information		
P1,Q4,B5	Improving auditing courses with the approach of reporting internal controls and independent auditing		
P1,P3,O1,O2,Q4,Q5,B3	An independent supervisory body such as PCAOB		Regulatory Theme policy
P1,P3,O1,O2,Q2,Q4,Q5	Increasing the level of precision in the quality control group investigations		
P3,O2,Q1,Q4	An official report of audit institutions' Quality control weaknesses		

P3,O1,Q3,T1,T3,B5	An appropriate framework for reporting audit firms' error by staff	
P1,P3,O1,Q2,Q3,Q4,B1,B3,B5	Training special surveillance forces and efforts to protect them	
P3,O1,Q3,T3,B2	Periodic changes in regulatory forces	
P1,P2,P3,O2,Q1,Q2,Q4,Q5,T3,B2,B4,E1,E3,E4	Training industry-specific regulatory forces	
P1,P2,P3,O1,O2,Q1,Q2,Q3,Q5	Use of information technology and proper platform for instant monitoring	

In the present study, the content of the qualitative interviews with the participants provides a basic research model for measuring the audit quality as follows:



3.3. Research hypotheses

Six main hypotheses and six sub-hypotheses are proposed for this research based on the obtained model:

Main hypotheses:

Hypothesis 1: there is a positive and significant relationship between policymakers in the audit profession and audit quality.

Hypothesis 2: There is a positive and significant relationship between operational audit factors and audit quality.

Hypothesis 3: There is a significant positive relationship between regulatory audit factors and audit quality.

Hypothesis 4: There is a positive and significant relationship between policymakers in the audit profession and operational factors related to audit quality.

Hypothesis 5: There is a positive and significant relationship between policy-making

factors in the audit profession and supervisory factors related to audit quality.

Hypothesis 6: There is a positive and significant relationship between operational audit factors and supervisory factors related to audit quality.

Subsidiary Hypotheses:

Hypothesis 7: There is a positive and significant relationship between the operational factors of audit input and audit quality.

Hypothesis 8: There is a positive and significant relationship between operational factors of the audit process and audit quality.

Hypothesis 9: There is a positive and significant relationship between the operational factors of audit output and audit quality.

Hypothesis 10: There is a positive and significant relationship between the operational factors of audit input and the audit process operational factors with the audit quality.

Hypothesis 11: There is a positive and significant relationship between audit inputs and audit outputs, and audit quality.

Hypothesis 12: There is a positive and significant relationship between the operational factors of audit process factors and audit output and the audit quality.

4. Research Methodology

The present study is applied research in terms of the purpose and descriptive-analytical research in terms of the method. This study seeks to provide a model for measuring audit quality. In the theoretical section, the needed data to conduct the research were gathered by referring the books, journals, and internet sites. The questionnaire was used to collect data in the field stage. In the first step, the effective factors were identified by studying the theoretical foundations and confirmed by 22 experts. The final items were then distributed among 207 auditing partners of the Iranian Association of Certified Public Accountants, and 160 Likert questionnaires were finally received. The data were then analyzed through structural equation modeling.

The minimum number of samples is obtained according to the Cochran formula:

$$n = \frac{NZ^2pq}{Nd^2 + Z^2pq}$$

$$n = \frac{920 \times 3.8416 \times 0.25}{920 \times 0.0036 + 3.8416 \times 0.25} = 207$$

4.1. Reliability and validity

The composite reliability (CR) method was used to determine the reliability of the constructs. If the CR value for constructs is greater than 0.7, the reliability is more acceptable, and the closer this value is to 1 for a construct, the greater its reliability.

Unlike Cronbach's alpha, the composite reliability, which implicitly assumes that each index has the same weight, relies on each construct's actual factor loadings, and provides a better criterion for reliability.

The formula for calculating the composite reliability is as follows:

$$CR = \frac{(\sum\lambda)2}{(\sum\lambda)2+\sum\delta}$$

Where:

CR: Combined reliability

λ: extracted factor load for each marker in the form of confirmatory factor analysis; and

δ: the variance is the standard error of the indices.

Table 2. Composite and Cronbach's Reliability

Variables	Combined reliability coefficient CR¹(CR >0.7)	Cronbach's alpha reliability coefficient
policy	0.945813	0.932975
Inputs	0.936443	0.908970
Operational	0.924645	0.877609
processes	0.952545	0.937671
Outputs	0.932939	0.904244
Supervision	0.953604	0.943210

In Table 2-2, the Cronbach's alpha coefficients and the composite reliability of all variables in this study were greater than 0.7.

In addition to the questionnaire, reliability, content validity, and convergent validity were analyzed using PLS structural equation modeling. Convergent validity refers to the principle that the indices of each construct are moderately correlated with each other. According to Magner et al. (1996), the convergence validity criterion is that the mean extracted variance (AVE) is greater than 0.4.

Table 3. Convergent validity

Variables	Average extracted variance (AVE)
policy	0.814050
Inputs	0.845990
Operational	0.886757
processes	0.800625
Outputs	0.876696
Supervision	0.803595

The model is at a very good level in terms of all three criteria mentioned above, as can be seen.

4.2. Data analysis method

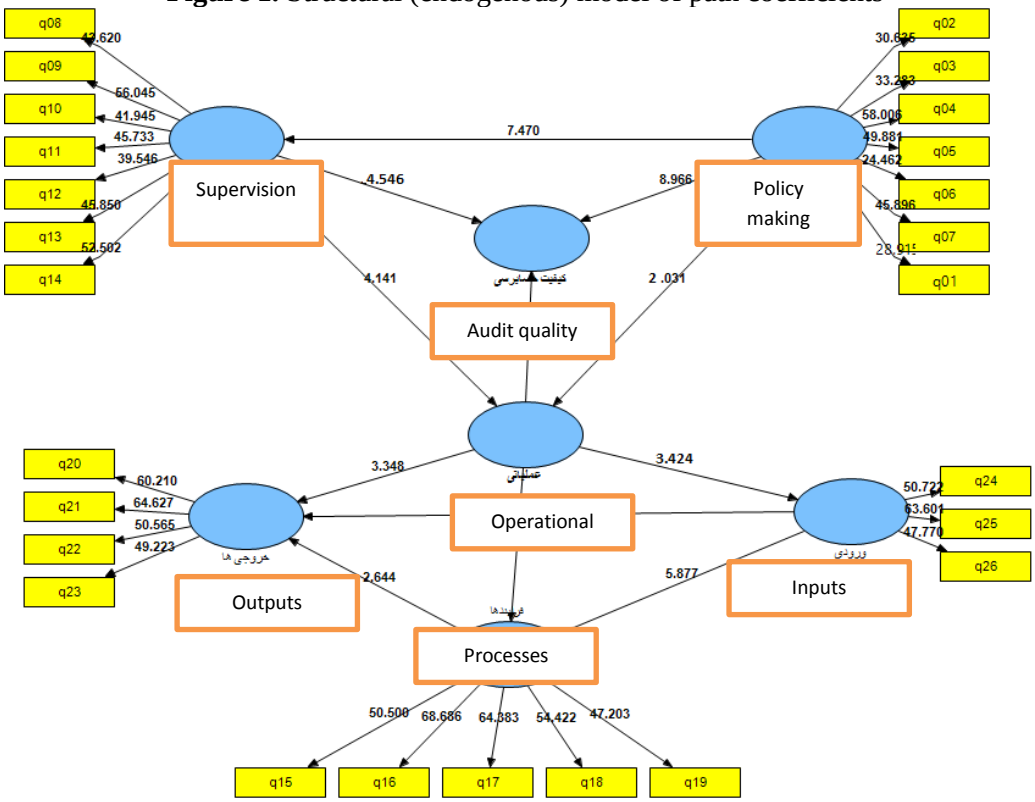
Structural Equation Modeling technique is a powerful multivariate analysis of the multivariate regression family and, more specifically, the development of "the general linear model to allow researchers to test a set of regression equations, simultaneously. Structural Equation Modeling is a common approach to test hypotheses about observed and latent variable relationships occasionally named as the structural analysis of covariance, empirical causal models, structural equation modeling, or SEM in short (Henock, 2005). Also, according to Henock (2005), multivariate analysis is one of the most powerful and appropriate analytical methods in behavioral research. This is because such issues are multivariate and cannot be solved by by-variable methods (where an independent variable is considered with a dependent variable). "Covariance analysis structures" or "Structural Equations Modeling" is one of the most original methods of the complex data analysis and one of the new methods for examining cause and effect relationships to analyze the various variables that, in have simultaneous effects on variables a theory-based structure. This method can test theoretical models' acceptability in their communities using correlation, non-experimental and experimental data. In addition, to meet the coefficients of equations of the linear estimate, LISREL Method is developed to fit models involving latent variables, measurement errors in each of the dependent and independent variables, mutual causality, and interdependence.

5. Research Findings

The overall research model was designed in the PLS Smart software environment. There is one dependent variable (audit quality) and six independent variables in this model, including policy, operational, (input, process, output) monitoring. The latent variables are shown as circles, and the explicit variables are shown as rectangles. Relationships between latent variables and explicit variables are called factor loadings. Structural equations are also relationships between latent and observed variables and are used to test hypotheses. These coefficients are called path coefficients. For testing the significance of the independent variable relationship with the dependent variable, value-t is used. At 95% confidence level, the value-t must be outside the range of -1.96 to 1.96 to be considered significant.

In the Structural Equation Model, we show how the latent variables relate to each other. The researcher develops a structural equation model to show specific relationships between latent variables and illustrates it by drawing arrows. In fact, we use this model to investigate the research hypotheses. After validating the measurement models and calculations of structural and diagnostic validity in the present study, we can test the relationships between the research structures at this stage. For this purpose, the model is implemented in LISREL software. Charts 2 and 3 show the research model with standard and significant coefficients.

Figure 1. Structural (endogenous) model of path coefficients



Since there is a latent first-order endogenous variable in this model, the $\overline{R^2}$ is equal to 0.76

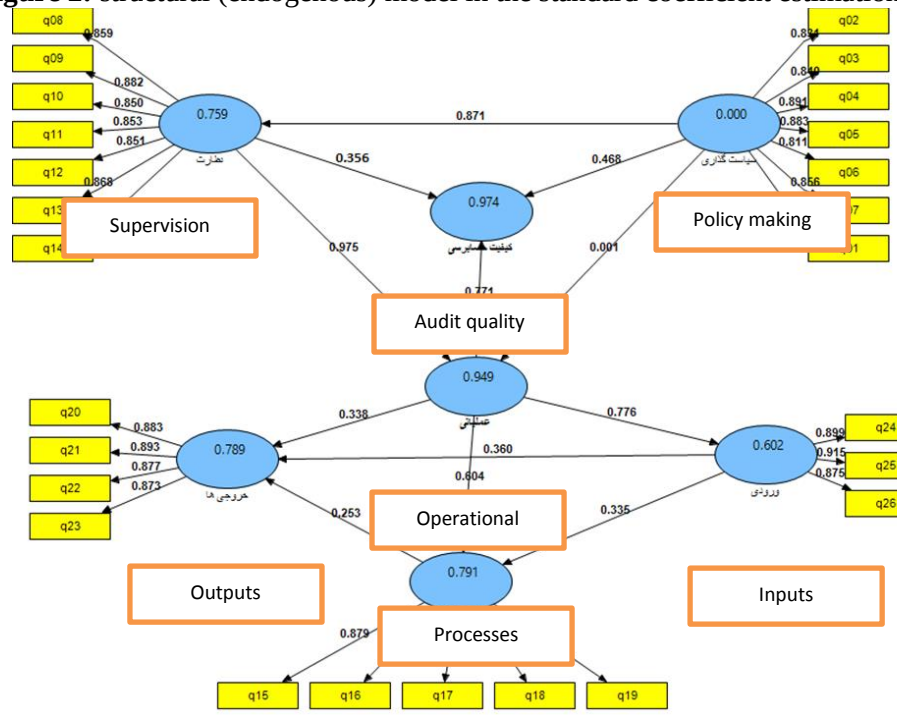
So the GOF index is:

$$GOF = \sqrt{*} = \qquad .624 \qquad .76 \qquad .69$$

Considering the three values of 0.01, 0.25, and 0.35 introduced as a low medium, and strong values for GOF. Finding a value of 0.724 for this criterion indicates a good fit for the overall research model.

According to Hashi and Mazaheri Fard (2013), the proposed value of GOF> 0.35 means the model quality reaches 97% of the covariance.

Figure 2: structural (endogenous) model in the standard coefficient estimation mode



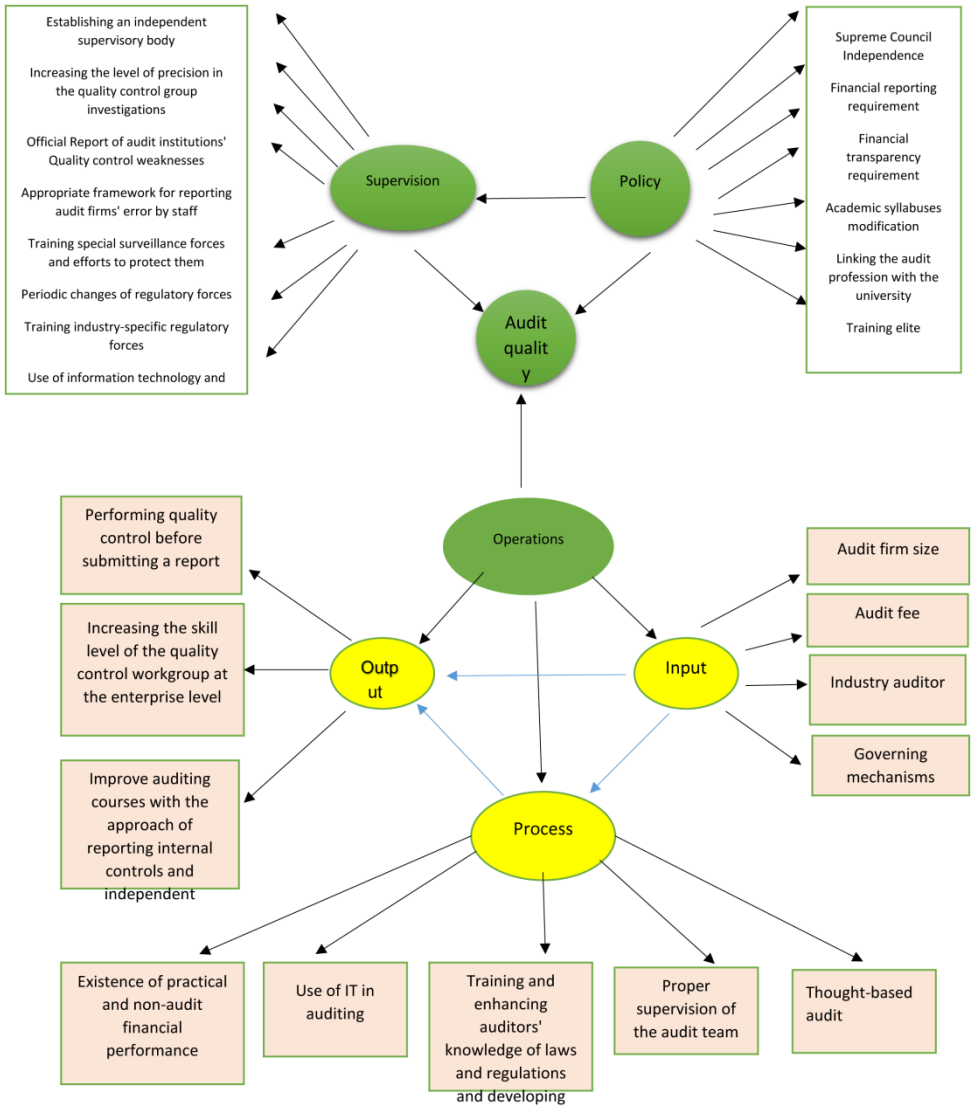


Figure 3. The final model of auditing quality measurement

Table 4. Measurement Model values for research sub-constructs (Structural Validity)

Dimensions	Component marker	Components	Factor loading	t-value
Policy-making	q1	Independence of the Supreme Council	0.799	28.915
	q2	Financial reporting requirement	0.824	30.625
	q3	Requires financial transparency	0.840	330283
	q4	Modifying syllabuses according to the audit profession	0.891	58.006
	q5	Linking the profession with the university	0.883	49.881
	q6	Professional youth	0.811	45.896
	q7	Audit elitism	0.856	45.896
Supervision	q8	Establish an independent supervisory body	0.859	42.620
	q9	Quality control working groups	0.882	56.045
	q10	Official quality control weaknesses report	0.850	41.945
	q11	Proper bedding to report errors	0.853	45.733
	q12	Training special supervisory forces	0.851	39.546
	q13	Use of information technology	0.868	45.850
	q14	Training industry-specific regulatory forces	0.881	52.502
Operational Processes	q15	Perform thought-based audit	0.879	50.500
	q16	Proper supervision of the audit team	0.913	68.686
	q17	Training and enhancing auditors' knowledge of laws and regulations and formulating industry guidelines	0.909	64.383
	q18	Use of IT in auditing	0.898	54.422
	q19	Existence of practical and non-audit financial performance	0.875	47.203
Operational - Inputs	q20	Audit firm size	0.883	60.210
	q21	Audit fee	0.893	64.627
	q22	Industry auditor	0.877	50.565
	q23	Governing mechanisms	0.873	49.223
Operations - Outputs	q24	Performing quality control before submitting a report	0.899	50.722
	q25	Increasing the skill level of the quality control group at the enterprise level	0.915	63.601
	q26	Improving auditing courses with the approach of reporting internal controls and independent auditing	0.875	47.770

Table 5. Fit indices of the general research model

Variables	Shared values	$\overline{R^2}$
policy	0.714050	.....
Operational	0.786757	0.949068
Inputs	0.803595	0.601716
processes	0.800625	0.790929
Outputs	0.776696	0.789260
Supervision	0.745990	0.758641

According to the above values, the mean of shared values is 0.69

5.1. Hypotheses testing

For the last two decades, Structural Equation Modeling has been a common research

tool in management, medical, and social sciences. Considering the material presented in this section, SMART-PLS will investigate whether these factors are influenced by the factors mentioned below. Then, factor measurement indices and factor determination coefficients will be examined.

The data obtained from the field research were executed in SMART-PLS software, and the following results were obtained.

