



# Study the Effect of Audit Market Concentration on Auditors' Job Stress and Audit Quality of Tehran Stock Exchange (TSE) Listed Firms

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## ABSTRACT

Audit market concentration causes to decrease the scope of Firms' authorities for selecting the audit institutions but instead it increases the power of auditors' market that it turns, leads to a decrease in quality and an increase in auditors' stress. The purpose of the present research is to study the effect of audit market concentration on auditors' job stress and audit quality of Tehran Stock Exchange (TSE) Listed Firms performed on a total of 97 Firms between the years of 2013-2017. In order to evaluate the audit market concentration, the ratio of Firm's audit fees to total industry audit fees was used. The Accruals Quality model was also used to evaluate the audit quality. The results of the study showed that the audit market concentration had a negative and significant effect on the audit quality so that with the increase in audit market concentration, the audit quality is decreased. Also it was found that the audit market concentration had a positive and significant effect on the auditors' job stress: it means that the increase of concentration on audit market as a result of time pressure can increase the auditors' job stress and thus the risk of financial statement assessment.

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## 1 Introduction

Capital market policy makers in some of developed countries have expressed their concerns about the potential effects of the audit market concentration on audit fees and quality during the last decade [1, 2]. The main concerns are that the audit market concentration lead to decrease the customer options to choose between service providers of audit firms, reinforce the auditors' market power, decrease the market attractiveness and finally increase the audit fees and decrease its quality [3, 4, 5, 6, 7, 8]. In fact, the audit market concentration because of disturbing fair competition in the market and reducing the market share of smaller audit firms will cause a decrease in audit quality. Indeed, the workload in audit firms having more market share that is caused due to audit market concentration can lead to an increase in auditors' stress level because the Public Firm Accounting Oversight Board in the United States believes that the increase in audit market concentration causes to decrease significantly the quality of auditors' audits due to more workload and time pressure because of more market share. They believe that its reason is auditors' job stresses [9]. It should be noted that since the auditors perform their tasks under the condition governing on audit market concentration and also more than

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standard workload, they will experience too much stresses. Thus these factors decrease the risk of audits and finally the quality of auditing reviews [10]. Despite the wide scope of the audit, academic research has rarely addressed the issue of stress in this profession and they have less concerned with this mental challenge of the auditors [11, 12]. According to Article [1] of Audit Firms' Executive Regulations approved in 2004 that refers to the role of auditors and accountants in the society and according to Article [2] of the same Regulation focusing on the role of audit firms in accreditation, assurance and information transparency provided to economic system of the country for decision making and regarding the necessity of auditors' compliance in behavior and business ethics in the form of provisions of the Regulation, it should be noted that the audit profession in our country is considered as a hard job and the existence of effective criteria like the audit market can affect the balance in this profession in terms of workload. This suggests that the work hours of auditors in a week is about 703 hours. If each audit firm consists of at least three auditors according to the law, we can clearly see the high work pressure in this profession. In addition, the concentration on audit market can change the standards in reviews and increase the risk of financial statements due to increased stress. Moreover, in [4] that is about the Audit Firms Relations with the Iranian Official Accountants Community states that: "failure to comply with the Rules & Regulations adopted by the Supreme Council and failure to present the requested documents and information or unusual lag is considered as a violation from the regulations and according to the written notice law, it will have associated with a suspension of the profession and finally getting the auditor's license". So given the regulations and provided laws, it is likely that many audit partners accept more hours of works specified in the Standards due to the financial motives. This in turn, intensifies the risk of auditing reviews and causes the stress among the auditors. So the aim of the present research is to study the effect of audit market concentration on auditors' job stress and audit quality in Tehran Stock Exchange (TSE) Listed Firms. Accordingly, the research questions are:

1. Is the Effect audit market concentration on audit quality?
2. Is the Effect audit market concentration on Stress audit profession?