Table 6. Regression coefficients and their significance level

Hypothesis	Path coefficient (B)	T-) (VALUE	Results
1. Policy factors affect audit quality.	0.468	8.966	Confirmed
2. Operational factors affect audit quality.	0.771	2.617	Confirmed
3. supervision factors affect the audit quality	0.356	4.546	Confirmed
4. There is a significant positive relationship between policy-making factors in the accounting and auditing profession and operational factors related to accounting quality.	0.001	2.031	Confirmed
5. There is a significant positive relationship between policymakers in accounting and auditing and supervision related to accounting quality.	0.871	7.470	Confirmed
6. There is a significant positive relationship between supervision in the auditing profession and operational factors related to accounting quality.	0.975	4.141	Confirmed
7. There is a significant positive relationship between operational factors in the audit profession and input factors related to audit quality.	0.776	3.424	Confirmed
8. There is a significant positive relationship between operational factors in the audit profession and process factors related to audit quality.	0.604	10.888	Confirmed
9. There is a significant positive relationship between operational factors in the audit profession and output factors related to audit quality.	0.338	3.348	Confirmed
10. There is a significant positive relationship between the audit profession's input factors and the process factors related to audit quality.	0.335	5.877	Confirmed
11. There is a significant positive relationship between process factors in the audit profession and output factors related to audit quality.	0.253	2.644	Confirmed
12. There is a significant positive relationship between input factors in the audit profession and output factors related to audit quality.	0.360	6.663	Confirmed

6. Conclusions and Suggestions

The present study aimed to provide an audit quality measurement model using structural equation modeling. For this purpose, the research has identified the factors affecting audit quality and has introduced the model of auditing quality measurement using structural equation modeling. The research results show that policy-making in the audit profession will have a high effect on audit quality. The appointment of an Independent High Council to select qualified people in the Association of Certified Public Accountants and influence the government for the benefit of the Association of Certified Public Accountants may provide requirements for financial transparency and reporting. On the other hand, policymakers in the audit profession can enhance the

auditing industry's relationship with the university, build productive interactions, and effectively communicate by synchronizing syllabuses with the profession. Policymakers in the auditing profession should seek elitism and rejuvenation because of their current status and the low audit fee. It is possible for the auditing to exit because of low income. Considering that most constituent communities are made up of senior accountants, special attention may need to be paid to rejuvenation. From the audit operation perspective, it is necessary that the staff of the corporations move toward thought-based auditing rather than routine audits. The audit profession is a critical professional that requires familiarity with up-to-date issues and techniques. The prerequisite of the audit quality improvement is to supervise auditing tasks and utilize information technology more quickly. Train industry auditors, and ultimately increase the quality audit work and publish more quality reports or increase corporate income level. Although most international corporations derive their income from other financial services and earn more than reassurance services, their audit fees are high. The rationality of audit fees makes institutions more sensitive to auditing, preventing the departure of strong auditing forces, increases institutional-level elitism, focuses on training, and so on that. In addition to the policy-making level, these issues should also be addressed at the institution's operations level. The absence of an independent oversight body, either from the government or from the public body, is one of the major problems in today's public accountant community, leading to poor audit quality. In most countries in the world, such as the United States, Britain, and China, the overseer body is public. It operates under the Stock Exchange or the Ministry of Economic oversight. The establishment of an overseer body will give greater attention to the audit profession, prevent audit reports, and complete poor quality audit records. On the other hand, increasing the Association of Certified Public Accountants' quality and software knowledge and skills will also prevent audit quality reports. These will all serve as monitoring tools for audit firms to improve the quality of audit work. Suppose auditing firms are aware of audit reports' quality weaknesses, such as the audit quality records published annually by the US Audit Quality Control Center. In that case, firms can better understand audit quality weaknesses and provide audit efforts with more accurate records following auditing standards.

Focusing on the audit quality in different dimensions, the present research addressed the issue from the policy point of view and suggested that it synchronize the audit profession's syllabuses. It is also necessary to appoint individuals to the Supreme Council. They have the power to lobby with government agencies to convince the authorities of the financial transparency required to conduct quality audits so that the auditing profession in the community can be more highlighted and the responsiveness is institutionalized in society. The practical application of the research findings and the model presented will help the community to take a more effective step towards enhancing the auditing profession, financial transparency, financial reporting, and the fight against corruption. Undoubtedly, the proposed model can be used by the Tehran Stock Exchange, Ministry of Economic Affairs and Finance, and the Association of Certified Public Accountants, and this model can be used to measure the audit quality and increase the audit quality in the country.

From the operational perspective, the Association of Certified Public Accountants is expected to support auditors and audit firms on audit fees. According to the research findings at domestic and foreign level, the fees have a significant impact on the good quality. Institutions cannot spend enough time on audit work or employ professional staff to perform audit operations as long as audit fees are low. Hence, the audit fee needs to be structured and systematic. The institutions are also required to continue professional education, and the community can also train and introduce industry-

specific auditors to enhance the audit quality. Most companies in today's world report a lack of time to perform audit quality control after publication, which leaves auditors unaware of any potential issues, so there is a need to provide a mechanism to standardize audit quality at the institutional level before issuing audit reports and make the necessary controls by the Association of Certified Public Accountants such as sudden visits.

Suppose the Association of Certified Public Accountants seeks to designate industry-specific auditors. In that case, industry-specific working groups can be set up, as well as industrial quality control audit groups to assess the audit quality that can result in the audit quality improvement.

The establishment of an overseer body can greatly contribute to audit quality and enhance financial reporting transparency. The Association of Certified Public Accountants, which operates under the Ministry of Economic and Finance supervision, is therefore suggested to have constructive interactions with the government to select the supervisory body and its executive form.

Several research has been conducted on audit quality, mainly regarding the relationships between audit quality and financial reporting, audit fees, audit report clauses, and so on. However, little research has been done on the dimensions that affect audit quality. It is therefore recommended to research the area of international financial reporting and audit quality. Also, given the widespread changes in information technology, it is suggested to perform research in information technology and audit quality. The capital market requires a major evolution in electronic financial reporting. This will not be the case until momentary auditing is established, so the qualitative aspects of auditing and financial reporting should be considered after transformation. Since that audit records have been kept on paper for many years and audits are still in paper form, future research is recommended to address the factors affecting audit technology and quality and determine the reasons for the lack of up-to-date auditors and records based on IT.

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Research Article

The Relationship between Earnings Quality and Audit Quality: An Iranian Angle

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Abstract

The present study is concerned about the relationship between earnings quality and audit quality of audit firms to figure out whether the earnings quality of firms audited by larger audit firms is more than that of the smaller firms or the earnings quality of firms audited by longer tenure audit firms is more than that of the shorter tenure firms or not.

The study's hypotheses were tested using a sample of 129 year-company listed on the Tehran Stock Exchange during 2012-2016 and by using the multiple regression pattern based on the data integration technique. Hence, the multivariable regression model is used for testing the hypotheses.

The obtained results show that the earnings quality of firms audited by small audit firms outweighs that of the large audit firms. Moreover, the findings indicate that those firms audited by longer tenure audit firms, compared with those audited by shorter tenure audit firms, enjoy a better earnings quality.

Keywords: Earnings Quality, Audit Firms' Tenure, Mandatory Rotation, Audit Quality.

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1. Introduction

An audit firm's income is one of the items of financial statements that are of great importance for all users. According to declaration No. 1 of financial accounting concepts, financial reports are on firm performance information, presented through earnings calculation and its constituent components. The earnings quality is influenced and reduced by the imposed managerial opinions. By adopting special accounting policies, managers adjust the accounting estimations, discretionary accrual management, and reported profits. According to Barth et al. (2005), using estimations in financial statements will influence the earnings and may lead to a profit different from the firm's real performance. Thus, the reported profit went farther than the real profit and lost its required objectivity.

One of the main objectives of financial statements is to present useful information for a broad spectrum of users inside and outside an organization to make wise economic decisions. Auditing, among them, takes the role of accreditation to financial statements and auditors, as independent individuals with a professional qualification, ensure the users of financial statements that these documents are free from any distortion or significant error and financial status, financial performance, and financial flexibility will be shown favorably based on the accounting standards. However, the main question raised by beneficiaries about the performed audit is to what extent the audit process has been able to report and explore the shortcomings and errors and the overall quality of the performed audit. Following the recent restatement of firms' profit and bankruptcy of large corporations, auditing firms' earnings information's accrediting role has increased significantly. Audit quality differences arise as a difference between auditors' presented credit and their clients' earnings quality. On the other hand, the increase in the number of frauds mingled with large corporations' bankruptcy arouses some concerns about the quality of financial reports. Accounting and auditing professions attempted to find some strategies for this issue. For example, the U.S. Congress established a particular committee to map out some strategies for combating fraud and distortion, which lead to the formation of the Sarbanes Oxley Act (2002). This Act results in the emergence of powerful supervisory authority, called accounting public companies' supervisory board, to monitor accounting and auditing professions. Providing new audit standards, determining the required accounting principles, compiling quality control standards for auditors, and publishing a professional code of ethics are among this board's main duties. This role is even more significant than other previous regulatory boards' role and asks to develop the relationship between the audit committee and independent auditors (Cohen et al., 2007). Hence, auditing plays a significant role in the financial reporting process, so the present study attempts to realize whether the earnings quality of firms audit by larger audit firms outperform that of the smaller firms or the earnings quality of firms audited by longer tenure audit firms is more than that of the shorter tenure ones or not. It is noteworthy that this paper is the first study dealing with the comparative relationship between firms' earnings quality and firms' audit quality. This paper can contribute to the development of scientific knowledge in this field.

2. Theoretical Issues, Literature Review, and Hypothesis Development

The increasing economic units' growth, information technology development, and a conflict of interests make the regulatory requirements. The economic globalization and information revolution have taken control of governments and have caused the audit profession to gradually not fall behind and move along with technological changes in line with communities' needs. In such a setting, users require different information, including economic firms' financial information for decision-making. Financial statements are considered the most important set of financial information. Still, the major point here is

uncertainty about such information's reliability, which is the origin of conflict interests. In addition to the conflict of interests, there are some other issues involving lack of direct access of users to information, which puts forward the demand for independent audit services. The function of auditing is to evaluate the information quality for users. The word "quality" has more than one universal equivalent. To improve and control each aspect of quality, it should be defined and assessed initially. Sometimes, it is defined as a business unit feature, sometimes as a particular feature or a product, and sometimes as a superiority index. General definitions of quality include suitability for use and/or a set of characteristics and features which create desirability and satisfy the needs. Quality is applied lexically as quality control, level of quality, quality increase, etc. (Ghylin et al., 2008). Moreover, numerous studies are conducted on audit quality so far (including DeAngelo, 1981; Palmrose, 1988; and Baker et al., 1988), and various definitions are presented for quality. For example, the first definition of audit quality is proposed by DeAngelo (1981) as follows: "market evaluation of auditor's competency in exploring significant distortions and reporting the detected frauds". Further, he stressed that the auditor who explores and reports the erroneous issues is independent, literally. Therefore, according to the definition of DeAngelo, audit quality is the growth of audit capability in exploring accounting distortion and evaluating the auditor's competency and independence in the market. When DeAngelo applied these concepts, the main assumption was that the market perceives the audit quality, indicating real audit quality. However, there is a difference between real audit quality and audit quality concepts because real audit quality is intangible and cannot be assessed unless it yields a result. DeAngelo defined the audit quality based on two probabilities. Defect exploration measures the audit quality based on knowledge and competency, while its report depends on the auditor's motivation for disclosure. Since DeAngelo's definition for auditing financial statements is satisfactory, it can encompass other types of auditing. Although there is no comprehensive audit quality definition to contain different auditing types, we can logically imagine that audit quality includes regulating policies and audit standards. Years after DeAngelo's definition, Palmrose (1988) defined audit quality. They said that "being assured of financial statements and that there is no chance of the presence of significant distortion is audit quality". Moreover, DeAngelo (1986) believes that larger audit firms provide high-quality audit services because they try to gain more fame in the market, and since the number of their clients is high, they are not afraid of losing them.

Although various factors contribute to audit services' quality, limited studies are carried out to map out a framework or perceptual model for describing the quality structure of audit services. Catanach and Walker (1999) proposed a model which shows that audit quality relies on two factors related to audit performance, namely, auditor's competencies (including knowledge, experience, matching power, and technical efficiency) and professional capabilities (involving independence, objectivity, professional care, conflict of interests, and judgment).

2.1. Relationship between audit quality and earnings quality

According to the conceptual declaration of financial accounting No. 1, financial statements are mostly audited by independent auditors to increase trust about their reliability (conceptual declaration of financial accounting No.1). Hence, to have an opinion about the quality of financial statement items, including earnings, the performed audit quality is a significant feature. The relationship between audit quality and earnings quality is not new and is well-documented in the accounting and auditing literature. Several studies have proven the relationship between size, high-quality audit, and high-quality financial reporting (Gul et al., 2009). So, earnings quality can be a sign of audit quality. When the audit quality is low, effective supervision is not exercised on the

auditor's side to explore the client's suspicious accounting methods. Then it is more probable that he reported figures to contain some items hiding the appropriateness of financial status and operation results. In such circumstances, the low quality of earnings would probably lead to audit failure. Legal claims against auditors and larger discretionary accruals positively correlate with audit failure and subsequent legal cases (Chen et al., 2012). In this case, the auditor may even persuade the management to go away from the framework of accepted accounting standards, so the earnings quality reflects the audit quality. From this perspective, the financial reporting quality (earnings quality) may be considered the common product of management and auditing attempts (Gul et al., 2009). Moreover, Becker, DeFond, Jiambalvo, and Subramanvam (1998) indicate that high-quality audit lowers earnings management. Further, Watkins, Hillson, and Morecroft (2004) illustrate that a high-quality audit can lower indirect measurement errors. Higher-quality audits will increase the reporting reliability by lowering intentional and non-intentional measurement errors of previous earnings, and analysts use them for predicting future earnings. The higher the audit quality, the higher the precision of analysts' earnings prediction (Becker et al., 1998; Watkins et al., 2004). Hence, we could claim that users are more likely to consider a high-quality audit reliable because it decreases reported errors in financial statements. In addition, recent studies (like Kwon et al., 2007; Barnet et al., 2015; Sun and Liu, 2013; Tavakol Nia and Makrani, 2015; and Habib et al., 2014) show that the expert auditors in the management industry decrease the profit and enhance the earnings quality instead. Kim et al. (2003) reveal that the difference between the effectiveness of large audit firms and small audit firms originates from the conflict between the motivation of firm managers and auditors for reporting. When managers are motivated enough to increase profit-increasing accounting methods, preserving impartiality by auditors would lead to the conflict between managers and auditors. They noticed that larger audit firms, compared with smaller ones, are more effective in preventing profit manipulation (by assuming conflict between management and auditors). Lam and Chang (1994) discovered that larger audit firms do not necessarily present better audit quality than the smaller ones. Lewis Henock (2005) carried out a study on the relationship between audit firms' service quality and auditor's size and found that larger audit firms do not always present better services than the smaller firms. Two Belgian researchers, Bauwhede and Willekens (2004), analyzed the effects of audit firms' size on audit quality in the Belgium market and defined some marginal factors for audit size, including auditor's market share, number of clients of the audit firm, etc. Finally, the results of this study show no significant relationship between auditor's size and audit quality. Fuerman (2006) concluded in his study that larger audit firms have fewer audit faults. Deltas and Doogar (2004) claimed that the less the diversity of audit products, the higher is the audit quality of financial statements. Chuntao et al. (2007) carried out a study to analyze the stock market's familiarity with audit quality among a number of small audit firms in the Chinese audit market. They found a positive relationship between the audit firm's size and the investors' understanding of earnings quality. This study indicates that audit quality is significantly associated with audit firms' size (Deltas and Doogar, 2004; Fuerman, 2006; Krishnan and Scheuer, 2000; Dies and Giroux, 1992; Palmrose, 1988; Lennox, 1999). There is other evidence, however, showing that larger audit firms do not necessarily provide better audit quality than smaller audit firms (Kim et al., 2003; Bauwhede and Willekens, 2004; Lewis Henock, 2004). Therefore, given the facts above, the research hypotheses are as follows:

H_1: The earnings quality of audited firms with larger audit firms is more than that of the smaller audit firms.

H_2: The earnings quality of audited firms with longer auditor's tenure is more than that of the shorter auditor's tenure.

3. Research Methodology

This paper is causal-correlational and, in terms of the methodology, is quasi-experimental and post-event in the realm of positive research in accounting with real data. This paper is practical in terms of nature and objective. Practical studies aim to develop practical knowledge within a certain field. However, in terms of data collection and analysis, this study is causal-correlational.

3.1. The population under study

The present study's statistical population includes all listed companies on the Tehran Stock Exchange during 2012-2016.

3.2. Sampling method

The systematic elimination method is used for sampling, and after applying the following conditions, the statistical sample of the study will be selected:

1. Companies should be listed on the Tehran Stock Exchange until the year 2011;
2. Companies should continues activity during the study, and their shares should be dealt with (no more than 6 months of transaction halt would be listed);
3. Companies should provide the required financial information during the study, thoroughly; and,
4. Companies should not be affiliated with investment companies, banks, insurance, and financial intermediaries.

As depicted in Table (1), the final sample is selected, given the gathered information at the end of 2016.

Table 1. Companies in the statistical population following the stipulated conditions

Description	No.
Total No. of companies listed on Tehran Stock Exchange	489
Investment companies, financial intermediaries, banks, and leasing	(78)
No. of inactive companies during study	(129)
No. of unavailable companies during study	(125)
No. of companies with no change in their financial period during the study	(28)
Remaining companies	129

3.3. Data collection method and tools

The required data were gathered based on their types from different resources. Data related to the study's literature and theoretical issues were collected from library resources, involving books, Persian and English journals, and websites. Data related to firms (balance sheet and profit and loss statements) were used as the research tools.

Initial information and raw data required for hypothesis testing were gathered using an information bank related to Tehran Stock Exchange, including Tadbir Pardaz and Rah Avaran-e Novin as well as published information of Tehran Stock Exchange and by direct observation (by analyzing the disclosed reports of the Codal website and manually) and presented in CDs and also on the website of www.rdis.ir.

3.4. Data analysis method

Since no variable is manipulated in this study, and there is no laboratory condition, this study is descriptive (nonexperimental). Descriptive studies include a set of methods, the aim of which is to explain the conditions of phenomena under study. The main objective of descriptive studies is to realize the status quo or to help the decision-making process. Based on nature, the present study can also be considered as a sample of

evaluative studies. These types of studies are a process for data collection, analysis, and decision-making. For this study, initially, the design records, then the main topic of the thesis is studied. The F significance test of multiple regression is used in the Stata Software, and for creating the required database, the EXCEL Software is employed.

3.5. The statistical model of the study

This paper attempts to assess whether the audit quality contributes to the earnings quality or not. Given that the following multivariable regression model is used for hypothesis testing:

Model (1)

$$EQ1_{it} = a_0 + a_1 A_{it} + a_2 B_{it} + a_3 C_{it} + a_4 D_{it} + a_5 BIG_{it} + a_6 TENURE_{it} + a_7 Change_{it} + a_8 Size_{it} + a_9 ROA_{it} + a_{10} ROE_{it} + a_{11} MTB_{it} + a_{12} LEV_{it} + a_{13} LOSS_{it} + a_{14} Age_{it} + a_{15} Growth.sales_{it} + a_{16} Afee_{it} + a_{17} year_{it} + a_{18} Industry_{it} + \varepsilon_{it}$$

Where

EQ is earnings quality, a dependent variable, for the calculation of which the model of Francis et al. (2005) is used as follows:

Model (2)

$$\frac{TA_{i,t}}{Asset_{i,t-1}} = \beta_1 \times \frac{1}{Asset_{i,t-1}} + \beta_2 \times \frac{(\Delta Rev_{i,t} - \Delta AR_{i,t})}{Asset_{i,t-1}} + \beta_3 \times \frac{PPE_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t}$$

Where

$\Delta AR_{i,t}$ are changes in accounts receivable of the firm i from year t-1 to t and $\varepsilon_{i,t}$ is the error sentence in the year t, the absolute value of which is indicative of the absolute value of abnormal discretionary accruals. The higher this value, the lower is the earnings quality. In this paper, error residuals are used as the dependent variable of the study.

A: firms audited by large audit firms (by large firms, we mean the audit organization and Mofid Rahbar) 1, otherwise 0 will be assigned.

B: firms audited by small audit firms (firms other than the organization and Mofid Rahbar) 1, otherwise 0 will be assigned.

C: firms audited by longer tenure audit firms 1; otherwise, 0.

D: firms audited by shorter tenure audit firms 1; otherwise, 0.

BIG: if the audit firm is organization 1, otherwise, 0.

TENURE: audit firm's' tenure is a period the audit firm performs auditing in a certain firm.

Change: auditor change if the auditor has changed within the year under study 1; otherwise, 0.

Size: firm size, the natural logarithm of firm assets.

ROA: return on assets, net profit to book value of equity.

ROE: return on equity, net profit to book value of equity.

MTB: book value to equity market ratio.

LEV: financial leverage, which is equal to total debts to total firm assets.

LOSS: firm loss, if the firm is losing 1; otherwise, 0 will be assigned.

GROWTH SALES: sales growth, sales of the current year minus sales of the previous year divided by sales of the previous year.

Afee: audit fee, which is equal to the natural logarithm of the audit fee.

Year: dummy variable of year.

Industry: dummy variable of year.

4. Data Analysis

4.1. Descriptive statistics

In this paper, the absolute value of abnormal discretionary accruals (EQ1) is used for

assessing the effect of audit quality on earnings quality in listed companies on the Tehran Stock Exchange. In addition, the present study has used the panel data method, including 129 firms from 2012 to 2016, in its basic data. In order for assessing the impact of audit firm size and auditor's tenure, several variables, including dummy variable of firms and large firms (A), dummy variable of firms and small firms (B), dummy variable of firms and long tenure (C), dummy variable of firms and short tenure (D), dummy variable of auditing by the organization (BIG), auditor's tenure (TENURE), auditor change (Change), firm size (Size), return on assets (ROA), return on equity (ROE), market to book value (MTB), financial leverage (LEV), dummy variable of firm loss (Loss), firm age (Age), sales growth (Growth sales), audit fee logarithm (Afee), and dummy variable of industry and year were added as descriptive variables to the model. The main source of these data is Central Bank, the official website of Tehran Stock Exchange, Codal Website, and Rah Avaran-e Novin Software. Table (2) briefly shows the information related to the variables of the model.

Table 2. Descriptive statistics of variables

Sign	Name	No. of observation	Total average	Std. dv.	Min	Max
EQ1	The absolute value of abnormal discretionary accruals	645	0.0591	0.0539	0.0002	0.6189
A	dummy variable of firms and large firms	645	0.2558	0.4367	0.000	1.000
B	Dummy variable of firms and small firms	645	0.7442	0.4367	0.000	1.000
C	Dummy variable of firms and long tenure	645	0.2000	0.4003	0.000	1.000
D	Dummy variable of firms and short tenure	645	0.8000	0.4003	0.000	1.000
BIG	Dummy variable of auditing by the organization	645	0.3039	0.4603	0.0000	1.0000
TENURE	Auditor tenure	645	3.9473	3.9370	1.0000	15.0000
Change	Auditor change	645	0.2775	0.4481	0.0000	1.0000
Size	Firm size	645	14.2004	1.5176	10.5330	19.5100
ROA	Return on assets	645	0.1111	0.1513	-0.7896	0.6313
ROE	Return on equity	645	0.2564	0.9418	-16.8456	6.8885
MTB	Market to book value	645	3.5143	8.2390	-114.4768	103.1528
LEV	Financial leverage	645	0.6023	0.2268	0.0902	2.3152
Loss	Dummy variable of firm loss	645	0.1256	0.3316	0.0000	1.0000
Age	Firm age	645	38.0310	12.8016	10.0000	65.0000
Growth.Sales	Sales growth	645	0.2079	0.5455	-0.8453	7.7053
Afee	Audit fee logarithm	645	6.7540	0.7740	3.2453	8.4726

Resource: research findings

By evaluating all model variables' unit root, these variables are mostly united (stationary) at an unrooted level. The obtained LM statistic for each variable is reported in Table (3). Only the variables of A, C, Big, Age, and Afree are united at the root level. The obtained LM statistic for the unit root test of these variables rejects the null hypothesis concerning the absence of unit root at 99% probability level.

Differentiating the variables for one time, A, C, Age, and Afee have no unit root. The first-order difference of the big variable has a unit root at a 99% significance level. The second order of this variable has no unit root.

Table 3. The results of the Hadri unit root test

Name	Level	First-order differentiation	Second-order differentiation	Name	Level	First-order differentiation
EQ1	0.9999			ROA	0.9824	
A	0.0000	1.0000		ROE	0.9999	
B	0.2227			MTB	0.9984	
C	0.0000	0.2932		LEV	0.7314	
D	0.4045			Loss	0.9153	
BIG	0.0000	0.0801	1.0000	Age	0.0144	0.9832
TENURE	0.7074			Growth.Sales	0.9523	
Change	0.9976			Afee	0.0045	0.9906
size	0.5917					

Note: the null hypothesis is the absence of a unit root in variables. LM statistic is reported. *, **, and *** are 90, 90, and 99% level of significance.

Resource: research findings

4.2. Results of model estimation

Table 4. Results of model estimation

Name	Coefficient (Standard error)	Name	Coefficient (Standard error)
$Constant$	-0.4524 (0.4110)	ROA	-0.1000* (0.0783)
Large firms and institutions (A)	0.0556 (0.0357)	ROE	-0.0156** (0.0119)
Small firms and institutions (B)	-0.0717** (0.0371)	MTB	-0.0017** (0.0011)
Firms and long tenure (C)	-0.0478** (0.0333)	LEV	-0.0508 (0.0283)
Firms and short tenure (D)	0.0477** (0.0334)	$Loss$	0.0481** (0.0230)
Big	0.0124** (0.0336)	Age	-0.0186** (0.0087)
$Tenure$	-0.0177** (0.0084)	$Gross.Sale$	-0.0216** (0.0126)
$Change$	0.0108** (0.0165)	$Afee$	-0.0196** (0.0149)
$Size$	0.1098** (0.0362)		
Number of obs.	182		
Adj. R - squared	0.0012		

Note: *, **, and *** are 90, 95, and 99% level of significance.

Resource: research findings

The results of the robust model estimation are reported in Table 4. In this panel data model, four classic econometrics hypotheses were analyzed, and reliable results will be reported. These four hypotheses include the absence of collinearity among variables, the

exogeneity of descriptive variables, the coincidence variance, and the absence of serial autocorrelation among disruptive components.

According to the performed estimation, the model's fixed coefficient is -0.4524, which is not significant. The dummy variable of firms and large firms (A) has a coefficient of 0.0556 with a level of significance of 90%. Hence, the larger the firms and institutions, the higher is the abnormal discretionary accruals. In contrast, the coefficient of the dummy variable of firms and small institutions (B) is -0.0717. Therefore, the smaller the firms and institutions, the lower is the abnormal discretionary accruals at 95% confidence level and the higher the earnings quality, so we can say that companies audited by small audit firms, compared with those audited by large audit firms, have higher earnings quality. Hence, the first hypothesis of the study is rejected.

The estimation coefficient of firms' dummy variable and long tenure (C) is -0.0478 at a 90% level of significance. Hence, the longer the tenure, the lower is the abnormal discretionary accruals. On the other hand, the dummy variable of firms and shorter tenure (D) is 0.0477, so the shorter the firm tenure, the higher is the abnormal discretionary accruals. Thus, we can say that firms audited by longer tenure firms, compared with those audited by shorter tenure firms, have higher earnings quality. Hence, the second hypothesis of the study is accepted.

The auditor tenure variable (Tenure) is negative, with a 95% level of significance. Therefore, with a 1% increase in auditor tenure, the abnormal discretionary accruals will decrease by -0.0177%. The firm size variable's coefficient is positive in the estimated model, with a 99% level of significance. Thus, by 1 increase in the variable (Size), the abnormal discretionary accruals will increase by 0.1098%.

The coefficient of both variables of return on assets and return on equity are negative. Therefore, with a 1% increase of ROA and ROE at 90% of significance level, the abnormal discretionary accruals will decrease by -0.1000 and -0.0156, respectively. The coefficient of the variable of MTB is negative, with a 90% level of significance. Thus, by 1 increase in market value to book value, the abnormal discretionary accruals will decrease by -0.0017%.

The coefficient of the variable of financial leverage is -0.0508 at a 90% level of significance. Given the model estimation, by a 1% increase in the LIV variable, the abnormal discretionary accruals will decrease by -0.0508%. The coefficient of the dummy variable of firm loss is positive at a 95% level of significance. So, the more losing the firm, the abnormal discretionary accruals will increase by 0.0408%.

On the other hand, firm age has a negative coefficient with a 95% level of significance. With a 1% increase in age, abnormal discretionary accruals will decrease by -0.0186%. Sales growth of the firm has a negative coefficient of -0.0216 at a 90% level of significance. Therefore, by a 1% increase in Gross sales, abnormal discretionary accruals will decrease by -0.0216%. The coefficient of the audit fee logarithm variable is negative, with a 90% level of significance. Hence, with a 1% increase in Afee, abnormal discretionary accruals will decrease by -0.0196%.

It is worth mentioning that the organization's dummy variables (Big), auditor’s change (Change), and industry and year dummy variables do not affect abnormal discretionary accruals. Moreover, given the performed estimations, the descriptive power of the model is 0.0012. By considering the above variables, the model could describe 0.0012% of abnormal discretionary accruals fluctuations.

5. Conclusion

The present study is concerned about the relationship between the earnings quality of firms and the size of audit firms to figure out whether the earnings quality of firms audited by larger audit firms is more than that of the smaller audit firms or not. The hypothesis

testing results show that the more audit firms' size, the more abnormal discretionary accruals because the coefficient of firms' dummy variable is positive for larger audit firms (A). Hence, the larger the firms and institutions, the higher is abnormal discretionary accruals. In contrast, the coefficient of small firms' dummy variable and institutions (B) is negative. Hence, the smaller the size of firms and institutions, the lower is the abnormal discretionary accruals, and the higher is earnings quality. Thus, we can say that those firms audited by small audit firms, compared with those audited by large audit firms, benefit from better earnings quality, so the first hypothesis of the study is rejected, which is in contrast with that of the Gul et al. (2009) and Chen et al. (2004), who declare when the audit quality is low, effective supervision will not be exercised by the auditor to explore suspicious accounting methods of the client. Hence, the reported figures and numbers are more likely to hide the soundness of financial status and operation results. In such a situation, the low quality of earnings is more probable to result in an audit failure and law claims against accountants. Some larger discretionary accruals will positively correlate with audit failures and their subsequent law cases against auditors. Moreover, this finding is in line with that of Lawrence et al. (2011). They argue that discretionary accruals are more influenced by audit firms' characteristics, not the employers themselves, so it cannot be an index for measuring the audit quality. Further, this paper also analyzes another concept about earnings quality, named audit firms' tenure, to find whether the earnings quality of firms audited by longer tenure audit firms is more than that of the shorter tenure or not. The results of related hypothesis testing show that the longer the tenure, the less is abnormal discretionary accruals because the estimating coefficient of dummy variable of firms and longer tenure (C) is negative, so the longer the tenure, the less is the abnormal discretionary accruals. On the other hand, the dummy variable of firms and shorter tenure (D) has a positive coefficient. Thus, the shorter the tenure of firms, the higher is the abnormal discretionary accruals. Therefore, we can say that those firms audited by longer tenure audit firms, compared with firms audited by shorter tenure audit firms, have better audit quality. In other words, the second hypothesis of the study is accepted, which conforms with that of the Hamilton et al. (2005), who declare that in firms in crisis, the extremely aggressive reporting of the client which occurs as a result of debilitation of an auditor's independence, would lead to secrecy about profitability losses of the so-called firms.

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Research Article

The Relationship between Intellectual Capital Components and Audit Market Competition

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Abstract

The present study aims to assess the relationship between intellectual capital and competition in the audit market.

The audit market concentration index is used to measure competition in the audit market, calculated according to three auditor concentration indices, client concentration and competition pressure. The study period is from 2013 to 2017, during which 705 firm-years is selected among the listed firms on the Tehran Stock Exchange as the sample of the study and is tested using the panel method.

The results indicate a negative and significant relationship between human, structural, and relational capital and auditor concentration. There is a positive and meaningful relationship between relational and structural capital and client concentration and a negative and significant relationship between human capital and client concentration. Furthermore, the relationship between structural and relational capital and competition pressure of rivals is positive and meaningful. The relationship between human capital and the competition pressure of competitors is negative and significant.

This paper enables the firms to lower their auditors' fees by employing exert and experienced people in making the best use of intellectual capital. This paper also causes the wise people to benefit from all production capacities of the firm. It enhances products' sales to increase the competition in the audit market and sometimes lower clients' costs for audit fees.

Keywords: Intellectual Capital, Audit Market Concentration, Human Capital, Structural Capital, Relational Capital

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1. Introduction

After several decades, we have witnessed global growth from the industrial economy to the knowledge economy. The firms attempt to create value and competitive advantage (Lev, 2004) and direct their attention to success factors, developing intangible assets and knowledge. IC is a significant source of firm innovation and human advancement through knowledge. As a general rule of thumb, knowledge and qualifications are two main factors of production. Learning, development, and frequent renovation have turned into an organisation's main capabilities to uphold the competition (Drucker, 1988). Hence, organisations are more interested in the evaluation, management, and development of their intellectual assets. This challenge for both academia and experts has led to the advent of the Intellectual Capital (IC) approach (Bontis, 1999; Roos & Roos, 1997). Furthermore, high concentration is to the benefit of the audit market because it enables the auditors to develop their expertise in pursuing complicated audit processes, which leads to saving in scales (Choi et al., 2017).

The present study analyzes the relationship between intellectual capital indices and audit market completion, measured by the audit market concentration index. In this paper, a relationship is built between audit market concentration, which is derived from three indices (auditor concentration, client concentration, and the competitive pressure of rivals), and intellectual capital components (human, structural, relational capital), which is indicative of a positive relationship between structural and relational capital and client concentration and the competitive pressure of rivals and a negative relationship between human capital and auditor concentration and client concentration and the competitive pressure of competitors. These results would increase the firm's net sales by strengthening the labour force, infrastructures, relations, foreign policies, and raising the audit fee. This paper is the first study compiled on the relationship between intellectual capital and audit market concentration, enabling firms to lower auditors' fees by recruiting experienced people and utilizing intellectual capital. Further, under such circumstances, wise people can benefit from all the firm's production capacity, which will elevate the sales of products and the competition in the audit market.

In some cases, this process would lead to lower audit fees to satisfy the management's objectives for lowering the client's costs, so audit market concentration can be associated with the intellectual capital by having expert members, and advanced technology fees can be reduced. The firms' motivation for strengthening intellectual capital will be improved. The information reported concerning the intellectual capital would lead to a decrease in information asymmetry and the improvement of beneficiaries' decision-making.

2. Theoretical principles

2.1. Intellectual capital

IC can be defined as an amalgamation of all kinds of knowledge and recognition of capabilities that allow the firms to achieve or uphold their stable competitive advantage. IC can also be defined as a combination of human, organisational, and relational resources and series of activities of an organisation, which includes knowledge, skills, experiences, and capabilities of staffs, organisational procedures, policies, and systems and all related resources to foreign relations of the firm, like customers, suppliers, research and development partners, etc. (Maria Diez et al., 2010). IC is under the title of intangible assets (IA) and appears in the form of knowledge, brand, patent, trademarks, customer relations, human capital, and research and development. Intellectual capital plays a significant role in an organisation's success or failure (Meles et al., 2016; El-Bannany, 2008), resulting in value creation for firms. IC is analysed as an incentive for firm value, which converts the production resources to properties with added value)(Lari Dashtbayaz et al., 2020).

The recognised difference between the book value of the firm and market value (MV) is related to covert values that are not recognisable in the annual reports. Therefore, IC is proposed to describe the gap between the firm's market value and book value (Lev, 2004). Stewart (1997) states that IC assesses the intellectual resources, knowledge, experience, information, competition, and learning of those organisations used for wealth creation.

However, El Tawy & Tollington (2012) perceive no universal definition of intellectual capital. The cause of effect relationship is between intellectual capital and value creation (Zeghal and Maaloul, 2010). The problems concerning IC investments' evaluation are increased agency costs derived from information asymmetry between the firm and foreign investors (Lev, 2004). The IC investment features may cause inappropriate selection, moral hazard, and managers' opportunistic behaviour (Holland, 2006). Based on a comprehensive study in IC literature during a decade, Guthrie, Ricceri, and Dumay (2012) defined IC accounting as an accounting, reporting, and managing technologies related to organisations to understand and manage knowledge resources. More specifically, this approach attempts to overcome the classifications and criteria of intangible assets and limitations of conventional financial indices used to describe, measure, and manage organisational performance. Ricceri and Guthrie (2009) investigate the IC framework and classify them according to two stock approach methods, the aim of which is to create a decentralised financial value and flow approach based on the content creation of knowledge resources. The IC is divided into three groups: human capital, structural capital, and relational capital (Rehman et al., 2011; Nimtrakoon, 2015; Bontis et al., 2015; Abdollah and Sufiyana, ۲۰۱۲).

2.1.1. Human capital

Human capital includes the personal knowledge of the staff. Human capital is to pursue an organisation's objectives as a career and knowledge capital and the relational capital (ties and relations with customers, colleagues, dealers, and foreign partners). HC refers to a set of knowledge, qualification, innovation, commitment, and capability (Morris, 2015). Such knowledge is personal, which belongs to firms and the main objective of human capital in innovation and improving the staff (Abdollah and Sufiyana, 2012; Lopez et al., 2012). Moreover, Bontis (2002) explains human capital as a collective capability of an organisation to extract the staff's best solution. Chen et al. (2004) express that human capital as the cornerstone of intellectual capital refers to factors like knowledge, skill, capability, and attitude of the staff, which leads to the improvement of performance for which the customers are willing to pay.

2.1.2. Structural capital

Structural capital (SC) comprises the firms' most valuable strategic properties, including organisational, cultural processes, inventions, copyright, trademarks, database, etc. (Denicolaiet al., 2015). SC includes all non-human knowledge warehouses in organisations that belong to the organisation (Stewart, 1997; Roos et al., 1997; Bontis et al., 2000). Let's consider that SC includes the firms' most valuable strategic properties. Understandably, the staff has enough time to adapt to organisational characteristics, including culture and processes. In the long term, SC contributes positively to firms' financial performance, which involves organisational routines, policies, customs, datasets, etc. (Chen and et al. 2004). According to Skandia's report, structural capital comprises factors like organisational culture, information management, and datasets. Chen et al. (2004) believe that structural capital is more clearly classified in organisational culture, organisational learning, operational process, and information system. Roos et al. (1997) declare that structural capital is all those things that remain in the organisation

when the staff goes back home, which is elicited from processes and organisational policies.

2.1.3. Relational capital

Relational capital (CEE) includes all foreign relations like official business cooperation and other unofficial communications with international institutions, including customers, suppliers, banks, and non-profit organisations. Moreover, Chen et al. (2004) classify the relational capital in marketing ability, market intensity, and customer loyalty. In general, it works as a connecting bridge in the process of intellectual capital. Therefore, the growth of relational capital relies on the support of human capital and relational capital. RC is knowledge acquired by establishing relations with foreign beneficiaries (Yu et al., 2015). RC comprises relationships with partners outside the firm and other relational resources, like reputation, trademark, and loyalty. Relational capital (CEE) contributes to the financial performance of firms in the short run. For example, through special exercises or spare time activities, creating a positive working environment and cooperation inside the firm may lead to the staff and managers' motivation to enjoin their attempts to propose relatively new solutions (Agostini, Nosell and Filippini, 2017).

2.2. Audit market concentration

To measuring the competition in the audit market, the audit market concentration index is used, which is comprised of three indices of auditor concentration, client concentration, and competition pressure of rivals. Recent reports in the United States, the UK, and European Union express some concerns about audit market concentration by Big 4 audit firms and the potential effect such focus could have on the audit markets and audit quality general accounting office (GAO), 2003; governmental accounting office, 2006, 2007, 2008; the United States, 2006 and 2008). Recently, GAO voiced some concerns relative to audit market concentration, which may increase audit costs and lower audit quality. However, the present literature shows that local audit markets are more concentrated on lower audit fees and fewer accounting amendments. When the audit market includes fewer customers or small customers, audit market concentration audit costs have an ascending trend.

In contrast, in markets where there are many customers or big customers, audit market concentration would reduce audit costs (Salehi et al., 2020a). The European Commission issued a "green card" on October 13, 2010, concerning the Big 4 accounting firms' persistent threats in audit concentration and suggested that several mechanisms for lowering the concentration and elevating the competition should be selected from non-Big4 firms (European Commission, 2010). In September 2011, European Commission declared that it would put forward a suggestion to the European Parliament to modify the domination of the Big 4 and also ask for some other amendments, including the prohibition of audit firms from presenting non-audit services and the creation of net audit firms, compulsory audit rotation, and shared mandatory audit where the auditor should be among the non-Big 4 auditors. The second objective is to lower the audit market's partnership with the Big 4 to reduce these firms (accounting period, 2011). Although on November 30, 2011, the European Commission offered a series of strictly confidential suggestions with some significant changes forcing the audit firms in every six years and prohibiting non-audit services for audit customers. After the collapse of Arthur Anderson, the Sarbanes Oxley Act in 2002 has resulted in the United States' audit accounting investigation by the General Accounting Office, which showed that only a few local and international large firms could handle large audit projects. State-owned firms increase the concentration by the potential selection of price, quality, and significance, while no report is evident concerning the negative consequences of domination on the Big4 market. The

considerable changes in this profession may influence the competition and the selection of general firms, especially in specific industries. The tracking report of the Government Accountability Office (2008) also warned about potential adverse effects of market concentration. However, this report reminds us of the lack of enough studies in this field. In all these reports, the unsubstantiated claim is that concentration in audit markets is detrimental (partially, indeed) because the absence of competition decreases the Big 4 auditors' motivation to carry out high-quality audits. Audit market concentration debilitates the quality of audit results. The quality of audit results is computed using the statistical characteristics of audit earnings given total reimbursement, unnatural commitments, earnings report probability (avoiding losing), and to recognise timely losing officially. Results indicate that both big auditors and non-Big ones present high quality in countries with the highest percentage of complete audits (B4 SHARE). These results illustrate that the domination of the Big 4 does not hurt the audit quality, and it seems. Indeed, that audit quality is higher for Big 4 and non-Big4 firms, reflecting the market demand for high-quality audits in these countries, where low-quality audits are not satisfactory.