## 2 Theoretical Framework and Hypothesis Development

### 2.1 Audit Market Concentration

The audit market is of particular properties that distinguish it from other markets related to business services. Watts and Zimmerman [13] argue that the audit market plays a main role in keeping the transparency and improving the capital market performance. Market structure in providing different tendencies such as audit market concentration also suggests the extent of corporate power distribution in the market and the competition is affected by it. In fact, the effective competition needs a sufficient number of audit service providers who establish the balance in markets. But when the competitions become a coverage for monopolies, the qualities decrease and the self-interest seeking incentives increase and the main property of the audit profession that is maintaining independence is diminished [14]. Indeed, the part of service provider in these markets can be centralized because of its being specialized. For example, in the United States, most of the audit interactions and almost all the audit fees belong to four major audit firms. The concentration determines the major audit firms' behavior and so it is considered as an important factor in market competition [15]. There is a general concern about the issue that over-centralization causes a decreased competition and increased price of services pro-

vided by some auditors [2]. From the perspective of industrial economics, the high concentration of seller through economies of scale causes a customer profit, in contrast lower costs can reduce the quality of the services provided. The competition in the supply chain comes from two sources: the former is entering the new auditors into the market and the latter is increasing the supply capacity of the current auditors. This increasing competition has its own consequences [16]. Some of the professional accountants worry about that the competition, particularly competition on price in relation to work contracts leads to a loss of quality [17]. Although the research does not support these concerns, the theory that the budget pressure and the time limitation alternatively result in audits lower than standard has attracted a lot of advocates. A reason for budget and time limitations is intense competition on price. The reason is not enough documented and thus not defensible but the ambiguity in relation to competition in audit profession is a common debate and the unique features of this profession increase the ambiguities.

## 2.2 Auditors and Job Stress

Since the early 20<sup>th</sup> century, with industrialization and information development, job stress became an important subject in the fields of psychology, behavioral sciences and sociology [18]. The term of "stress" was introduced for the first time by Hans Sileh, a famous Austrian psychologist, in 1930s. Following the behaviorism, he defined "stress" based on the theory of "stimulus and response" and considered it as a physical or mental need of humans that causes a person to respond in a stressful condition [11]. Over time and developing the theoretical perspectives based on the environmental changes, the subject of stress became serious, insofar as today it is referred to as a negative consequence on a person's job performance and mental and physical health [19]. Stress resulting from the external and internal factors affects a person. It is considered a bad and complicated experience that while it can be very harmful, is also needed in some cases [20]. In a comprehensive definition, the International Job Safety & Health Institute defines the "job stress" as a mental and physical harmful response which occurs when the requirements of the job do not match the capabilities, supportive resources and individual needs [21]. The stress experienced by employed people in the workplace has different reasons, for example it can be considered as a consequence of internal and external job factors or as a determinant for the health and quality of life and job performance. In other words, the job stress can be a result of factors such as lacking a good fit or match with the job tasks [22]; not paying attention to emotional and psychological needs; few opportunities for decision-making and undesirable safety conditions in the workplace [21]; higher workloads [10]; shift work [23]; poor communication in the workplace [24] and many other reasons. By combining different interpretations about job stress, in the present study, stress job is defined as "a series of behavioral, physiological and psychological responses in occupational situations that influences continuously or shortly one's function. In audit profession, it is mainly resulting from a conflict between the limited resources of audit and higher workload in a limited time [25]. According to the Job Expectations model proposed by Karasek [26], the subject of job stress that is often used extensively in psychology and management includes two main aspects: 1) job expectations 2) job control. The researcher claimed that the effect of job stress depends on interactions between the extent of job expectations and job control. He suggested that "*job expectations*" refer to work hardness and high workload including the amount of work, time and conflict of role, while "*job control*" refers to a person's response to job needs such as tolerance strategy and rest mechanisms [27]. The previous research on this model

showed that there is a positive relationship between the job stress and the intensity of job expectations as well as a negative relationship between the job stress and the job control [28, 29]. In addition, the job control can improve the job satisfaction and the job performance [30]. From the perspective of audit work, the auditors' job expectations (stress factors) include several aspects such as time pressure, workload, cost control, performance evaluation of responsibilities and the existence of social expectations. From the perspective of job expectations, an auditor's job control ability (control strategies) usually includes time planning and adjustment of the audit plan, etc. Therefore the general influence depends on job control effectiveness of an auditor on job tasks that is expected to do and any of heterogeneity of auditor's ability in job control will result in their job stress.