2.3. The relationship between the components of intellectual capital and auditor concentration

Two approaches exist in this regard, which will be explained in the following:

First approach: the higher the human capital or the workforce's expertise, the higher the payment should be, so auditor concentration is directly associated with the audit fee increase. Moreover, the presence of technology, inventions, and secure databases increases auditor concentration as much as they ask for a higher payment (Salehi et al., 2020b). The growth of firm capability in investment and relations with customers and foreign institutions brings about the increase of audit costs or, in other words, the audit fee, and this would enhance auditor concentration. In general, by increasing the industry's audit fee, audit services, and firm performance will be improved. Like the results (Eshleman, & Lawson, 2016; Huang et al., 2015; Newton et al., 2013), this study employs an auditor concentration index for audit market concentration. The lower this index would be, the higher is the competition in the market. Since audit market concentration is negatively associated with competition in the audit market (Boone et al., 2012), it is hypothesised that audit quality will increase in competitive conditions by increasing audit market size.

Lower competition of audit markets with higher payment would probably increase audit quality (Palmrose et al., 2004). According to the results of Eshleman and Lawson (2016), along with the rise in audit market concentration, audit quality will increase. Moreover, they also perceived that concentration is associated with higher audit quality in the contract's early years. The concentration increase would enhance the client's audit quality and reduce the auditors' adjusted opinion and improve the audit quality directly through an increase in audit fees (Huang et al., 2015).

Second approach: If the intellectual capital or intangible asset increases in a firm, this indicates the growth of that business firm, equal to more complications. The auditor is faced with higher pressure and risk, so auditor concentration is lower.

Bramhandkar et al. (2007) show a significant relationship between intellectual capital components and firm performance. Flavio et al. (2007) indicate a positive relationship between firms' intellectual capital components and financial performance. Pew Tan, Plowman, and Hancock (2007) state that intellectual capital and firm performance are positively interrelated, and the intellectual capital growth rate is also positively associated with firm performance. Kamath (2008) illustrates a significant relationship between intellectual capital components and financial performance criteria, but human capital has

the highest effect on performance among the intellectual capital components.

Cheng et al. (2010) show a remarkable relationship between intellectual capital and firm performance. Such results show that firms would be able to improve their performance through human capital. The results of Zaghal and Maaloul (2010) reveal that intellectual capital is positively and significantly associated with economic performance and financial performance. Huang et al. (2015) find a positive relationship between audit market concentration and audit quality.

Maditions et al. (2011) illustrate no relationship between intellectual capital and financial performance and the stock market but find a significant relationship between human capital and equity return. Boone et al. (2012) figure out that the audit market's high concentration would lead to the decline of earnings quality and audit quality. Eshleman (2013) shows a positive and significant relationship between audit market concentration and audit quality. He also indicates that audit quality will decrease by increasing audit market size in a highly concentrated market and finds that audit market concentration is negatively associated with competition in the audit market. Newton et al. (2013) perceive that an increase in audit market concentration is not associated with a decrease in the chance of financial restatement. In contrast, Dumany and Garanina (2013) substantiate that structural capital is mainly essential for RI in terms of cooperation of partners/ business networks, and structural capital and intellectual capital are among the reducing factors. Stankeviciene and Liucvaitiene (2012) state that the result of intellectual capital evaluation relies on the firm size, its activity, and managers' view on-demand for measuring intellectual capital.

Min Lu et al. (2014) indicate that intellectual capital is considerably associated with firm performance in the insurance industry and such a relationship is also positive and significant. Further, paying attention to intellectual capital may be beneficial for the firm and investors. According to Dummy (2016), if intellectual capital makes monetary, profitability, social, and stable value for the firm, the firm's financial and market performance will be improved. Eshleman and Lawson (2016) indicate that audit quality increases along with increased audit market concentration. They also conclude that concentration is associated with higher audit quality in the early years of contract with the client. Rehman et al. (2011) perceive that human capital has a positive and significant effect on firms' performance.

Gou, Siah-Hou, and Chien (2012) find a positive relationship between technological innovation and financial performance. Additionally, their findings present a coherent framework for establishing a relationship between the compensation plan, human capital, and biotechnology firms' financial performance. Clark et al. (2011) show a direct relationship between intellectual capital and firms' financial performance. Moreover, a positive relationship was found between intellectual capital (human and structural capital) and the current year's financial performance in the previous year. Nimtrakoon (2015) finds a positive and significant correlation between human capital and firms' financial performance. Sekhar et al. (2015) indicate a non-linear relationship between family ownership and intellectual capital disclosure. This study also shows that external ownership, board independence, and an audit committee's presence positively impact intellectual capital disclosure. Huang et al. (2015) demonstrate that the increase of concentration would lead to audit quality improvement of the client's firm, reducing the need to present auditors' adjusted opinions through increasing audit fees.

Moreover, this study suggests that concentration enhances audit quality directly through an increase in audit fees. Huang et al. (2015) discover a positive relationship between audit market concentration and audit quality. Eguasa (2017) expresses that the audit market concentration elevates audit quality. Chi, Sing, and Lew (2017) argue a mutual relationship between different intellectual capital kinds. Besides, social capital has

a significant mediatory role in the relationship between IC and CCO performance. Moreover, the business has a moderator, and a positive role and environmental distrust have some adverse effects on social capital and CCO performance.

H_1: There is a positive and significant relationship between human capital and auditor concentration.

H_2: There is a positive and significant relationship between structural capital and auditor concentration.

H_3: There is a positive and significant relationship between relational capital and auditor concentration**.**

2.4. The relationship between intellectual capital components and client concentration

A firm with strong relations with customers, suppliers, institutions, and banks will cause people's attraction, the growth of the sales market, and increased client concentration. Broadly, client concentration goes up along with the rise in sales in the industry. By threatening to change the auditor to a new one, the client may stage a competition. Newton et al. (2013) believe that less competition in the audit market will reduce the risk of losing a client, so the chance of amity between auditor and client and independence loss is extremely lower, and less competition will increase audit quality. In contrast, within a concentrated audit market, auditors are more likely to be overconfident, leading to decreased audit quality (Boone et al., 2012). Additionally, more competition in the audit market may cause the auditors to ask for lower fees. Such a decline may cause them not to perform their duties appropriately and hurt the audit quality. Zeghal and Maaloul (2010) indicate that intellectual capital performance is positively associated with financial and economic performance. Still, about the market value in the technology industry, this is only a significant relationship. Boone et al. (2012) perceive that audit market concentration is associated with a high chance of analysts' predicted earnings. Moreover, the results show a positive relationship between audit market concentration and the quality of discretionary accruals.

Wang (2013) indicates a positive relationship between Tobin's Q ratio and the value-added coefficient of intellectual capital. Using profitability variables, Bontis et al. (2013) measure total properties, return on assets, return on equity, staff efficiency, and banks' performance. The results of this study indicate that human capital considerably affects staff efficiency. Tsenget et al. (2011) approve its positive impact on the financial performance of firms. Morris (2015) fined a positive and significant relationship between human capital and firms' financial performance. Su et al. (2013) discover that customer capital and human capital will enhance new product development. Maditions et al. (2011) discover that only structural capital is significant. There is no relationship between other human capital and intellectual capital return (ROE) and return on assets and income growth rate. Enzo Dia (2009) shows a significant relationship between intellectual capital components and financial performance, which indicates the high impact of relational capital, compared with other intellectual capital components, on performance and agility in financial issues.

H_4: There is a positive and significant relationship between human capital and client concentration.

H_5: There is a negative and significant relationship between structural capital and client concentration.

H_6: There is a positive and significant relationship between relational capital and client concentration.

2.5. The relationship between intellectual capital components and the competitive pressure of rivals

The enlargement of a business firm contributes to the auditor fee because it is one example of audit fee determination. The expansion of a business firm asks for higher audit risk and, consequently, higher audit fees. The competitive pressure of rivals is the third concentration and audit market competition index (Newton et al., 2015). When there is fierce competition in the audit market, auditors acquire more markets with fewer audit fees than the previous year. The less the difference, the higher is the competition. Wu et al. (2007) show that organisational capital and relational capital generally distinguish the relationship between HC and new product development in Taiwanese firms' framework in the electronic industries and information technology. Change (2007) indicates that a relationship between intellectual capital components and relational capital has the highest competitive advantage. El-Bannany (2008) shows that investment in information technology, bank efficiency, and investment efficiency in intellectual capital significantly impact intellectual capital performance. Also, he demonstrates that profitability variables and bank risk are also substantial. Wang and Cheung (2004) reveal that Tobin's Q ratio and the value-added ratio of intellectual capital have a positive relationship with firm value. Cho et al. (2011) perceive that intellectual capital is not associated with the capital return and market to book value ratio. Still, there is a positive relationship between this factor and return on assets and a negative turnover. Also, they conclude that there is a significant relationship between intellectual capital components and some performance criteria, and the critical point here is that the relationship between human capital and profitability is negative. Mondal and Ghosh (2012) conclude a positive and significant relationship between firms' intellectual values added ratio and financial performance criteria. Mura et al. (2012) express that intellectual capital has a directive role and creates innovative organisations' innovative behaviours by sharing knowledge. Nazari et al. (2010) claim that structural capital has a positive and significant relationship with firms' financial aspects; moreover, there is a positive relationship between human capital and firm performance. Chen et al. (2014) conclude that intellectual capital has positive and significant effects on efficiency changes. Therefore, to obtain sustainable productivity growth, insurance companies should invest considerably in intellectual capital because, in this way, managers' managerial skills will go up, which is itself one of the critical factors in efficiency increase. Chiucchi & Montemari (2016) indicate a mutual relationship between three intellectual capital elements and their performance. They also show that water distribution companies in Romania have most of the intellectual capital components. Hence, we can declare that the proposed model for investigating intellectual capital impacts such as firms' organisational performance. Estrin, Mickiewicz, and Stephan (2016) assess the effects of human capital on technological entrepreneurship. They conclude that human capital contributes to the commercial entrepreneurship of such countries. Choi et al. (2017) find a direct relationship between the audit market concentration and audit fee.

H_7: There is a positive and significant relationship between human capital and the competitive pressure of rivals.

H_8: There is a negative and significant relationship between structural capital and the competitive pressure of rivals.

H_9: There is a positive and significant relationship between relational capital and the competitive pressure of rivals.

3. Research Methodology

Audit concentration model

$$AC = \beta + \beta HC + \beta SC + \beta CC + LEV + LOSS + INDUSTRY + EXPORT + SIZE + ROA$$

$+^{\varepsilon}$

Client concentration model

$CC= \beta + \beta HC + \beta SC + \beta CC + LEV + LOSS + INDUSTRY + EXPORT + SIZE + ROA + ^{\varepsilon}$

Rivals' pressure

$CP= \beta + \beta HC + \beta SC + \beta CC + LEV + LOSS + INDUSTRY + EXPORT + SIZE + ROA + ^{\varepsilon}$

3.1. Dependent variable

Auditor concentration (AUDIT_HHI): Herfindahl index from dividing audit fee into total auditor's fees in the industry

Client concentration (CLIENT_HHI): Herfindahl index from dividing net sales of the current year into total industry sales

Competitive pressure of rivals (DISTANCE_IND): percentage of audit fee change in proportion to the previous year (audit fee of the last year – audit fee/audit fee of the past year)

$$CP = \frac{\text{audit fees of the previous year} - \text{audit fees}}{a\text{udit fees of the past year}}$$

3.2. Independent variable

Intellectual capital ($VIAC_{it}$): includes human capital (HCE_{1t}), structural capital (SCE_{2t}), and relational capital (CCE_{3t}), which is computed using the Pulic model.

1- Human capital (HCE_{it}): is the capabilities, skills, and expertise of the human organisational force, which is considered as the total salary cost of the firm.
2- Structural capital (SCE_{it}): Knowledge remains in the organisation at the end of each day and belongs to the organisation. It encompasses some factors like patent rights, dataset, and organisational charts and is computed by dividing human capital (total paid salary of the firm) into added value.
3- Relational capital (CCE_{it}): knowledge exists in the firm's relations with customers, shareholders, beneficiaries, rivals, and state-owned institutions, like contracts and agreements (through book value of all firm properties minus intangible assets).

3.3. Control variable

LEV: financial leverage: total debts to total assets;
LOSS: firm loss, if the firm is losing 1, otherwise, 0;
INDUSTRY: virtual variable of industry
EXPORT: if the firm has exports 1, otherwise, 0;
Sizeit: natural logarithm of firm sales in the year under study;
ROAit: return on assets, net profit to total assets ratio.

3.4. Statistical population, statistical sample, and data collection method

The statistical population of the present study includes all listed firms on the Tehran Stock Exchange. The reason for selecting the statistical community is to gain access to available data in financial statements of the listed firm on the Tehran Stock Exchange. The number of remained firms for hypothesis testing is 141 firms, five years, 705 year-company.

To gathering the data, library method and documentary studies were used and to obtain the desired data for hypothesis processing, the available information of Rah Avard Novin Software is used, and financial statements of the listed firm on the Tehran Stock Exchange were analysed by visiting the official website Tehran Stock Exchange and Codal.

The statistical method of regression analysis is used for hypothesis testing using

Eviews Software.

4. The Results

4.1. Descriptive statistics

Table 1. The descriptive statistics

Variable	Mean	Median	Max.	Min.	Std. dev.	Skewness	Kurtosis
Auditor concentration	0.023	0.006	0.542	0.000	0.048	4.763	35.223
Client concentration	0.051	0.023	0.870	0.000	0.091	4.085	24.885
Competitive pressure of rivals	0.266	0.159	12.738	-1.000	0.978	6.900	70.330
Human capital	0.136	0.175	1.647	-7.5780	0.587	-9.695	118.438
Relational capital	17.010	13.725	486.796	-923.586	77.252	-5.531	75.842
Structural capital	0.863	0.953	11.367	-38.380	1.619	-20.037	495.033
Industry 1	0.149	0.000	1.000	0.000	0.356	1.972	4.889
Industry 2	0.057	0.000	1.000	0.000	0.231	3.832	15.685
Industry 3	0.128	0.000	1.000	0.000	0.334	2.231	5.980
Industry 4	0.262	0.000	1.000	0.000	0.440	1.080	2.166
Industry 5	0.128	0.000	1.000	0.000	0.334	2.231	5.980
Industry 6	0.120	0.000	1.000	0.000	0.326	2.330	6.431
Industry 7	0.092	0.000	1.000	0.000	0.289	2.819	8.948
Industry 8	0.014	0.000	1.000	0.000	0.118	8.217	68.514
Industry 9	0.050	0.000	1.000	0.000	0.217	4.147	18.195
Financial leverage	0.618	0.613	2.315	0.090	0.250	2.052	13.568
Loss	0.146	0.000	1.000	0.000	0.353	2.004	5.016
Return on equity	0.110	0.106	0.705	-2.444	0.187	-3.820	53.443
Export	0.915	1.000	1.000	0.000	0.279	-2.971	9.826
Firm size	13.862	13.816	18.44048	10.121	1.355	0.440	4.093

Audit concentration in the first model (ac) with a maximum value of 1. and the maximum amount of 0. Moreover, client concentration in the second model (cc) with the maximum value of 1.740 and minimum value of 0, and in the model of competitive pressure of rivals (cp), the maximum amount of 29737.93% and the minimum amount is -200%. Moreover, in independent variables, including human capital (HCE), the maximum value of 7521771 and a minimum amount of 870.

Given the F test results, the p-value in all three models and all three modes is less than 0.1, so H0 is rejected, and a panel with fixed effects is approved.

Given the values of Chi-square statistics resulted from the Breusch-Pagan test based on the above table, the coefficient in all three models and both modes (cross-section, cross-section, and time) is less than 0.1, so the H0 is rejected, and the panel with random effects is approved.

Given the Hausman test results, p-values in all three models are less than 0.1, so H0 is rejected, and a panel with random effects is used.

Table 2. The results of F-Limer (chow), Breusch-Pagan, and Hausman tests for the first, second, and third model

Description	F-Limer (cross-section)		F-Limer (time)		F-Limer (cross-section and time		Breusch-Pagan (cross-section)		Breusch-Pagan (time)		Breusch-Pagan (cross-section and time		Hausman test		Result
	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	
Model 1	47.60	0.000	2.930	0.000	41.440	0.000	1099.300	0.000	1.600	0.200	1101	0.000	8.890	0.003	Model has fixed cross-sectional and time effects
Model 2	38.500	0.000	4.070	0.000	37.700	0.000	653	0.000	1.350	0.240	655	0.000	9.070	0.001	Model has fixed cross-sectional and time effects
Model 3	21.800	0.000	4.150	0.010	21.500	0.000	302	0.000	0.920	0.330	303.400	0.000	11.190	0.000	Model has fixed cross-sectional and time effects

In this stage and after specifying the appropriate estimation method for final model fitting and before final estimation, it is first necessary to analyze the primary receptors of regression models. Hence, in the following, we investigate the classic hypotheses of multiple regressions.

4.2. Variance heterogeneity

The first basic receptor understudy for the model related to hypothesis testing is the variance heterogeneity of model residuals, for which the variance coefficient tests are used with the following results:

Table 3. The results of variance heterogeneity

H0	Test statistic	p-value	Result
Series with variance homogeneity	1.03	0.17	H0 is accepted: series has variance homogeneity
H0	Test statistic	p-value	Result
Absence of serial autocorrelation	1.47	0.22	H0 is accepted: series has no autocorrelation

The second hypothesis of the regression model hypothesis is the absence of the first-order autocorrelation among model residuals. In the first, second, and third model, the Durbin-Watson statistic is a number equal to 1.560, 2.143, and 2.391, respectively, and there is no autocorrelation among residuals. Moreover, the results related to the test of residual correlation are presented in the following:

Given the obtained results from the variance inflation factor and the relationship between the independent variable, VIF, and relationship values are not high in these two variables, there is no collinearity among variables.

Table 4. Test results of the first model

Variables	Symbol	Regression coefficient	Std. dev.	T statistic	Sig.
The constant value of the model	C	0.031	0.003	-8.680	0.000
Relational capital	CCE	-0.001	0.001	-2.691	0.0073
Structural capital	SCE	-0.000	8.74E-06	-13.158	0.000
Human capital	HCE	-8.37E-07	5.17E-08	-16.190	0.000
Industry 1	INDUSTRY01	0.008	0.004	1.719	0.086
Industry 2	INDUSTRY02	0.011	0.004	3.190	0.001
Industry 3	INDUSTRY03	0.003	0.001	4.441	0.000
Industry 4	INDUSTRY04	0.035	0.001	29.479	0.000
Industry 5	INDUSTRY05	0.021	0.007	3.240	0.001
Industry 6	INDUSTRY06	0.011	0.001	11.430	0.000
Industry 7	INDUSTRY07	0.004	0.000	11.960	0.000
Industry 8	INDUSTRY08	-0.003	0.000	-5.146	0.000
Financial leverage	LEV	-0.000	0.001	-0.158	0.874
Loss	LOSS	0.001	0.001	0.869	0.385
Return on equity	ROA	0.010	0.003	0.343	0.731
Export	EXPORT	-0.010	0.001	-12.042	0.000
Firm size	SIZE	0.003	0.000	9.473	0.000
Coefficient of determination		0.569	F statistic of model		55.783
The adjusted coefficient of determination		0.536	Probability F statistic of model		0.000

As can be seen in Table 4, given the t statistic at the significance level of coefficients and regression coefficient sign of each variable of relational capital (-0.001), structural capital (-0.000), and human capital ($-8.37E^{-07}$). The significance level is less than 0.1, we can conclude that there is a negative and significant relationship between relational capital and structural capital and human capital and auditor concentration and also in control variables given the significant level of more than 0.1, there is no meaningful relationship between financial leverage, loss, and return on equity and auditor concentration. At a significance level of less than 0.1, there is no significant relationship between export industry, firm size, and auditor concentration. We can say that intellectual capital contributes negatively to audit concentration, so the first hypothesis is accepted.

The model's determination coefficient is 0.565, which shows existing descriptive variables in the model elucidate 56% of changes in the dependent variable.

Table 5. Test results of the second model

Variables	Symbol	Regression coefficient	Std. dev.	T statistic	Level of significance
The constant value of the model	C	-0.009	0.108	-0.084	0.933
Relational capital	CCE	0.043	0.008	5.099	0.000
Structural capital	SCE	0.004	0.001	2.056	0.040
Human capital	HCE	-0.000	0.000	-3.378	0.001
Industry 1	INDUSTRY01	-0.065	0.006	-10.560	0.000
Industry 2	INDUSTRY02	-0.015	0.005	-3.207	0.001
Industry 3	INDUSTRY03	-0.079	0.006	-12.809	0.000
Industry 4	INDUSTRY04	-0.039	0.005	-7.657	0.000
Industry 5	INDUSTRY05	-0.067	0.007	-10.15	0.000
Industry 6	INDUSTRY06	-0.026	0.005	-5.624	0.000
Industry 7	INDUSTRY07	-0.063	0.008	-8.062	0.000
Industry 8	INDUSTRY08	-0.121	0.008	-15.527	0.000
Financial leverage	LEV	-0.126	0.027	-4.733	0.000
Loss	LOSS	0.010	0.022	0.442	0.659
Return on equity	ROA	0.066	0.091	0.724179	0.469
Export	EXPORT	-0.011	0.060	-0.183	0.855
Firm size	SIZE	0.015	0.006	2.406	0.016
Coefficient of determination		0.569	F statistic of model		2.275
Adjusted coefficient of determination		0.536	Probability F statistic of model		0.003

As can be seen in Table 5, given the t statistic at the significance level of coefficients and regression coefficient sign of each variable of relational capital (0.043), structural capital (0.004), and human capital (-0.000). The significance level is less than 0.1. We can conclude a positive and significant relationship between relational capital and structural capital, and client concentration. The relationship between human capital and client concentration is negative and significant. Moreover, given the significant level of more than 0.1, there is no meaningful relationship between losses, return on equity, export, firm size, and client concentration, and given the significant level of less than 0.1, there is a significant relationship between the variable of industry, financial leverage, and client concentration, so the second hypothesis is accepted.

Moreover, the F statistic and its probability are equal to 2.275 and 0.000, respectively,

indicating model significance.

Table 6. Test results of the third model

Variables	Symbol	Regression coefficient	Std. dev.	T statistic	Level of significance
The constant value of the model	C	-0.232	0.007	-30.930	0.000
Relational capital	CCE	0.032	0.005	5.829	0.000
Structural capital	SCE	0.007	0.003	2.299	0.022
Human capital	HCE	-5.58E-05	1.64E-05	-3.401	0.001
Industry 1	INDUSTRY01	-0.071	0.008	-9.183	0.000
Industry 2	INDUSTRY02	-0.013	0.004	-3.438	0.001
Industry 3	INDUSTRY03	-0.084	0.008	-10.728	0.000
Industry 4	INDUSTRY04	-0.044	0.005	-8.035	0.000
Industry 5	INDUSTRY05	-0.068	0.004	-14.98	0.000
Industry 6	INDUSTRY06	-0.0370	0.006	-5.861	0.000
Industry 7	INDUSTRY07	-0.065	0.008	-7.707	0.000
Industry 8	INDUSTRY08	-0.126	0.007	-17.89	0.000
Financial leverage	LEV	-0.192	0.027	-7.183	0.000
Loss	LOSS	0.005	0.001	6.237	0.000
Return on equity	ROA	0.003	0.001	2.754	0.006
Export	EXPORT	-0.010	0.069	-0.151	0.880
Firm size	SIZE	0.023	0.001	21.813	0.000
Coefficient of determination		0.724	F statistic of model		66.586
Adjusted coefficient of determination		0.713	Probability F statistic of model		0.000

As shown in Table 6, given the t statistic at the significance level of coefficients and regression coefficient sign of each variable of relational capital (0.032), structural capital (0.007), and human capital ($-5.58E^{-05}$). The significance level is less than 0.1. We can conclude a positive and significant relationship between relational capital and structural capital and rivals' competitive pressure. The relationship between human capital and the competitive pressure of competitors is negative and significant. Moreover, given the significant level of less than 0.1, there is a significant relationship between industry variables, leverage, return on equity, firm size, and the competitive pressure of rivals, and given the significant level of more than 0.1 in the variable of export, there is no relationship between export and the competitive pressure of competitors, so the third hypothesis is accepted.

5. Conclusion

The results show that there is a negative and significant relationship between human, structural, and relational capital and auditor concentration, which means the more these three intellectual capital components go up, the less is the auditor concentration; this finding in line with Nazari et al. (2010) and contrast to Rehman et al. (2011), Chen et al. (2004), Chang Wang et al. (2012), Tsenget et al. (2011). Further, there is a positive relationship between relational and structural capital and client concentration, which means the increase in relational and structural capitals would lead to a rise in client concentration. Moreover, there is a negative relationship between human capital and

client concentration, in line with the result of Nazari et al. (2010). The findings show a positive relationship between relational and structural capital and rivals' competitive pressure, which means the increase in relational and structural capitals would lead to a rise in competitors' competitive pressure.

Furthermore, there is a negative relationship between human capital and the competitive pressure of rivals. In conformity with such results, Enzo Dia (2009), Abdullah and Friha (2012). The presence of contradictory results in the audit market concentration is that auditors' range of audit fees is calculated according to working pressure and volume and is closer to standard in different countries. In Iran, this amount is hugely higher than the standard in some firms due to no market stability and vice versa.

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Research Article

The Relationship between Normal and Abnormal Audit Fees and Financial Restatements

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Abstract

The present study aims to analyze the relationship between normal and abnormal audit fees on financial restatements.

This article benefits from an applied method, and the statistical method used includes a panel regression pattern. Five hypotheses are formulated and tested for this study. The study's statistical sample comprises 116 enlisted companies on the Tehran Stock Exchange from 2012-2016.

The results obtained from hypothesis testing show that the audit fees and audit fees shortage sensitivity significantly affect the Tehran Stock Exchange's financial restatements. Furthermore, these results suggest that abnormal audit fees, high-standard audit fees, compared with low-standard audit fees, and excessive audit fees sensitivity could not influence the financial restatements.

Keywords: financial restatements, normal audit fees, abnormal audit fees.

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1. Introduction

Managers of a business unit are responsible for supplying and disclosing financial statements, and auditors are obliged to credit such statements. One of the problematic issues for the financial statements' reliability is the annual adjustments and the resubmission of comparative figures of financial statements. Annual adjustments may occur for two main reasons, change of accounting policy and the error correction of the present or previous period. Such adjustments may indicate a weakness in the accounting system, financial reporting, internal control of the firm, and management effort to manipulate the income through the inappropriate use of accounting methods, intentional non-recognition of incomes and costs, or recognition of dummy incomes and costs. Moreover, annual adjustments may show the weakness or failure of the auditor in previous audits.

Restatements may warn the investors about the probable deterioration of the economic condition of the restatement firm (Palmrose, Richardson, and Scholz, 2004).

Financial restatements reflect some implicit signs about the non-reliability of the previous periods' financial statements and their low quality in the capital market. Consequently, this would lead to investors' change of expectations about future cash flows and their expected return rate. Financial restatements cause the decline of investors' trust in financial reporting and lower investment efficiency (Vivek and Myungsoo, 2013). In general, the users' response is negative to this issue. On the other hand, when a company restates its financial statements, it acknowledges a significant error or an inappropriate trend in the current or the previous period's financial statements. Accidental or intentional avoidance of restatement, related results, and financial restatements through which the previous periods' reported data would be improved are signs of low-quality accounting information, including reported audit in the previous years.

Some studies suggest that auditors' expulsion rate after financial restatements is more than its regular rate (Hennes et al., 2012).

Presently, the pricing of audit services is one of the auditing scholars' vogue words. Within the competitive markets, the range of audit fees is, to a great extent, indicative of audit attempts and legal risk. Hence, the higher the risk of manipulating data by the management, the higher the audit risk, and the expected audit fees (Latridis and Kadorinis, 2009). Audit risk is the mutual effect of the inherent risk (derived from the firm's characteristics), control risk (related to internal control quality), and the risk of non-discovery (due to failure of auditing methods to discover significant errors). The range of inherent and control risk goes up due to income and costs manipulation based on the audit risk framework. Such an increase will influence the audit time budget, enhancing the audit fees (Desender et al., 2011).

According to professional standards of auditing, auditors are obliged to carry out the auditing project in order to sensibly make sure that financial statements are free of any significant distortion. For this purpose, auditors organize the nature, time, and the scope of auditing methods and after that, among other factors, determine the degree of significant distortion risk of financial reports by considering the business model of the firm and other related factors, like the inherent risk and lack of internal controls, to prevent, explore, or correct a significant distortion, namely the control risk (the supervisory board of public corporation accounting, 2010).

Auditors cannot control the inherent and internal control risks. The discovery risk is only a part of audit risk under the auditor's control, which is defined as a risk that cannot explore or modify any significant distortion using the auditing methods. Therefore, it is expected from companies with financial restatements to have more risks in their previous years and consequently to spend more time and more fundamental tests in order to alleviate the risk of discovery, increase the possibility of significant distortion discovery

by the auditors, and finally to enhance the audit costs (Messier et al., 2010).

Therefore, the study's main question is whether there is a relationship between auditor's fees and financial restatement.

2. Literature review and hypothesis development

From an investors point of view, financial restatements are not only sung of some performance problems within the previous periods, but it is a kind of future problem prediction for the firm and its management, which could cause the distrust of investors in the credit and qualification of the management and the reported earnings quality. Restatements are a type of public awareness and confirmation that the reported financial statements are not provided following the standard accounting principles and present the most obvious evidence about inappropriate accounting (Palmrose, Richardson, and Scholz, 2004). One of the implicit signs of financial restatement is that the previous periods' financial statements were unreliable and had a low quality in the capital market. Such deeds will change investors' expectations concerning the future cash flow their expected rate of return. Financial restatements can take down investors' trust in financial reporting and lower investment efficiency (Vivek and Myungsoo, 2013).

As mentioned earlier in the prior studies, financial restatements have dramatically decreased companies' average stock price. Hence, the exploration and improvement of any accounting error could lead to a transfer of inappropriate information about the firm to the capital market practitioners. Financial restatement reminds about the increase of the firms' information risk due to a lack of financial statement credit and low accounting quality. Further, a financial restatement may inform the investors of the possible deterioration of the economic status of the firm (Palmrose, Richardson, and Scholz, 2004).

An argument backing the issue is that restatement hurts the contractual relationship between the firm and parties outside, including customers, suppliers, etc., and has an adverse effect on the firm's cash flow. This means that restatement decreases the level of existing internal cash resources for investment. The other argument is that financial restatements could reduce the firm's ability to reach a lower external financial supply (Albring, Huang, and Pereira, 2013).

Independent auditors play a vital role in the credibility of financial statements and advocate investors' rights. Although the management of a business unit is responsible for supplying and presenting financial statements, the audited financial statements are the common byproduct of the employer and the auditor, so as claimed by Czerney et al. (2013), financial restatements could be a kind of auditing failure. According to current theoretical and experimental literature (e.g., Blankly et al., 2014; Files et al., 2014), financial restatements and the reflection of annual adjustments in the financial reports are constantly affected by several factors. Auditing characteristics, including auditor tenure, auditor size, audit industry specialization, and audit report delay, are among the factors that contribute to financial restatements and their recurrence by affecting the audit quality.

When firms restate their financial statements, investors reevaluate their imagination about those companies' financial information quality. The reaction of investors to such statements may be twofold. First, they may observe the report of restatements as modified and qualitative financial reports, in which the previous errors are improved, and second, it is logical to expect from such restatements to increase the financial asymmetry which is derived from the lack of management transparency, distrust in financial reports, and unclarified continuance of firm activity. Therefore, we expect a lower trust of investors in the management credibility and more investors' concerns that management takes opportunistic accounting decisions. Given the above-said factors, investors would be uncertain about the reality of the previous financial statements of the firm as much as they

are of the future ones. Hence, such unpredictability will consequently lead to market information asymmetry and cause a high uncertainty level. As a result of such an event, the proposed price of transactions will be surged by brokers or specialists to compensate for the risk of inappropriate selection. Different reasons proposed in the accounting literature related to financial restatements, among which Scholz (2008) claim that the main factors of restatement are the incomes (e.g., inappropriate or intriguing generation of income), costs (e.g., improper capital spending), and reclassification and disclosure (e.g., the classification of debt reimbursement as an investment) and Hribar and Jenkins (2004) believe that firms carry out financial restatements due to some issues, including income recognition, final price, operational costs, properties, and inventories. Moreover, the auditor may be one of the other factors of the restatement because providing audited financial statements by independent auditors is a useful tool for transferring reliable information. The auditor gives credit to the claims provided by another party in the form of financial statements to increase the reliability applied in the economic decisions. It is worth mentioning that principally the use of annual adjustment is not something disturbing, but being informed of the previous unfair financial statements is the issue that raises many concerns.

Within the past twenty years, the auditing profession has experienced a fast-paced and considerable advancement. The decline of auditing regulations allowed the audit firms to pursue the economic objectives more enthusiastically and seek more earnings and lower costs. In such circumstances, an auditor who can have the best estimation of his/her fees is more fortunate to maintain the project quality and perform that with the minimum cost.

The main objective of auditing is to give credit to financial reporting and make the users confident of the financial statements. At the same time, it is the audit fees that supply the economic interests of an auditor. The classic model of Simonic associates the audit fees with job-related descriptive variables, including the firm size and number of departments, and with risk-related descriptive variables, involving the leverage and financial losses (Khondkar et al., 2015). The firm complication is the other factor of the audit fees increase. When the scope of a firm’s operation is wide and complicated, the demand for financial reporting supervision is higher. Firms with complicated operations require various audit services and, consequently, ask for higher audit fees.

Audit fees comprise any payment type for presenting audit services according to the contract or agreement with the auditor or an audit firm. The price of any service or goods is the cost the user will pay for. In reality, such a formula does not work in countries lacking a competitive economy, and the price is set based on the monopolies or minimum livelihood wage.

Abnormal audit fees is the difference between real audit fees (the fees paid for the auditing of financial statements) and the regular expected level of audit fees (Krishnan et al., 2008)

A positive abnormal audit fee reflects the range of reliance between auditor and employer. More dependency between these two by altering the auditor’s independence will cause a lower-quality audit (Asthana and Boone, 2012). The abnormal audit fees could be defined based on the auditor and employer (Choi et al., 2010). As Kinney and Libby (2002) mentioned, abnormal audit fees, compared with the regular fees, could be paid more easily in the form of rents or economic briberies relative to audit services or the auditor's economic dependency employer.

The fees paid to the auditor are comprised of two discrete parts: first, costs related to auditors’ efforts showing the risk of financial supply, which is called normal audit fees. The normal or expected audit fees are defined based on several factors, including the employer’s scale, the employer’s operation's complication, and the employer's special risk (Simunic, 1980). The second part, called the abnormal audit fees, could be set based

on the auditor and employer (Choi et al., 2010).

According to Gonzalez et al. (2015), the fees of audit firms is made up of three parts, first the natural costs of auditing (like the required audit policies, providing reports, and the cost of lost opportunities), second the expected costs (including, risk and potential costs derived from running the audit), and third, the profit of the audit firm. The employer hopes to reduce the reporting system's costs while the auditor looks for a plausible profit from the auditing process. Hence, the audit fees result from maximizing both parties' interests (Gonzalez et al., 2015).

Negative abnormal audit fees are the difference in the auditor's fees in proportion to the normal audit fees estimated through the audit fees model (Choi et al., 2010). From a different perspective, lawmakers are concerned about lower initial audit fees than the auditor's actual costs. In fact, in case the auditor is hopeful about the compensation of the initially incurred audit losses in the future, this may be due to his/her fear of losing the job and will cause the non-disclosure of some of the problem in the audit report, so this could lead to a low-quality audit and the weakness of the auditor's independence (Kacer and Wilson, 2016). Salehi et al. (2017) declared that there is a negative relationship between these two variables. The abnormal audit fees are lower during the periods before the occurrence or restatement (namely the upcoming fiscal year). Choy and Gul (2011) concluded that audit fees are increased in companies with more restatements. Mironiuc and Robu (2012) indicated that a lower payment level for audit services and a higher level of payment for non-audit services could enhance the risk of fraud in companies listed on the New York Stock Exchange. Fang et al. (2014) noticed that negative abnormal audit fees have a significant relationship with audit quality. Moreover, there is limited evidence suggesting that the auditor bears the earnings management when the abnormal audit fees are negative. Xinhua (2009) noted that abnormal audit fees could disturb the auditor's independence and consequently believed the firm data are less related to the stock price. The abnormal non-audit fees of the periods before SOX are not this type (Xinhua, 2009). Choi et al. (2010) revealed that negative abnormal audit fees (extra standard to real fees) have no significant relationship with the audit quality, while positive abnormal audit fees (extra real to standard fees) have a negative relationship with the audit quality. They concluded that positive abnormal audit fees could cause a loss of auditors' independence and lower audit quality. Choi et al. (2010) and Hribar et al. (2014) claimed a negative relationship between fee residuals and the audited items' financial reports' quality metrics. The payment-based findings of Choi et al. (2010) could be an organized motive for interrupting the audit market to limit the audit fees. In contrast, the payment-based interpretations of Hribar et al. (2014), based on the fact that the current market puts the auditors under pressure for more efforts relative to the quality of financial reports, is a driver to leave the organization of this area. Having sufficient information about the cost residual is vital to deal with the issue to realize whether the costs should be considered an option for the auditor costs or considered as unpredicted audit costs or none of them.

Within the competitive audit market and from the viewpoint of different individuals' competencies, the probable compilation of cost residuals could be considered a factor for explaining the costs proposed by fresh and experienced auditors (we herein call the approach the stability of cost residuals). Provided that the cost residuals are more than the unpredicted costs and related to both current and future audits, such costs will remain stable (in other words, they account for the upcoming year). For example, about one dollar will be set aside for each dollar of cost for ongoing and new obligations. In contrast, if the cost residuals are more than the fees the current and future auditors are seeking, such costs will remain stable in the ongoing obligations. Still, they will be omitted along with the auditor change process. Such a decline is the competition of new operators that, by gaining future payments, cause the auditors to pay back the excessive payments to the

clients (Kanodia and Mukherji, 1994). Broadly, in case the cost residuals are higher than the amount spent or the payments that are considered as out of the norm by the current auditors, they should be asked by the fresh auditors (in other words, such costs should not be shared with the new auditors or should not be available).

The results of Lifschutz et al. (2010) suggested that the independence of the board members and the competency of the audit committee have a significant relationship with the audit fees. Owusu-Ansah et al. (2010) noticed that the employer's size, the time spent for auditing, the firm size, and the employer's financial condition positively and significantly affect the audit fees. Griffin and Lont (2011) indicated that the audit fees have a significant relationship with some factors, including the type of audit report, auditor change, type of industry, current ratio, number of departments of the business unit, and the employer's size. Charles, Golver, and Sharp (2010) argue that choosing an auditor is a kind of economic decision and the employer purchases the audit services at a level of quality he/she expects at the lowest price from the buyer (auditor) and auditor change is a reaction to the change of amount and type of clients expectations. In addition, the compensation plans for managers contribute significantly to the risk of financial reporting and will increase as the risks of such plans go up (Kannan, Skantz, and Higgs, 2014).