### 2.3 Hypothesis Development

The previous research on audit market concentration and its quality provide uncertain evidence. The primary research provides us with indirect evidence about the relationship between the audit quality and concentration through taking advantage of particular events such as deregulation on price competition. For example, Hackenbrack et al. [31] studied the effect of competition in audit market on audit quality. They believed that the competition in audit market leads to a better quality in audit. Jeter and Shaw [32] did not find any significant relationship between the audit market competition and the audit quality. Most research in recent years measure directly the audit market concentration, for example Kallapur et al. [33], using a statistical population from American firms during the years of 2000-2006, found that more concentration improves the quality of accruals. Similarly, Newton et al [6], using a statistical population from American firms during the years of 2000-2009 found that there is a negative relationship between the audit concentration and audit quality. Also, using a statistical population from American firms during the years of 2003-2009, Boone et al [7] found that there is a positive relationship between the concentration and the quality of accruals. Francis and Wang [34] studied the effects of influence and concentration of Big 4 firms on the audit quality using a statistical population consisted of 42 countries during the years of 1999-2007. The result of the study showed that there is a positive relationship between the concentration of Big 4 firms in audit market and the audit quality. The relation between the audit market concentration and the audit quality has remained in ambiguity. On one hand when the audit market is of high concentration, the fear of losing customers' decreases, because the options of audit firms are limited. Under the condition, the auditors try to maintain more their independence because of lack of fear losing their customers and it in turn increases the quality of audit [33, 6]. In addition, more concentration of audit market results in economies of scale and enables the auditors to reduce the costs and intensify their efforts to increase the audit quality. On the other hand, in a centralized auditing market, the auditors have less motivation for improving quality of services due to high workload. The issue leads to high self-confidence among them and thus lower quality in auditing [7, 8]. Assuming the ambiguity in correlation between the audit market concentration and the audit quality, the hypothesis 1 of the present study is as follows:

- *Hypothesis 1: The audit market concentration affects the audit quality*

According to the laws of each country and according to Internal Regulations and Instructions of Audit Standards, a specified time has been determined to present the audit reports. For example, in Spain, the time of disclosing audited financial statements is at most 85 days after the end of the fiscal year of

the Firms [7], in Greece, 98 days [35] and in Kuwait, it is 62 days [36]. But in Iran, the disclosure instruction of Stock Exchange led the Firms to disclose their audited financial statements 10 days before Annual General Meeting of Shareholders or under the Articles of Association, the General Meeting must be held within 4 months after the end of fiscal year. Under the Note 5, Article 7 of this Instruction, if the midterm and annual financial statements were prepared before the deadline in this Article, it must be disclosed immediately by the publisher, otherwise it subjects to normal delay of the audit report [37]. The information based on regulations of different countries show that the auditors face a clear time pressure, because they must do all their works in prescribed time and publish their reports [27]. Usually, when the audit market is centralized, the large-sized audit firms (Big 4) experience more complex auditing process and as a result of more workload, the process of doing work will face more time pressure and more limited time and this raises concerns for auditors. In fact, the audit market concentration is always associated with more employers than other audit firms and this issues causes an increase in risk of reviewing the employers' financial statements. In other words, with the increase of concentration in audit market, the auditors because of having more share in audit market, can usually choose several employers (customers) in a fiscal year [15]. This decreases the work time of auditors to each customer and thus increases their job stress. The main point is that in terms of double pressure (time limitation and timespan), the auditors should apply the corresponding control strategies including time allocation (time scheduling) for all customers and the way for using the auditors in terms of market and industry needs [38]. But the extent of these strategies' effectiveness is not too much due to concentration in audit market. In fact, because of time pressure, there is no enough time to fully implement audit procedures and regarding the time limitations, the auditors may compress their workload and ignore some audit procedures [10, 39, 40]. This directly affects the reliability and accuracy of the audited evidences and thus reducing the effectiveness of auditors' judgement due to job stresses. So given the descriptions, the hypothesis 2 of the present study is as follows:

- *Hypothesis 2: The audit market concentration affects the auditor's job stress*

## 2.4 Literature Review

Ghebremichael [41] Investigating, under titled Determinants of behavioral intentions in the audit market. A survey of supervisory board members of large and medium companies in The Netherlands is made to identify audit quality dimensions. The multivariate analysis is used to identify the quality dimensions influencing supervisory board members' behavioral intentions. Overall, the author's results indicate that the quality dimensions identified in this study have significant influence mainly in the supervisory board members' intention to refer their auditors to an acquaintance. In this regard, the salient determinants are the functional quality dimensions and auditor independence. The technical quality dimensions are not found to be crucial. In contrast, most of the quality dimensions are not significant determinants of supervisory board members' intention to retain or recommend the purchase of non-audit services from the auditor albeit having a minor influence. The results have some implications for regulators and audit firms. Amiruddin [42] Investigating, under titled Mediating effect of work stress on the influence of time pressure, work-family conflict and role ambiguity on audit quality reduction behavior. The sample selection in this research is done by purposive sampling method, because based on the criteria specified by the researcher. In addition, random sample selection does not necessarily produce a sample that can represent auditors at all levels and types of KAP. This re-