Scherand and Zechman (2012) realized that due to managers' optimistic view and their reliance on the upcoming periods' profit, the risk of their wrong prediction is high. Therefore, if the auditor perceives such a personal characteristic of the managers and overestimates the risk of financial reporting, he/she would be able to ask for a higher payment. By doing so, he/she could complete the auditing operations to lower the risk of non-discovery of significant distortion. Audit fees are directly associated with the working hours of the auditors. In order to decrease the audit cost, the employer negotiates with the auditor about the auditing plans and the scope of the project (Ball, Jayaraman, and Shivakumar, 2012). Within a meta-analysis on the fees of non-audit services and the quality of financial reporting, Habib (2012) showed that the fees of specific non-audit services of the employer are associated with low-quality financial reporting. Such an approach shows the possibility of a positive relationship between audit fees of the year before declaring and the possibility of a future restatement. Moreover, negative audit fees are along with future restatements. Lobo and Zhao (2013) evaluated the relationship between the auditor's characteristics and the range of financial restatements in terms of modified errors. They found out a negative relationship between the auditor's range fees and the amount of error modification. Zhang (2017) showed that the abnormal audit fees reflect the economic tie between the auditor and the firm, which hurts auditor independence and, consequently, the audit quality. Negative audit fees indicate the firms' bargaining power. Such fees could lower the auditing efforts, control the audit costs to achieve a certain profit objective, and decrease the audit quality. Wan Mohammad et al. (2018) analyzed the effect of audit committee characteristics on financial restatements. Such characteristics, including size, independence, experience, and activity, could significantly account for the financial restatements.

Given the theoretical principles and the literature review, the following hypotheses are proposed:

H_1: There is a relationship between audit fees and financial restatements.

H_2: There is a relationship between abnormal audit fees and financial restatements.

H_3: There is a relationship between high-standard audit fees in proportion to low-standard audit fees and financial restatement.

H_4: There is a relationship between excessive audit fees sensitivity and financial restatements.

H_5: There is a relationship between audit fees, shortage sensitivity, and financial restatements.

3. Research Methodology

The study is practical, in terms of objective, and is concerned about the effect of the auditor's characteristics on financial restatements. Data related to research variables are gathered by studying financial statements in CDs provided by the Tehran Stock Exchange, research management websites, and Islamic research and development of Securities and Exchange. They were entered into the Excel Software and finally analyzed using the R Software.

3.1. Statistical population and sample

The present paper's statistical population includes all listed companies on the Tehran Stock Exchange during 2012-2016. The systematic elimination method is used for sample selection, such that among all existed companies, those that lack the following qualifications will be omitted and the remaining with being selected as the sample of the study:

1. Should be accepted in Tehran Stock Exchange till the end of 2011;
2. Companies should not have changed their financial yearend and experienced no operational lag during 2012-2016.
3. Their notes should be available in the Stock and Securities.
4. Should be affiliated with investment companies, banks, and financial intermediaries.

A total of 116 companies was selected as the sample of the study by considering the above conditions.

3.2. Hypothesis testing model

The following regression model is used for hypothesis testing:

$$RES_{it} = \beta_0 + \beta_1 SFee_{it} + \beta_2 ABFREE_{it} + \beta_3 HAFEE_{it} + \beta_4 PAFEE_{it} + \beta_5 NAFEE_{it} + \beta_6 AC_{it} + \beta_7 Dsimiss_{it} + \beta_8 MF_{it} + \beta_9 MW_{it} + \beta_{10} OOR_{it} + \beta_{11} INDAC_{it} + \beta_{12} Z_{it} + \beta_{13} LEV_{it} + \beta_{14} Size_{it} + \beta_{15} Loss_{it} + \beta_{16} ROOT\_SEGS_{it} + \beta_{17} FOREIGN\_SALES_{it} + \beta_{18} AGE_{it} + \beta_{19} GROWTH_{it} + \beta_{20} ACQUISITION_{it} + \beta_{21} BIG1_{it} + \beta_{22} ROA_{it} + \beta_{23} CASH_{it} + \beta_{24} GC_{it} + \beta_{25} INVERC_{it} + \beta_{26} TENURE_{it} + \beta_{27} INST\_OWNERSHIP_{it} + \beta_{28} MGMT\_CHANGE_{it} + \varepsilon_{it}$$

(Equation 1)

3.3. Variables

3.3.1. Dependent variable

Financial restatement (RES_{it}) is the dependent variable of the study, which is a virtual variable. In case financial restatement occurs, we will assign 1; otherwise, it would be 0.

3.3.2. Independent variables

Normal audit fees (SFee it): is the natural logarithm of the amount of real audit fees paid to an auditor, which is extracted from financial statement notes in the department of general, office, and sales costs.

Abnormal audit fees (ABFREE it): in this paper, the auditor's abnormal audit fees are estimated through the auditor's normal audit fees model's regression residuals.

$$lnfee = \beta_0 + \beta_1 lnTA + \beta_2 ROA + \beta_3 LEVE + \beta_4 TEN + \beta_5 AUD\ SIZE + \beta_6 INVERC + \beta_7 ISSUE + \beta_8 LOSS + \beta_9 LIQUID + \beta_{10} CHG\ SAL + \varepsilon$$

(Equation 2)

LNfees: the natural logarithm of the fees paid to the auditor, LNTA: the natural logarithm of total assets, ROA: return on assets, which is calculated through net profit divided by the total assets, EV: is the financial leverage achieved through total debts

divided by total assets, TEN: the continuity of auditor selection, if the auditors is changed during the years under study, we will assign 0, otherwise, it would be 1, AUD SIZE: the firm size is a virtual variable that in case the firm is monitored by the audit organization, we will assign 1, otherwise, it would be 0, INVREC: inventories, accounts, and documents receivable ratio to total assets, ISSUE: is a dual variable that in case of issuance of stock and bonds in the current year, it would be 1, otherwise it is 0, LOSS: is a virtual variable that in case the firm experienced a loss within the year under study, we will assign 1, otherwise it would be 0, LIQUID: current ratio, which is achieved by dividing current assets into current debts, CHG SALE: change in sales of the current year in proportion to the previous year, ε: the residual of the regression model indicating the abnormal audit fees.

HAFEE it: high-standard audit fees, such that if the abnormal fees are positive, we will assign 1; otherwise, it would be 0.

PAFEE it: excessive audit fees sensitivity, such that if the abnormal audit fees are negative, we will assign 1; otherwise, it would be 0.

NAFEE: audit fees shortage sensitivity, such that if the abnormal fees are positive, we will assign 1; otherwise, it would be 0.

3.3.3 Control variables

Buying the auditor's opinion (OOR it): the significance of internal control is a variable that, if realized as significant by the auditor, would be 1; otherwise, it is 0. If the firm decreases the significance of its internal control weakness, and we have no auditor change, the variable of buying an auditor's opinion would be 1; otherwise, it is 0.

Financial expertise of the audit committee (AC it): knowledgeable audit committee members in finance or accounting ratio to total audit committee members.

Audit committee effort (MF it): the number of sessions held by the audit committee during a year.

Internal control weakness (MW it): significant weaknesses of the internal control achieved from independent auditors' report. Since only significant weaknesses of internal controls of the firm are presented in the audit reports as a condition paragraph and all weaknesses mentioned by the auditor previously in the management letter are ignored, in this study, only those condition paragraphs are proposed that are related to internal control weaknesses as significant weaknesses of the internal control. The number of significant internal control weaknesses in an audit report of listed companies on the Tehran Stock Exchange is extracted during the study. Hence, by significant internal weaknesses in this paper, we mean those weaknesses mentioned by the auditor in the report. Such weaknesses are usually minimized during the year and remain stubborn in some cases. For example, the accounts receivable's weaknesses, inventory, assets, and taxes are among those items related to the board's decisions. They are not available at the level of company accounts or even the company itself.

$$MV_{it} = \beta_0 + \beta_1 MV_{it-1} + \beta_2 DISMISS_{it} + \beta_3 LnTA_{it} + \beta_4 Age_{it} + \beta_5 Foreion - sales_{it} + \beta_6 \text{RooTESEG}_{it} + \beta_7 \text{BIG1}_{it} + \beta_8 Loss_{it} + \beta_9 \text{INST\_OWNERSHIP}_{it} + \beta_{10} \text{MGMT\_Change}_{it} + \beta_{11} Z_{it} + \beta_{12} growth_{it} + \beta_{13} DISMISS_{it} * MV_{it-1} + \beta_{14} LnTA_{it} * DISMISS_{it} + \beta_{15} AGE_{it} * DISMISS_{it} + \beta_{16} Foreion - sales_{it} * DISMISS_{it} + \beta_{17} \text{RooTESEG}_{it} * DISMISS_{it} + \beta_{18} Big1_{it} * DISMISS_{it} + \beta_{19} Loss_{it} * DISMISS_{it} + \beta_{20} \text{INST\_OWNERSHIP}_{it} * DISMISS_{it} + \beta_{21} \text{MGMT\_Change}_{it} * DISMISS_{it} + \beta_{22} Z_{it} * DISMISS_{it} + \beta_{23} growth_{it} * DISMISS_{it} + \varepsilon_{it}$$ (Equation

3)

MW t: is an artificial variable that in case a significant internal control weakness is reported by the auditor is would be 1, otherwise, it is 0, MW t-1: is an artificial variable that a significant internal control weakness is reported by the auditor for the year t-1, it would be 1, otherwise, it is 0, Auditor change (Dsimiss it): is a virtual variable and in case the change of auditor is occurred it is 1, otherwise, it would be 0, LnTA it: is the natural logarithm of total assets of the firm, age it: is the firm age, Foreign-Sales it: the foreign sales and in case the firm has an export, it is 1, otherwise, it would be 0, Big1 it: is the auditor size that in case the auditor is a company affiliated with the audit organization and grade 1 institutions, it is 1, otherwise it would be 0, loss it: is a virtual variable for the loss that in case the company has some losses, it is 1, otherwise it would be 0, INST-OWNERSHIP: is the institutional ownership of the stock which is achieved by dividing the shares of institutional shareholders (bank, insurance, etc.) into total shares published, MGMT-Change it: is a virtual variable that if a member of the board is change, it would be 1, otherwise, it is 0, Z it: the possibility of bankruptcy which is explained in the following, Growth it: is the sales growth.

Auditor change (Dismiss it): is a virtual variable that is 1 in case of auditor change; otherwise, it would be 0.

Audit committee independence (INDAC it): the number of audit committee members not affiliated with the board of directors.

Chance of bankruptcy (z it): the chance of bankruptcy of the firm is calculated using the Z Altman Score as follows:

Z= (total debt/book value of equity) +1.05 (total assets/profits before tax and interest) +6.72 (total assets/ accumulated profit) +3.26 (total assets/working capital) 6.5

Leverage ratio (LEV it): is calculated by total debts divided by the total assets.

Firm size (SIZE it): the natural logarithm of total sales.

(LOSS it): is a variable indicating that if the net profit is negative, it is 1; otherwise, it would be 0.

(ROOT_SEGS it): the square root of the number of commercial and geographical departments.

(FOREIGN_SALES it): is a variable indicating that if the firm has a foreign sale, it is 1; otherwise, it would be 0.

Firm age (AGE it): the natural logarithm of the number of years, for the first time, the company's name is listed on the Stock Exchange.

(GROWTH it): the rate of net sales growth.

(ACQUISITION it): if the firm is engaged in integration activities, and it is done, it is 1; otherwise, it would be 0.

(BIG 1 it): the auditor’s size that if the size of the firm auditor is the audit organization and grade1 institutions, it is 1; otherwise, it would be 0.

(ROA it): return on assets of the shareholders.

(CASH it): total cash and its equivalent ratio (short-term investment) to book value of total assets.

(GC it): if the firm auditor received t-1 for the firm activity's continuity in his/her audit report, it is 1; otherwise, it would be 0.

(INVREC it): inventory plus receivables on a scale of total assets.

(TENURE it): the subsequent number of years of auditor-employer relation is the beginning of the year with the maximum value of 10 years.

(INST_OWNERSHIP it): the percentage of institutional owners.

(MGMT_Change it): is a virtual variable that if one of the board members is changed, it is 1; otherwise, it would be 0.

4. Findings

4.1. Descriptive statistics

Tables 1 and 2 illustrate the descriptive statistics of the research variables.

Table 1: the descriptive statistics of the quantitative variables of the study

Variable	Min.	Max.	Mean	Standard deviation
Tenure	1.0000	7.0000	2.66	1.580
The number of commercial and geographical depts.	0.0000	72.0000	2.04	7087
Audit committee effort	0.0000	12.0000	3.73	5.291
Audit committee independence	0.0000	1.0000	0.1411	0.2144
Audit committee financial expertise	0.0000	1.0000	0.2883	0.3977
The net sales growth rate	-1.7006	0.7321	0.7162	0.3147
Current ratio	0.2226	-.9564	1.3380	0.6905
Financial leverage	0.1470	1.5673	0.6390	0.2019
Natural logarithm of total assets	22.815	32.7517	27.7294	1.3007
Natural logarithm of total sales	3.865	8.2239	6.0427	0.5649
Firm age	2.079	3.8918	2.8912	0.3424
Cash	0.001	0.4791	0.0564	0.0672
Total inventory and receivables	0.00001	0.9207	0.5033	0.1881
Natural logarithm of the paid audit fees	18.488	22.9388	20.5391	0.7161
Return on assets	-0.7896	0.6216	0.0974	0.1343
Percentage of institutional ownership	0.0000	0.9826	0.4137	0.3336
Chance of bankruptcy	-8.6795	14.2751	2.7294	3.1013
Internal control weakness	-2.6549	5.8301	0.6454	1.3371
Abnormal audit fees	-1.9627	1.7878	0.0000	0.6486
High-standard audit fees	0.0000	1.7878	0.2572	0.3880
Audit fees shortage sensitivity	-1.9623	0.0000	-0.2572	0.3709

4.2. Inferential statistics

In this paper, the variable of abnormal audit fees is achieved via the regression model No. 2, estimated as panel data models.

In the following, we report the type of regression model recognition tests, including F-Limer and Hausman tests, which direct the scholar for selecting the type of regression model. The F-Limer test shows whether the model is a panel or not, and the Hausman test specifies whether the model is random or fixed.

Table 2: The descriptive statistics of qualitative variables of the study

Qualitative variable	Value	Frequency	Frequency percentage
Internal control weakness	0	223	38.4%
	1	327	61.6%
Restatement	0	290	50%
	1	290	50%
Buying the auditing opinion	0	173	29.8%
	1	407	70.2%
Export	0	161	27.8%
	1	419	72.2%
Loss	0	503	86.7%
	1	77	13.3%
Issuance of stocks and bonds	0	418	76.7%
	1	454	23.3%
The board change	0	471	81.2%
	1	109	18.8%

Continuity	0	474	81.7%
	1	106	18.3%
Auditor change	0	403	69.5%
	1	177	30.5%
Auditor size	0	401	69.1%
	1	179	30.9%
Firm achievement	0	584	94.5%
	1	32	5.5%
High-standard audit fees	0	298	51.4%
	1	282	48.6%

Table 3: the results of regression model recognition tests

Test	Statistic value	Degree of freedom	P-value	Result (appropriate mode)
F-Limer	10.745	(115.454)	<0.001	Panel data model
Hausman	40.11	10	<0.001	Fixed effects model

In the F-Limer test, if the P-value is less than 0.05, the selected method would be the panel data model; otherwise, the integrated data method (regular regression) is suitable. Based on the above tables' results, the F statistic's P-value in the model is less than 0.05, so the model should be fitted based on a panel regression model. In the Hausman test, if the P-value is less than 0.05, the fixed-effect model is appropriate; otherwise, the random-effects model should be set. Given the Hausman test results, we can observe that the above model's respective significance is less than 0.05, so the fixed effects model should be fitted.

4.3. Breusch-Pagan test (test of integrability)

In order to test the model of integrated data against the random effects, the test of integrability is used, the H0 of which indicates that the integrability of temporal and spatial effects is possible.

Table 4: The results of the Breusch-Pagan test

Test of integrability	Test statistic	P-value	Test result
Time effects	80.315	<0.001	Time effects cannot be integrated

Given the table results, if the test's P-value is less than 0.05, the H0 is rejected, meaning that the integrability is not possible. As shown in the table, the P-value is less than 0.05, so the integrability of spatial effects is not possible in the model; consequently, the panel with fixed effects is an appropriate model for estimating the coefficients.

4.4. Breusch-Godfrey test (evaluating the autocorrelation of the model errors)

One of the panel models' major principles is to have no serial autocorrelation among the model errors. The Breusch-Godfrey test is used for this purpose, the H0 of which indicates no serial autocorrelation among the model errors.

Table 5: The results serial autocorrelation analysis among the model errors

test	chi-squared statistic	Degree of freedom	P-value	Test result
Breusch-Godfrey	85.354	5	<0.001	Serial autocorrelation is reported

Given the results, there is a serial autocorrelation between the panel model's errors and fixed effects. The adjusted model of the panel model with a fixed effect should be used for this purpose. Thus, the model is used for estimating the coefficients, the results of

which are as follows:

Table 6: The results of the model fitting of abnormal audit fees

Dependent variable: paid audit fees				
Model fitting method: panel regression of adjusted fixed effects				
Variable	**Parameter estimation**	**Standard deviation**	**T statistic value**	**P-value**
Intercept	10.8178	0.9682	11.173	0.001
Natural logarithm of total assets	0.3417	0.0336	10.165	0.001
Return on assets	-0.5301	0.2336	-2.269	0.0233
Financial leverage	0.0658	0.1871	0.352	0.7252
Tenure	0.0436	0.0369	1.182	0.2372
Auditor size	-0.036	0.0585	-0.615	0.5387
Total inventory and receivables	0.2136	0.1622	1.317	0.188
Stock issuance	-0.0076	0.0404	-0.19	0.8494
Loss	-0.0814	0.0676	-1.204	0.2285
Current ratio	0.0567	0.0409	1.385	0.1662
Net sales growth rate	-0.0834	0.0600	-1.39	0.1644

By replacing the β values in model No. 2, the residuals or the abnormal audit fees are calculated.

By fitting model No. 3, we will achieve the internal control weakness variable. This model is fitted to data using the logistic panel method. Then we compare the models of time effects simple logistic, panel model of integrated data, and random effects panel model using the Akaike criterion. The model with less Akaike criterion is more suited for data fitting and accepted as the final model. The results of the model can be shown in the following table.

Table 7: Akaike values of the four models

Random effects panel	**Integrated panel data**	**Time effects simple logistic**	**Simple logistic**
926.674	672.926	178.668	926.672

As shown in the table, the time effects simple logistic model has less Akaike value, so it is the appropriate data fitting model. The results of the fitting of the time effects simple logistic regression model are presented in Table 8.

Table 8: The results of the fitting of internal control weakness model

Dependent variable: internal control weakness				
Model fitting method: time effects simple logistic				
Variable	**Parameter estimation**	**Standard deviation**	**Z statistic value**	**P-value**
intercept	-3.9483	2.1327	-1.851	0.0641
Internal control weakness	2.0744	0.2496	8.308	0.001
Auditor change	1.5829	3.6026	0.439	0.6603
Natural logarithm of total assets	0.4523	0.2998	1.508	0.1314
Firm age	0.1644	0.3718	0.442	0.6582
Export	0.5918	0.2836	2.087	0.0369
The number of commercial and geographical depts.	0.0327	0.0388	0.843	0.3990

Auditor size	0.1005	0.2739	0.367	0.7136
Loss	1.2322	0.4855	2.538	0.0111
Percentage of institutional owners	0.1666	0.3890	0.428	0.6684
The board change	-0.2662	0.3117	-0.854	0.3930
Chance of bankruptcy	-0.0199	0.0469	-0.427	0.6693
Net sales growth rate	-0.4121	0.5339	-0.772	0.4402
2012	-0.7141	0.3484	-2.05	0.0404
2013	-0.5597	0.3383	-1.654	0.0981
2014	-0.5775	0.3404	-1.697	0.0897
2015	-1.4258	0.4082	-3.493	0.0005
Mutual effect of internal control weakness and auditor change	-0.4269	0.4476	-0.954	0.3402
Mutual effect of firm size and auditor change	-0.2393	0.5047	-0.474	0.6354
Mutual effect of firm age and auditor change	0.5509	0.6312	0.873	0.3827
Mutual effect of firm export and auditor change	-1.5242	0.5118	-2.978	0.0029
Mutual effect of the number of commercial and geographical depts. And auditor change	0.0635	0.1196	0.531	0.5956
Mutual effect of auditor size and auditor change	0.1367	0.5634	0.243	0.8082
Mutual effect of loss and auditor change	-1.5467	0.8369	-1.848	0.0645
Mutual effect of institutional ownership and auditor change	0.6957	0.6772	1.027	0.3043
Mutual effect of the board change and auditor change	-0.3652	0.5746	-0.636	0.5250
Mutual effect of the chance of bankruptcy and auditor change	-0.0851	0.0856	-0.994	0.3201
Mutual effect of firm growth and auditor change	-0.5474	0.8204	-0.667	0.5046

By replacing the β values in model No. 3, the residuals or the internal control weakness is calculated.

5. Results of the Research Model

After calculating the variables of abnormal audit fees and internal control weaknesses, we now talk about the study's main model. The model is fitted using the logistic panel method then compares the simple logistic models, the simple logistic model with time effect, integrated panel data, and the random effects panel model using the Akaike Criterion. The model with less Akaike Criterion is more appropriate for data fitting and accepted as the final model. Table 9 indicates the results of the model.

Table 9: Akaike values of the four models

Random effects panel	Integrated panel data	Time effects simple logistic	Simple logistic
782.774	793.953	751.518	793.953

As can be seen in the table, the simple logistic model with time effects benefits from the fewer Akaike values, so it is suitable for data fitting. Table 10 illustrates the fitting results of a simple logistic regression model with time effects.

Given the obtained results, we can see that –p is a value related to the variable of audit fees, which is lower than 0.05 error, so the variable has a significant effect on the variable of financial restatements. The first hypothesis is accepted.

Given the obtained results, we can see that –p is a value related to the variable of abnormal audit fees, which is lower than the 0.05 error, so the variable has a significant effect on the variable of financial restatements. The second hypothesis is accepted.

Given the obtained results, we can see that –p is a value related to the variable of high-standard audit fees in proportion to low-standard audit fees, which is more than 0.05 error, so the variable has no significant effect on the variable of financial restatements and the third hypothesis is rejected.

Given the obtained results, we can see that –p is a value related to excessive audit fees sensitivity, which is more than 0.05 error. The variable has no significant effect on financial restatements, and the fourth hypothesis is rejected.

Given the obtained results, we can see that –p is a value related to the variable audit fees shortage sensitivity, which is less than 0.05 error. The variable has a significant effect on the variable of financial restatements, and the fifth hypothesis is rejected.

6. Conclusion

Financial restatements bring some fresh data to the capital market. From the investors' point of view, any news related to financial restatements is not merely indicative of the previous period's problems but also predicts its future problems and management. This will cause investors' distrust in the management's credit and competency and lower the quality of reported profits. The financial statement users count the restatements as a disadvantage, and shareholders are more willing to fire the auditor after such an event.

Table 10: The fitting results of the model using the simple logistic model with time effects

Dependent variable: financial restatements				
Model fitting method: time effect logistic regression				
Variable	**Parameter estimation**	**Standard deviation**	**Z statistic value**	**P-value**
Intercept	-2.3254	2.102	-1.106	0.2687
Audit fees paid	0.4481	0.1635	2.74	0.0061
Abnormal audit fees	-0.5425	0.2632	-2.061	0.0363
High-standard audit fees	0.2608	0.2992	0.871	0.3835
Excessive audit fees sensitivity	-0.3459	0.3715	-0.931	0.3518
Shortage audit fees sensitivity	-0.6806	0.3028	-2.248	0.0245
Financial expertise of the audit committee	-0.8295	0.5193	-1.597	0.1102
audit committee effort	0.0122	0.0356	0.342	0.7324
Internal control weaknesses	-0.1099	0.1152	-0.954	0.3399
Auditor change	-0.1009	0.3886	-0.26	0.7951
Buying auditor's opinion	0.3253	0.2574	1.263	0.2064
Audit committee independence	2.3276	0.8878	2.622	0.0087

Chance of bankruptcy	0.1236	0.1159	1.066	0.2865
Financial leverage	1.1891	1.2154	0.978	0.3279
Natural logarithm of total sales	-0.1523	0.2948	-0.517	0.6053
Loss	-0.0435	0.4162	-0.104	0.9168
The number of commercial and geographical depts.	0.0096	0.0177	0.544	0.5862
Export	0.1517	0.2287	0.664	0.5069
Firm age	0.5604	0.2953	1.898	0.0577
Net sales growth rate	-0.7813	0.3957	-1.974	0.4836
Achievement	-0.4796	0.4533	-1.058	0.2899
Auditor size	-0.3672	0.2466	-1.489	0.1365
Return of assets	-1.9231	1.8389	-1.046	0.2956
Cash	0.7652	1.7437	0.439	0.6608
Continuity	0.2266	0.3668	0.618	0.5368
Total inventory and receivables	-0.9466	0.7724	-1.225	0.2204
Tenure	-0.0883	0.1106	-0.798	0.4246
Percentage of institutional owners	-0.3286	0.3083	-1.066	0.2866
The board change	0.3112	0.2473	1.259	0.2082
2012	1.0075	0.3250	3.1	0.0019
2013	-0.9481	0.3404	-2.785	0.0054
2014	0.6953	0.3466	2.006	0.0448
2015	0.4834	0.4521	1.069	0.2849

The results suggest that the audit fees and audit fees shortage sensitivity contribute significantly to the Tehran Stock Exchange's financial restatements. In general, the results show that higher/lower audit fees significantly affect the risk of disclosure of the auditor's fraud. Any decline in the audit fees will cause some shortages in the evaluation of the required risks. In such cases, the audit firms will face a decreased number of staff, lack of specialized employees, less workload, which affect the risk of fraud discovery, and the increase of financial restatement is probable. Other results reveal that the abnormal audit fees, high-standard audit fees in proportion to low-standard audit fees, and excessive audit fees sensitivity could not influence the financial restatements. Among the reasons for hypothesis rejection, we could refer to a lack of appropriate concentration on audit committees' roles and ages. The results of the present study confirm with that of Stanley (2011), Habib (2012), Mironiuc and Robu (2012), Lobo and Zhao (2013), Fang et al. (2014), Khondkar et al. (2015), Kacer and Wilson (2016) who show those audit fees contributes to the quality of financial reporting and financial restatements.

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Emerging Technologies in The Audit Environment: Use and Perceived Importance Among Independent Auditors

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Abstract

To discover the possible weakness of knowledge and the use of a diverse group of technologies among independent auditors.

The descriptive survey study was used to describe the level of usable importance of innovative technologies among 196 auditors and find any correlation between 31 emerging technologies and the audit firms' quality ranking.

In general, this paper's results enumerate that Iranian auditors have a relatively acceptable knowledge and willingness to use emerging technologies, including Blockchain, Audit 4.0, etc. In auditing. However, due to various reasons such as lack of access to global markets, political and economic constraints, such facilitators are rarely used in auditing. For instance, technologies, including RPA, AI, and CPS, are not used by Iranian auditors. Although some items were deficient, the related tools' Importance level was moderate.

This research suggests that due to businesses' failure to grow as much as innovative technologies, partners and decision-makers may believe that there is no need for emerging technologies in auditing. However, this may not be the case, as auditors generally emphasized that the importance level of technologies was moderate and high. There seems to be a positive correlation between audit firm's quality rankings and the use of emerging technologies in audit processes. There is no meaningful correlation between audit firms' quality rankings and the importance of emerging technologies.

Keywords: Blockchain, Audit 4.0, Data Analytics, Social Media, Audit Firm Quality Ranking.

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1. Introduction

Technological innovations and their utilization in the auditing profession continue growing in this decade. Advances in various technologies, such as data analytics, data mining, RFID, Internet of Things, Blockchain, audit app, drones, etc., exert a deep influence on the life-style of human-beings (Dai J., 2017). Researchers are devoting efforts to explore using those technologies to investigate the entire population (Vasarhelyi, 2015). The emerging technologies have re-engineered business processes, redefined the business environment, and remodeled many aspects of the business (Huang, 2019). Information technology has made significant progress in the recent past, and this has had a profound global impact on contemporary human culture. Business operations have also dramatically evolved via information technologies, and this has facilitated numerous automation and redesign opportunities for the accounting profession (Lui & Vasarhelyi, 2014). Traditional auditing has changed considerably due to IT changes, including more advanced ERP systems, increasing the use of online transactions with both customers and suppliers, use of the cloud, and the rapid expansion of data available for use by management and auditors (AICPA, 2015). The potential use of nontraditional sources of information and the applications of disruptive technologies for auditing has recently captured the interest of the audit community (Hamm, 2018). Advances in technology occur at exponential rates and are transforming business practices (Rozario, 2019). Alles (2015) suggests that audit clients' use of advanced technologies is likely to be the driver of adopting such technologies by auditors. As a result, it is not surprising that the audit community, including academics, regulators, and audit professionals, is debating the extent to which technology will impact auditing (IAASB, 2016; PCAOB, 2017). New strategic and emerging technologies allow auditors to take advantage of the automation and monitoring tools that management has made possible through business process re-engineering efforts over the past few decades (Teeter, 2014). As the industry moves toward the next generation, auditing should also adapt to the new environment. Auditors can leverage new technologies to collect a large range of real-time, audit-related data, automate repetitive processes involving few or simple judgments, and eventually achieve comprehensive, timely, and accurate assurance (Dai & Vasarhelyi, 2016). The auditing area has lagged behind the business in technology adoption in the past (Oldhouser, 2016). However, it is prime for partial automation due to its labor intensiveness and range of decision structures. Furthermore, several technologies have been progressively developing that can serve as motivators of automation as well as change auditing methodology (Issa, Sun, & Vasarheyli, 2017). While the impact of information technology (IT) in business has grown exponentially in the past two decades, few studies examine IT's use and perceived importance, particularly outside of the largest audit firms (Fischer, 1996; Banker, 2002). This issue is important since IT has dramatically changed the audit process. Standards now encourage auditors and audit firms to adopt IT and use IT specialists, when necessary (American Institute of Certified Public Accountants[AICPA], 2001,2002b, 2005, 2006; Public Company Accounting Oversight Board[PCAOB], 2004b). However, auditing researchers and practitioners have little guidance on what IT has been or should be adopted (Janverin, Bierstaker, & Lowe, An Examination of auditor technology use and perceived importance., 2008). While IT has evolved over the past decade, limited guidance is available to help practitioners determine how IT can be used in their audits and its importance. This has prompted a call by the academic accounting community for additional research into understanding how and to what extent IT is used in conducting audits (Curtis, Jenkins, Bedard, & Deis, 2009; Mazza, Azzali, & Fornaciari, 2014; D'Onza, Lamboglia, & Verona, 2015). Furthermore, diffusion innovation theory suggests that innovations, such

as new IT, are adopted at different points in time by different groups consisting of innovators, early adopters, early majority, late majority, and laggards (or simply early and late adopters) (Agarwal, Ahuja, Carter, & Gans, 1998; Rogers, 2003). Thus, the adoption of IT in an audit context may vary by firm size, given differences in resource availability between large and small audit firms (Lowe, Bierskater, Janvrin, & Jenkins, 2018). Therefore, it seems compulsory to research to explore innovative technologies' significance and status, including audit apps, blockchains, data analytics, audit 4.0, etc., among Independent Iranian auditors. This study has also attempted to demonstrate any correlation between the use of innovative technologies and the audit firms' rankings. This paper also explores the extent of Use and level of Importance by auditors on current emerging technologies to provide the background for future researchers and business entities operating in the audit environment.

2. Research Background

The foundations and findings of many recent types of research have been used in this study. Two main research projects that I have used to develop the methods of this paper and the expression of key questions are those of (Janverin, Bierstaker, & Lowe, An Examination of auditor technology use and perceived importance., 2008) and (Lowe, Bierskater, Janvrin, & Jenkins, 2018). The research population in both studies is the auditors employed in national, regional, and local offices of big 4. Subsequently, in both papers, the extent of Use and Importance level of technologies have been measured.

Janverin, Bierstaker, and Lowe (2008) found that auditors' IT use at the national firms was more comparable to that of the Big 4 firms for some applications (sampling, internal control evaluation, fraud review, electronic working papers) and more comparable to the smaller firms for other applications (audit planning software, audit report writing) in 2004. Their research results indicate that some audit applications are used extensively (e.g., analytical procedures, audit report writing, electronic work papers, Internet search tools, and sampling), but others are not (e.g., digital analysis, expert systems, the test of online transactions, database modeling, and continuous transaction monitoring). Also, auditors indicated that several audit applications were important, although not used extensively (e.g., audit planning, client acceptance, client relationship management, fraud review, internal control evaluation, and risk assessment). Thus, practitioners may want to consider expanding their use of IT to include these applications. IT specialists do not appear to be used extensively in a typical audit, even by auditors who examine complex IT clients.

Zangabadi (2014), in his thesis titled Factors Affecting the Quality of Information Technology Audit, studies the influencing factor on the quality of IT audit from the standpoint of certified auditors working in the audit organization of Iran and Iranian Association of Certified Public Accountants. The results of this study show that from the standpoint of certified auditors working in audit organization of Iran and Iranian Association of Certified Public Accountants, independence, knowledge of accounting and auditing skills, business process awareness, appropriate audit team accountability, audit frameworks and procedures, business criteria and audit scope, audit capability, audit experience of the audited entity, information technology, and controls, planning, and execution of operations, access to resources, communication with the audited entity and the business environment affect the quality of the IT audit.

Mohsinia (2008), in the thesis on the impact of the use of audit software on audit operations in a set of Astan Quds Razavi companies and institutes to find answers to two key questions. (1) Is the use of software incorporate audit promoting the efficiency and effectiveness of the audit operations? (2) Does the use of this software reduce audit firm costs, especially personnel costs? Accordingly, the use of organization audit

software in the audit operations of Astan Quds Razavi's small, medium, and large enterprises has improved efficiency and effectiveness.

Bazgali (2015), in his dissertation entitled The Impact of Information Technology on the Quality of Internal Audit Services, to examine the impact of information technology on internal audit and identify the factors affecting the increase of internal audit quality. As a result of the relevant research, three hypotheses have been proved as follows: (1) In Iranian society, IT status is high in companies. (2) IT status is high in companies' internal audit department (3) status of internal audit staff from IT is high.

Rozario (2019), in a Ph.D. dissertation entitled Three types of research on Audit Innovation: Improving Audit Quality Using Social Network Information and Innovative Technologies, examined the usefulness of third-party entities' information company brands and products extracted from social networks to enhance existing methods of revenue account analysis. He also proposed an executive framework for the process of robotic audit automation process. So that the evolution of audit as a product line can be considered. In the third study, he proposes an independent blockchain audit that takes advantage of the reliability of the client's transactions recorded on the blockchain platform and the intelligent audit processes that automatically perform audit operations by the auditor. The results of this research in two areas have led to knowledge gains. First, change audit operations by technological innovations, including social network information, robotic process automation, blockchain, and smart contracts, and provide a solution for the practical use of these innovative tools in audit operations. Second, his research is among the first studies to evaluate the impact of progressive (rather than traditional) audit evidence and emerging technologies on audit quality.

Dai (2017), in a dissertation that included three research projects on audit technologies, including audit 4.0, Blockchain, and audit apps, examines the impact of these areas of technology on auditing. Accordingly, three relevant studies in this field include:

Predict the impact of the Fourth Industrial Revolution on the auditing profession. In this regard, the use of new technologies stemming from the Fourth Industrial Revolution in the auditing profession has been conceived. The challenges involved in moving auditors to the next generation of auditing as "audit 4.0" have been addressed. In the second study, she discussed how blockchain technology contributes to the accounting and auditing profession. The third study also discusses how applications are used in auditing and their use in current audit processes. The research results are classified into three categories: The first category is the result of the inclusion of the first research on the introduction of many emerging technologies such as audit 4.0, Blockchain, and audit apps to exploit them in the accounting and auditing profession. Discussion and explanation will enhance auditors, legislators, and technology developers' insights to incorporate relevant technologies into current auditing processes. It also promotes the transfer of the current audit model to its next generation. Third, these three studies provided insights into the challenges of applying and using relevant technologies, and subsequently, providing solutions capable of eliminating challenges.Thus, the first two questions (RQs) are:

RQ1: Which auditors most use technological innovations?

RQ2: Which technological innovations are most important to auditors?

Lowe, Bierskater, Janvrin, and Jenkins (2018) concluded that IT has significantly changed the audit environment over the last several years, few studies have examined and documented audit IT use longitudinally. They also mentioned IT's influence on how audits are performed and the potential for significant audit quality, effectiveness, and efficiency. Additionally, their research explains analytical procedures, risk assessment, sampling, internal control evaluation, internal control documentation, professional

standards research software, and electronic work papers were among the most extensively used by independent auditors. In contrast, the use of applications such as continuous transaction monitoring and database modeling was relatively low. Moreover, they found that auditors from Big 4 firms were significantly more likely to use IT than non-Big 4 auditors for relatively few audit applications (e.g., internal control evaluation and dashboards), suggesting that the dominance of the Big 4 firms in their use of IT has dwindled over the last ten years, consistent with the early majority phase of diffusion innovation theory. However, in terms of work paper review, the most common communication mode is still face-to-face (although this has decreased over the last decade), followed by email, collaboration (group) technology, telephone, and the rare use of video conferencing. The Big 4 firms continue to favor email (consistent with the 2004 data), and national firms have gravitated toward the use of email and the telephone more overtime. Regional firms have somewhat similar rankings of communication used as national firms. However, they are less likely to use each of the communication modes available, and local firms primarily use face-to-face communication. The most common group brainstorming mode was similar to that of the communication mode for work paper review, emphasizing face-to-face communication, a similar rank order of modes, and very little emphasis on video conferencing. Consequently, other research questions (RQs) are:

RQ3: Is the use of innovative technologies in audit firms ranked as "A" or "B" different?

RQ4: Is the importance of innovative technologies in audit firms ranked as "A" or "B" different?

3. Research Purposes

This research is expected to achieve a set of goals. Firstly, discovering the relationship between the use and importance of innovative technologies and the ranking of audit firms in the Iranian Association of Certified Public Accountants. It also identifies technological tools that are used most and classified as important by Iranian auditors and offers suggestions to enhance audit operations. This research could also play an effective role in future research projects.

4. Research Methodology

4.1. Participants

In this study, the scientific research design method was used. This research approach aims to produce scientific products (Hevner, March, Park, & Ram, 2004). to provide comprehensive guidance for discussing the proposed audit methods (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). To collect data from respondents First, the Iranian Association of Chartered Certified Accountants' audit firm membership is classified into four main groups. The results demonstrated that, based on audit firms' quality control ranking conducted in 2017, they were categorized into four main groups: A, B, C, and D (Iranian Association of Chartered Public Accountants[IACPA], 2018). Quality control has been implemented in all listed firms, and they are classified based on the ratings.

Score A: 801 to 1000
Score B: 651 to 800
Score C: 501 to 650
Score D: 0 to 500

Based on the latest results of audit quality control in member firms for the year 2017, 92 audit firms are in the "A" rank, 138 in the "B" rank, 27 in the "C" rank, and 8 in the "D" rank. Subsequently, as the rated firms' A and B (230 members) cover most of the target population, the survey has been purposefully conducted for A and B audit firm

members of the Iranian Association of Chartered Public Accountants.

5. Methods of Data Collection

In this study, two complementary data collection methods will be used: study past research projects and questionnaire. Response options are categorized into 7 categories for respondents' familiarity with the technology, the extent of use, and the importance of the technology concerned. Accordingly, respondents choose the appropriate technology to use in their audit operations out of 7 options, the least of which 1 means no use and the number 7 means extensive use. To determine the level of importance of the relevant technologies to auditors, the number 1 means unimportant, and the number 7 means very important.