search uses quantitative analysis with approach of Structural Equation Modeling (SEM) method to analyze direct and indirect effect. The main method for data analysis is structural equation model (SEM). Based on the results of the research note that Time Pressure, Work-Family Conflict, and Role Ambiguity each have a significant effect on Work Stress. In testing the direct effect on Audit Quality Reduction Behavior, only Time Pressure Influential Significant, while Work-Family Conflict and Role Ambiguity Not Significant. However, in the test of indirect influence. Influence of mediation there is a Significant influence on all tests that Time Pressure, Work-Family Conflict, and Role Ambiguity each have a significant effect on Audit Quality Reduction Behavior through Work Stress.

Duh et al [43] Research conducted under the title Corruption and audit market concentration: an international investigation. This paper examines the association between the corruption level of a country and audit market concentration. Using a sample from 78 countries over the 2003–2012 period, they document a positive association between corruption and Big 4 audit market concentration, suggesting that in more corrupt countries, the audit market at the industry level is dominated by one or two Big 4 audit firms rather than shared equally. To provide further understanding about how corruption is associated with Big 4 audit market concentration, they conduct a path analysis and find that corruption has an indirect effect on audit market concentration through collusion. These results are consistent with the notion that corrupt governments do not effectively control collusion and thus decrease market competition, leading to a decrease in the perceived severity of information leakage and a lower concern about sharing a common auditor. Finally, they conduct a battery of sensitivity tests. Their results are robust to change analysis, to controlling for other factors that are likely to influence auditor choices and the market structure, to an alternative measure of concentration, and to alternative samples. Overall, we provide evidence to suggest that country-level corruption plays a role in Big 4 audit market concentration. Velte and Stiglbauer [44] studied comparatively the effect of audit market concentration on audit quality using the audit firms' data of several developed countries such as UN countries, USA and China. The study suggests that due to the existence of obtained results different from the experimental research and lack of integration in studying the issue, the researcher has tried to present the detailed results by studying data from three mentioned countries.

According to the results, it was found that in China, due to the intervention of authorities in the audit market and lack of a dynamic supervision in controlling the audit costs, the audit market concentration has caused to reduce the audit quality while in markets of USA and UN countries, even with an audit market concentration, the audit quality will be increased as a result of following the free market system. Huang et al [45] in a research on stock Firms in China during the years of 2001-2011 performed a number of 12334 observations based on fiscal year of the Firms and evaluated the audit quality and audit fees. The results showed that there is a negative and significant correlation between the audit market concentration and the audit fees and on the other hand the audit market concentration leads to an increase in audit quality in China market. Climent-Serrano et al [46] studied the effect of reduced audit fees on improving the quality of audit services. In this study performed during the years of 2004-2015, a total of 37 audit firms of Spain were evaluated. The results of the study showed that reducing the fees of audit services are accompanied by a reduction in quality of their services and this also increases the lack of transparency. Agoglia et al [47] recognized the job stress from the high workloads and time pressure on auditors as two important and influential factors which affect not only on audit quality but they can also have a severe physical and psychological harms on a person. Liu & Zhang [12] in his study refers to the effect of time pressure on audit process and states that as a psychological criterion, it can affect an individual' performance and reduce the quality of financial state-

ments' audit. In another research, Margheim et al. [9] relying on Liu et al [12] studies on stress due to time constraints which is referred to as an effective measure on individual performance, suggests that the workload can affect the audit quality due to stresses caused by responding the public expectations and observing the laws and regulations. But all researchers have not necessarily referred to the role of time pressure and workload. Some researchers such as Sundgren & Svanstrom [48] have gone beyond the issue and referred to adaptation of auditors personal and psychological characteristics with the audit profession and focused on this issue in professional regulations of audit behavior while this important issue has been underestimated by other researchers. Kordestani et al. [49] performed a research under the title of " *to study the effect of audit market concentration on audit fees and audit quality*". For this reason, they tested the data from 78 Firms listed in Tehran Stock Exchange during the years of 2011- 2016. The results of the study showed that the audit market concentration results in a decrease in audit fees and audit quality.