Participants included 196 auditors from audit firms ranked "A" and "B" among audit firm members of the Iranian Association of Chartered Public Accountants (see Table 1).

Table 1. Participant Demographics*

	Frequencies		**Mean or Percent (Std. Dev.)**
Years as an External Auditor			15.5
			(5.6)
Age			42.4
			(8.8)
Highest Education Level			
Bachelor Degree	101		51.5%
Master Degree	89		45.4%
Course Beyond Mater Degree	6		3.1%
Certification			
Certified Public Accountant (IACPA)	136		
Chartered Certified Accountant (ACCA)	10		
Official Court Expert	11		
Chartered Management Accountant	10		
Official Tax Consultant	7		
Other Certification	4		
Gender	M=151 F=45		
Firm Quality Level			
A	92		
B	104		
IT Expertise			
Novice	59		30.1%
Intermediate	133		67.9%
Expert	4		2%

*Data was collected in 2019.

**Out of the total number of auditing firms, no response was received from 5 Rank A and 7 Rank B firms. In this case, the total number of firms that have obtained data from their auditors has been reduced to 184. Also, out of 223 questionnaires, 196 questionnaires were completed by the respondents.

Respondents averaged 15.5 years of external audit experience; their average age was 42.4 years. Fifty-Three percent of respondents were employed by Quality B ranked firms, and Forty-Seven were employed by quality A ranked firms. The highest

educational level (51.5% percent) was a bachelor's degree and after that master's degree (45.4%). Most Respondents (69.4 percent) held CPA certificates. The majority of the respondents (77 percent) were male. Participants varied in IT expertise, with 67.9 percent indicating intermediate IT expertise, 30.1 percent stating they were IT novices, and 2 percent indicating that they were IT experts.

6. Results

6.1. Use and Importance of Audit 4.0

MEANs analysis is used to demonstrate the extent use and importance level of innovative technologies by audit firms (i.e., RQ1 and RQ2). As noted earlier, we propose that audit emerging technologies encompasses Audit 4.0, Blockchain, Data Analytics, Audit Apps, Technology Productivity Tools, and Social Media. Descriptive statistics, shown in Table 2, indicate that audit 4.0 use and perceived importance vary significantly. Most Technologies categorized as Audit 4.0 innovative technologies in this area have not been used by auditors who work in A and B ranked firms. For example, respondents rated the extent of use as being None (means zero percent usage) for four technologies (Robotic Automation Process (RPA), Artificial Intelligence (AI), Cyber-Physical System (CPS), Internet of Things and Services (IOT/S). While assigning low extent of use ratings to other technologies, such as Drones, Censors, Global Positioning System (GPS), and Radio-Frequency Identification (RFID). However, participants assigned the highest importance ratings to Censors, Global Positioning System (GPS), Drones, Radio-Frequency Identification (RFID), Internet of Things and Services (IOT/S), Artificial Intelligence (AI), Robotic Automation Process (RPA), Cyber-Physical System (CPS). Interestingly, Auditors have argued that the use of audit 4.0 technologies in Iran has been very limited. However, given their comments, the use of these technologies in audit operations is so important.

Table 2. Descriptive statistics of the research

Audit 4.0	The extent of use* Mean (Std. Dev.)	Level of Importance** Mean (Std. Dev.)
Robotic Automation Process (RPA)	1	5.3 (1.2)
Artificial Intelligence (AI)	1	5.4 (1.4)
Drones	1.07 (0.29)	5.7 (1.4)
Censors	1.13 (0.41)	6 (1.3)
Cyber-Physical System (CPS)	1	3.7 (1.3)
Global Positioning System (GPS)	1.26 (0.63)	4 (1.4)
Internet of Things and Services (IOT/S) Radio-Frequency Identification (RFID)	1 1.46 (0.79)	5.4 (1.4) 5.5 (1.5)

6.2. Use and Importance of Blockchain

No one responded positively to the Use of Blockchain as a tool in auditing. So, descriptive statistics for Consortium and Public Blockchain in addition to Smart contract use equal to zero. Based on the auditor's answers, these technologies' perceived importance in auditing is relatively moderate and high, as shown in Table 3. Consortium Blockchain had the highest importance means while respondents assigned a lower extent of Importance ratings to Smart contract.

Table 3. Use and Importance of Blockchain

Blockchain	The extent of use* Mean (Std. Dev.)	Level of Importance** Mean (Std. Dev.)
Consortium Blockchain	1	6.5 (1.1)
Public Blockchain	1	5.8 (1.6)
Smart Contract	1	4.9 (1.9)

6.3. Use and Importance of data analytics tools

As shown in Table 4, auditors did not use two data analytics tools on auditing operations (SAS and Knime). Additionally, other analytics tools' usage was also fairly low (R Programming, Tableau Public, Python, Apache Spark, QlikView, and Splunk). However, the only data analytics which had the highest percentage of use among auditors was Excel (5.2 percent). The result obtained can be explained by the fact that independent auditors only use Excel to conduct audit tasks.

Table 4. Use and importance of data analytics tools

data analytics tools	The extent of use* Mean (Std. Dev.)	Level of Importance** Mean (Std. Dev.)
R Programming	1.12 (0.4)	6.1 (1)
Tableau Public	1.02 (0.14)	5.5 (1.6)
Python	1.11 (0.37)	5.6 (1.7)
SAS	1	4.6 (1.7)
Apache Spark	1.04 (0.19)	4.1 (1.8)
Excel	5.2 (1.8)	5.4 (1.6)
Knime	1	4.6 (1.9)
QlikView	1.14 (0.4)	4.4 (1.7)
Splunk	1.08 (0.3)	4.7 (2)

6.4. Use and Importance of productivity tools

Descriptive statistics for productivity tool use and perceived importance also vary significantly. As shown in Table 5, cell phones, email, remote network access, wireless networks, and instant messaging had the greatest extent of use means, while respondents assigned lower extent of use ratings to extensible business reporting language and personal digital assistants.

Table 5. Use and importance of productivity tools

Productivity Tools	The extent of use* Mean (Std. Dev.)	Level of Importance** Mean (Std. Dev.)
Email	5.7 (1.7)	6.1 (1.5)
Cell Phones	6.2 (1.3)	6 (1.7)
Remote Network Access	4.9 (1.3)	4.1 (1.2)
Personal Digital Assistants (PDAs)	4.2 (1.3)	4.1 (1.8)
Wireless Networks	4.6 (1.6)	3.9 (1.6)
Instant Messaging	4.6 (1.5)	5.1 (1.9)
Extensible Business Reporting Language (XBRL)	1.09 (0.3)	4.1 (1.3)

It is noteworthy that auditors use the XBRL much less frequently than other tools. Similarly, respondents assigned higher importance ratings to email, cell phones, and

instant messaging. Meanwhile, remote network access, Personal Digital Assistants, and XBRL have the same importance ratings. Whereas, based on the ratings, wireless networks had the lowest level of importance. Productivity tools are a group of technologies adapted from Janverin, Bierstaker, and Lowe's (2008) research paper. These items have been used by auditors more than other innovative groups of technologies by Iran Independent auditors. Hence, they are considered to be older in comparison with other groups. This may have led to the relatively high use of auditors in Iran by such technologies

6.5. Use and Importance of Social Media

Auditors stated that they use social media in auditing. They use LinkedIn and Facebook more than Instagram and Twitter. While they believe that these tools have a higher level of importance in comparison to their usage. The result Illustrates that Facebook, Instagram, and LinkedIn are extensively important in auditing. However, they might find social media to be either a communication or advertisement tool.

Table 6. Use and Importance of Social Media

Social Media	The extent of Use Mean (Std. Dev.)	Level of Importance** Mean (Std. Dev.)
Twitter	3.4 (1.2)	4.8 (1.7)
Facebook	4.3 (1.3)	5.9 (1.5)
Instagram	3.5 (1.3)	5.7 (1.4)
LinkedIn	5.2 (1.6)	5.7 (1.5)

6.6. Association of audit firm quality rating with emerging technologies use and perceived importance

The remaining research questions examine whether innovative technologies use and perceived importance varies by audit firm quality rating.

Based on audit firms' rating, whether it is "A" or "B," the use and importance of technologies are evaluated. Additionally, the ANCOVA test is used to determine whether the importance and use of innovative technologies vary among audit firms with different quality ranking (i.e., RQ3 and RQ4).

As is shown in Table 7, generally, innovative technologies have a higher level of importance and use among "A" audit firms. However, several technologies have not been used by Iranian auditors (Robotic Process Automation (RPA), Artificial Intelligence (AI), Cyber-Physical System (CPA), Internet of Things or Services (IoT/S), Consortium and Public Blockchain, Smart Contract, SAS, Knime). Furthermore, employees of level "A" audit firms use Drones, Censors, Global Positioning System (GPS), Radio Frequency Identification (RFID), R Programming, Tableau Public, Apache Spark, Excel, QlikView, Splunk, Email, Cell Phone, Remote Network Access, Personal Digital Assistants (PDAs), Wireless Networks, Instant Messaging, XBRL, Twitter, Facebook, Instagram, and LinkedIn significantly More than employees of "B" audit firms. Subsequently, except technologies like Drones, Python, Knime, Splunk, Email, Cell Phones, Remote Network Access, PDAs, Facebook, and Instagram, all other technologies are more important in "A" rank audit firms than "B" ranking.

ANCOVA test for the use of innovative technologies by "A" and "B" audit firms demonstrates that some technologies use to have a negative relationship with audit firm rankings (Drones, Global Positioning System (GPS), Radio-Frequency Identification (RFID), R Programming, Python, Apache Spark, Excel, QlikView, Email, Cell Phones, Remote Network Access, Personal Digital Assistants (PDAs), Facebook, Instagram, and LinkedIn).

Some technologies have a negative importance correlation with firm rankings (Robotic Process Automation (RPA), Artificial Intelligence (AI), Cyber-Physical System (CPS), Global Positioning System (GPS), Public Blockchain, Smart Contract, Python, SAS, Excel, Knime, Email, Remote Network Access, Personal Digital Assistants (PDAs), Wireless Networks, Instant Messaging, Extensible Business Reporting Language (XBRL), Twitter, Facebook, Instagram, and LinkedIn).

Meanwhile, ANCOVA and T-Test Identified the p-value among different audit firms based on both use and importance level of innovative technologies. Based on the ANCOVA results for the use of Technologies, Drones, R Programming, Tableau Public, Apache Spark, Splunk, Wireless Networks, Facebook, and LinkedIn, p-values are equal to or less than 0.01. Additionally, ANCOVA test for the level of importance of Drones, IoT\S identified $p \leq 0.01$. Subsequently, T-Test results for the use of Technologies demonstrate that Radio Frequency Identification (RFID), Email, Personal Digital Assistants (PDAs) and LinkedIn p-value were equal or less than 0.01 and Drones, Censors, Global Positioning System (GPS), R Programming, Python, QlikView and Instagram $p \leq 0.05$. Retrospectively, the level of importance t-test≤ 0.01 for Censors, Cyber-Physical System (CPS), SAS, Apache Spark, Excel, Wireless Networks, and Twitter.

Table 7. The Association of firm quality level with innovative technologies uses and perceived importance Means, ANCOVA and T-Test Results

	Extent of Use				Importance			
	A-Rank *	B Rank *	ANCOVA ***	T-Test ****	A-Rank **	B Rank **	ANCOVA ***	T-Test ****
Audit 4.0								
Robotic Process Automation (RPA)	1	1			5.43	5.29		
Artificial Intelligence (AI)	1	1			6.12	5.34		
Drones	1.12	1.03	⊗	⊗⊗	6.02	6.05	⊗	⊗
Censors	1.21	1.07	⊗⊗	⊗⊗	5.36	5.3		
Cyber-Physical System (CPS)	1	1			5.5	5.3		⊗
Global Positioning System (GPS)	1.36	1.16	⊗⊗	⊗⊗	4.03	3.37		
Internet of Things and Services (IoT/S)	1	1			6.19	5.9	⊗	
Radio-Frequency Identification (RFID)	1.62	1.32		⊗	5.6	5.33		
Blockchain								
Consortium Blockchain	1	1			6.54	6.42		
Public Blockchain	1	1			6.02	5.61		
Smart Contract	1	1			5.23	4.71		

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Table 7. (continued)

	Extent of Use				Importance			
	A-Rank *	B Rank *	ANCOVA ***	T-Test ****	A-Rank **	B Rank **	ANCOVA ***	T-Test ****
data analytics tools								
R Programming	1.19	1.06	⊗	⊗⊗	6.15	6.13		
Tableau Public	1.03	1.01	⊗		5.81	5.28		⊗⊗
Python	1.17	1.05	⊗⊗	⊗⊗	5.43	5.72		
SAS	1	1			5.04	4.3		⊗
Apache Spark	1.03	1.04	⊗		5.04	3.35		⊗
Excel	5.42	5.07			5.8	5.03		⊗
Knime	1	1			4.36	4.83		
QlikView	1.22	1.08	⊗⊗	⊗⊗	4.44	4.31		
Splunk	1.1	1.06	⊗		4.63	4.68		
productivity tools								
Email	6.13	5.36		⊗	5.98	6.15		
Cell Phones	6.17	6.27	⊗⊗		5.87	6.14		
Remote Network Access (RNA)	4.83	4.93			4.04	4.15		
Personal Digital Assistants (PDAs)	4.56	3.81		⊗	4.04	4.13		
Wireless Networks	3.49	3.28	⊗		5.3	4.37		⊗
Instant Messaging	4.79	4.5			5.28	5.02		
Extensible Business Reporting Language (XBRL)	1.14	1.04	⊗⊗		4.13	4		

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Table 7. (continued)

	The extent of use*				Importance**			
	A-Rank	B Rank	ANCOVA ***	T-Test ****	A-Rank	B Rank	*ANCOVA **	T-Test ****
Social Media								
Twitter	3.49	3.28	⊗		5.3	4.37		⊗
Facebook	4.54	4.15			5.75	5.95	⊗⊗	
Instagram	3.7	3.27		⊗⊗	5.7	5.79		
LinkedIn	4.87	5.48	⊗	⊗	5.7	5.63		

*Participants rated "the extent of use for each technology" using a seven-point scale where 1 _ none and 7 _ extensive.
**Participants rated "the importance of each technology" using a seven-point scale where 1 _ not important and 7_ very important.
***ANCOVA results for use and importance of rating differ based on the "A," and "B" quality ranking of audit firms where ⊗ indicates p≤0.01 and ⊗⊗ indicates p≤0.05 level.
**** T-Test results for use and importance of rating differ based on the "A" and "B" quality ranking of audit firms where ⊗ indicates p≤0.01 and ⊗⊗ indicates p≤0.05 level.

7.Conclusion, Implication, and Future Research

Innovative technologies have changed the environment of businesses during the past decades. There are few research projects to evaluate the existence and significance of these technologies by independent auditors. In this paper, the researcher tried to demonstrate the extent of Use and importance level of innovative technologies among Iranian auditors (Tables 2,3,4,5 and 6) and find any significant relationship between audit firms ranking and use or\and importance level of technologies in auditing (Table 7). In this respect, most technologies that have been categorized into groups of Audit 4.0, Blockchain, and Data Analytics are rarely used by Iranian auditors. Respectively, the level of use for other groups, including productivity tools and social media, is mostly less than or equal to 50 percent. In comparison, most of the technologies considered highly important by Respondents. On this basis, the key findings of this research can be categorized into the following criteria:

Auditors working at the Iranian Association of Certified Public Accountants audit firms commented on the Use and Importance of five groups of innovative technologies. According to the results, the overall use of some technologies including, Robotic Process Automation (RPA), Artificial Intelligence (AI), Cyber-Physical System (CPS), Internet of Things and Services (IoT/S), Public and Consortium Blockchain, Smart Contract, SAS, Knime was scratch (Tables 2,3 and 4). Surprisingly, auditors expressed their view on the Importance level of the same technologies as moderately Important. Respectively, the use of some items including Drones, Censors, Global Positioning System (GPS), Radio Frequency Identification (RFID), R Programming, Tableau Public, Python, Apache Spark, QlikView, Splunk, and Extensible Business Reporting Language (XBRL) was very low (Tables 2, 4 and 5). The Importance level of the related items was moderate. Thereupon, other groups, including Excel, Email, Cell Phones, Remote Network Access (RNA), Personal Digital Assistants (PDAs), Wireless Networks, Instant Messaging, Twitter, Facebook, Instagram, and LinkedIn are moderately used by auditors (Tables 4, 5 and 6). In comparison, the Importance level of most of them is considered to be moderate and high. There are several reasons for not using innovative technologies in auditing processes, but they are medium and high importance.

Since the 1970s, auditors have been able to use computing devices, software, and databases to examine electronic accounting data (Cash Jr, Bailey, & Whinston, 1977). These tools dramatically reduced auditors' effort on transaction tracking and calculation. Since then, an increasing number of technologies were used in the auditing profession to improve the efficiency and effectiveness of audit activities, and ultimately to enhance the overall assurance quality in the US (Dai J. , 2017). With the advent of 4 generations of audit tools, pencil and calculators are no longer exist. They have been replaced by audit applications, data analytics tools, Blockchain, etc., globally. But After the Iran revolution in 1979, most international accounting and auditing service providers quit the Iran market. As a consequence of audit leaders' absence, most traditional tools, including manual work papers and basic data analytical tools like Excel, are used by auditors in several auditing stages like planning, assessing risks, determining audit fees, and all other labor-intensive activities during past decades. However, these conditions have not diminished Iranian auditors' attention to the need to use technological tools.

Sequentially, because of the nature of Iran's economy and politics, Big 4 firms recognized as leaders in conducting, testing, and providing technological goods and services to consumers are not officially and legally allowed to operate in Iran. Subsequently, the development of technologies by many users is costly. Because Iran is isolated from international academic and professional communities, the possibility of training auditors to use these technologies is under restriction.

This research also suggests that due to businesses' failure to grow as much as innovative technologies, partners and decision-makers may believe that there is no need for emerging technologies in auditing. However, this may not be the case, as auditors generally emphasized that the importance level of technologies was moderate and high (Tables 2,3,4,5 and 6). Meanwhile, the lack of research and development of such technologies by Iranian professional auditors and academics has made them unknown to decision-makers' strengths and weaknesses. Based on the auditor considerations, the Importance level of technologies is relatively moderate and high. This result has clarified the need for the existence of such tools in the audit environment. Most Iranian auditors are emphasized interest in innovative technologies. Hereon, this study's result should be considered before deciding the development and use of technologies in the audit environment. Subsequently, I found a positive correlation between audit firms' quality rankings and the use of emerging technologies in audit processes. The importance level of technologies has a positive correlation with quality audits ranking. Most employees of "A" ranked audit firms are used technologies in audit processes more than "B" audit firms. Most Auditors who work in "A" audit firms defined innovative technologies as more important than auditors of "B" ranked audit firms.

Another result about the correlation between use and importance of technologies by different ranked audit firms has proved that the higher the level of quality ranking, the more use and importance level is considered in practice by auditors.

This research has some limitations that need to be addressed. As noted earlier, this is one of the first research (at least among the Iranian auditors) to test a set of technological innovations in the audit field. Due to the limited resources and lack of clarity on all the features and capabilities of innovative technologies in their early stages, respondents' lack of knowledge and possible errors in answering questions were also other potential limitations of this research.

Future researches can focus on the detailed knowledge level of auditors about innovative technologies. Additionally, many potentials should be tested for defining the availability of the Iran market to accept technologies in different criteria. Future projects could also determine how audit firms with different rankings are confident to use innovative technologies in auditing. There are also opportunities for academics and practitioners to test and evaluate Iranian auditors' knowledge and compare the results with Big 4 employees' responses. Another area could focus on the quality factors for evaluating audit firms by the Iranian Association of Chartered Public Accountants (IACPA) and finding out how these attributes may affect audit firms to use technologies. This study's statistical population was limited to auditors working in member firms of the Iranian Association of Chartered Public Accountants (IACPA) that are private entities. At the same time, other audit agencies such as the Audit Organization of Iran and the Supreme Court of Iran can be considered the statistical population of future research. Future researchers also have opportunities to determine the extent to which the technologies currently used by auditors enhance audit quality.

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