### 3 Research Methodology

The present study is an applied research and from the aspect of data collection method is of post-event semi-empirical type in the field of positive accounting research that has been performed using the multivariate regression method and econometric models. The statistical population of the research included Firms listed in Tehran Stock Exchange during the years of 2013-2017. The sample selected for this research consists of Firms with following conditions:

1. 1.Firms that have been listed in Stock Exchange before 2013 and by the end of 2017.
2. Their fiscal year ends at the end of March.
3. During the mentioned years, do not change their activity or their fiscal year.
4. Are not among the investment and financial intermediaries' Firms (the investment Firms are not included in our statistical population due to the difference in nature of their activity with other Firms).
5. The time interval in transactions of these Firms does not exceed 6 months during the mentioned period.

After applying the above constraints, a total of 97 Firms were selected as research sample. The data of the research were derived from the compact discs of statistical and video archives of Tehran Stock Exchange, the website of Tehran Stock Exchange and other websites and also Rahavard Novin software. The final data analysis was performed using the Econometric software, Eviews and Stata.

#### 3.1 Research Variable

The various variables that are used throughout this paper can be described as follows.

##### Independent Variable

**Audit Market Concentration:** According to Kalapur et al. [33], Carson et al. [5] and Newton et al. [6], the following equation is used to assess the audit market concentration:

$$\text{Concentration Audit}_{it} = \sum_{i=1}^k \left( \frac{\text{Firm Audit fees}_{it}}{\text{Total Industry Audit fees}_{it}} \right)^2 \quad (1)$$

K = number of auditors in industry according to the number of statistical samples.

### Dependent Variable:

**Auditor's job stress:** In this study, according to Yan and Xio [27], "job stress" is defined as "number of audited firms by an auditor considering the number of customers and the business complexity of each firm. Equation (2) is used to calculate the auditor's job stress:

$$WS = \frac{\sum_i^m \sum_{j=1}^n TA_{ij}}{m} \quad (2)$$

where,

WS = is the mean job stress in two or three auditors who are auditing the financial statements of Firm j:

TA<sub>ij</sub>= natural logarithm of total assets of Firm j audited by auditor i

n= total audited Firms by auditor i in fiscal year

m= number of auditors' signatures of Firm j (often, two auditors are responsible for reviewing the financial statements of a Firm (m=2) and sometimes there are maybe three auditors for reviewing the Firm financial statements (m=3).

**Audit Quality:** In order to evaluate the audit quality, the accruals criterion following the modified study of Jones [11] was used. In the first step, the total accruals for a given period known as "event period" are given as follows:

$$TA_{it} = (\Delta CA_{it} - \Delta CL_{it} - \Delta Cash_{it} - \Delta STDEBT_{it} - DEPN_{it}) \quad (3)$$

where

TA<sub>it</sub> Total accruals of Firm i in year t

CA<sub>it</sub> Changes in current assets of Firm i in year tΔ

CL<sub>it</sub> Changes in current liabilities of Firm i in year tΔ

Cash<sub>it</sub> Cash changes of Firm i in year tΔ

STDEBT<sub>it</sub> Changes of short-term debts of Firm i in year t Δ

DEPN<sub>it</sub> Depreciation expense of Firm i in year t

Then, the modified model of Jones was used to assess the audit quality that can be distinguished using the accruals capability. So a regression model for per year. industry is given as follows:

$$TA_{it}/Asset_{it-1} = K_1^{adj} 1/Asset_{it-1} + K_2^{adj} (\Delta Rev_{it} - \Delta AR_{it}). Asset_{it-1} + K_3^{adj} PPE_{it}. Asset_{it-1} + \epsilon_{it} \quad (4)$$

Where,

ΔRev<sub>it</sub> changes in sales revenue of Firm i in year t

AR<sub>it</sub> changes in accounts receivable of Firm i in year tΔ

PPE<sub>it</sub> gross value of estate, machinery and equipment of Firm i in year t

The values of above variables are standardized by summing all assets of Firm i in year t-1.

Now using the coefficients obtained from Equation (2), the amount of normal accruals is computed:

$$NA_{it}^{adj} = K_1^{adj} 1/Asset_{it-1} + K_2^{adj} (\Delta Rev_{it} - \Delta AR_{it}). Asset_{it-1} + K_3^{adj} PPE_{it}. Asset_{it-1} \quad (5)$$

and finally the amount of optional accruals (abnormal accruals) is estimated:

$$AA_{it}^{adj} = TA_{it}/Asset_{it-1} - NA_{it}^{adj} \quad (6)$$

The audit control of the study will be substituted by the absolute value obtained from the above equation, so,  $DA_{it} = |AA_{it}|$ , where larger values represent more audit quality.

### Control Variables

In the present study, the variables related to audit firms are considered as control variables. In order to assess the properties of audit firm using the [42, 50] study, we use a set of criteria such as auditor size (BIG), auditor opinion (AUDOPIN), audit lag (AUDLAG), auditor specialization (AUDSPEC) and auditor tenure (AUDTEN). Table 1 is used to describe the research variables:

**Table 1:** Assessment of the variables of audit firms

Variable	Symbol	Measurement method
Auditor Size	BIG	In order to measure this variable, we use 0 and 1. If the audit firm is supervised by the Stock Exchange, we use 1, otherwise 0.
Auditor Opinion	AUDOPIN	It is measured by 0 and 1. If the Firm has received an acceptable statement without explanatory clause, we use 1, otherwise 0.
Audit Lag	AUDLAG	This variable is calculated as the interval between the end of fiscal year and reporting date.
Audit Specialization	AUDSPEC	It is measured by 0 and 1. If the auditor has reviewed the financial statements of a firm over the last three years, we use 1, otherwise 0.

### 3.2 Research Model

Model (1) is presented to test the hypothesis 1 of the research:

$$|DA_{it}| = a_0 + a_1 \text{Concentration Audit}_{it} + \alpha_2 \text{BIG}_{it} + \alpha_3 \text{AUDOPIN}_{it} + \alpha_4 \text{AUDLAG}_{it} + \alpha_5 \text{AUDSPEC}_{it} + \alpha_6 \text{AUDTEN}_{it} + \varepsilon_{it} \quad (7)$$

$$WS_{it} = a_0 + a_1 \text{Concentration Audit}_{it} + \alpha_2 \text{BIG}_{it} + \alpha_3 \text{AUDOPIN}_{it} + \alpha_4 \text{AUDLAG}_{it} + \alpha_5 \text{AUDSPEC}_{it} + \alpha_6 \text{AUDTEN}_{it} + \varepsilon_{it} \quad (8)$$

## 4 Empirical Results

### 4.1 Descriptive Statistics

In order to study the general properties of the variables and also the model estimation and their exact analysis, familiarizing with descriptive statistics related to the variables is necessary. Table 2 shows the descriptive statistics of tested variables which include some central indicators and distribution for a sample composed of 485 firms. each year between the years of 2013-2017. As shown in this table, the mean auditor stress to review the financial statements of the firms is 60.232 which indicates that from a career perspective, how much stress does this occupation have on auditors? The mean audit market concentration is also 0.249 which indicates that 24.9% of total audit fees in industry is obtained from the place of the studied Firms. Also, the mean descriptive statistics of the auditors' opinion shows that 18.1% of the auditors' opinions are acceptable without explanatory clause and

41.6% of the auditors have been taken the responsibility of reviewing the financial statements of a firm during three years.

**Table 2:** Descriptive Statistics of the research variables

Variable	Observations	mean	median	Minimum	maximum	Standard deviation
Auditor stress	485	60.232	58.163	19.099	188.778	39.011
Audit quality	485	0.083	0.051	0.001	0.584	0.091
Audit market concentration	485	0.249	0.187	0.059	1.000	0.217
Auditor size	485	0.293	0	0	1	0.439
Auditor opinion	485	0.181	0.174	0	1	0.093
Audit lag	485	44.26	62	17	118	9.22
Audit specialization	485	0.527	1	0	1	0.496
Audit tenure	485	0.416	0.424	0	1	0.463

## 4.2 Default Tests of Regression

One of the assumptions of the regression equation is constant property of the variance of errors that is considered as variance homogeneity assumption. One of the tests to recognize the heterogeneity of variance is the Breusch-Pagan test which is about being constant or variable of the error term variance. Another default test for regression is serial autocorrelation test among the error terms that is taken into consideration in this study. For this reason, the Breusch-Godfree serial autocorrelation test was used. Another test for regression is normality test of error terms. One of the tests which determines the normality of error terms is Jarque-Bera test.

**Table 3:** Default tests of regression

Model	Test	Statistic F.J-B	Significance level	Situation
Model 1	Breusch-Godfree test	13.087	0.000	Non-rejection of $H_0$ , having a serial auto-correlation
	Breusch-Pagan- Godfree test	2.327	0.071	Rejection of $H_0$ , having no variance heterogeneity
	Jarque-Bera test	76.108	0.002	Non-rejection of $H_0$ , abnormal distribution of error terms
Model 2	Breusch-Godfree test	12.287	0.000	Non-rejection of $H_0$ , having a serial auto-correlation
	Breusch-Pagan-Godfree test	2.401	0.078	Rejection of $H_0$ , having no variance heterogeneity
	Jarque-Bera test	8.108	0.001	Non-rejection of $H_0$ , abnormal distribution of error terms

## 4.3 Model Review Using the Combined Data Method

The data of the research is as combined data. In combined data, we firstly used the Limer's F-test to determine is it combined or panel data? Then we used Hasmen's test to determine the constant or random effects of the research variables for more accurate estimation (distinguish between being random or being constant). According to the results of Table 4, the significance level of Limer F-statistic for all three models was less than 0.05. The results of Hasman's test showed that in regression models of the present research, because the significance level of the test is more than 5%, so we use the random effects model to estimate the model. It is noteworthy that since the models studied here have serial autocorrelation and since the random effects model has selected to test the

regression models, so there is no problem for testing hypotheses because in random effects method, the generalized least squares method (EGLS) was used.

**Table 4:** Results of the combined data effects test (panel)

Selected model	Test result	Significance level	Degree of freedom	F- statistic $\chi^2$	Test	
Panel	Rejection $H_0$	0.000	(83.119)	1.566	Constant effects (F)	Model 1
Random	Non-rejection $H_0$	0.073	6	7.382	Random effects) (Hasman)	
Panel	Rejection $H_0$	0.000	(83.119)	1.702	(F) Constant effects	Model 2
Random	Non-rejection $H_0$	0.095	6	7.554	Random effects (Hasman)	

Moreover, to ensure of lacking a collinearity problem between the explanatory variables, the collinearity test was evaluated using the variance inflation factor (VIF) which considering that the values of this statistic for explanatory variables is less than 10, so there is no collinearity between them.

#### 4.4 Testing the Research Hypotheses

The results obtained from testing hypothesis 1 and 2 (estimation of model 1 and 2) are shown in Table 5.

**Table 5:** Results of testing hypothesis 1

Dependent variable: Audit Quality(DA) and audit stress (WS)		Observations: 485			
Period: 2013-2016		Number of studied firms: 97			
Variable	Coefficient	Model (1)		Model (2)	
		Regression	t-Statistic	Regression	t-Statistic
Intercept elevation	+.-	0.094	2.612	0.086	2.231
Audit market concentration	+	-0.096**	-2.676	0.113**	3.127
Auditor size	+	0.096*	3.616	0.097*	3.621
Auditor opinion	+	0.111**	3.767	0.056	1.762
Audit lag	+	0.088*	2.326	0.090*	2.331
Auditor speciallization	+.-	0.091**	3.241	-0.091**	-3.241
Auditor tenure	+.-	0.076**	2.441	0.076**	-2.441
Coefficient of determination		0.712		0.784	
Modified determination coefficient		0.669		0.755	
F-Statistic		22.18**		22.39**	
Durbin-watson		1.801		1.87	

**Note:** \* represents the statistical significance in error level of 0.05. \*\* represent the statistical significance in error level 0.01.  
**Symbol:** Auditor stress (WS), audit quality ( DA), concentration audit, auditor size (BIG), Auditor opinion (AUDOPIN), Audit lag (AUDLAG), auditor specialization (AUDSPEG), Auditor tenure (AUDTUR) , determination coefficient (R), modified determination coefficient (R<sup>2</sup>).

The observation of F-statistic value and its significance level in this Table represents general significance of the fitted regression model in error level of 1%. Moreover considering the modified determination coefficient in model (1), it can be claimed that about 71% of the changes in audit quality can be explained by the model's variables. While this value in model (2) is 78%. As shown in the table above, the estimated coefficient and the t-statistic of model (1) related to the audit market

concentration variable are negative and significant at the error level of 0.01 which represent a negative significant effect between the audit market concentration and the audit quality. It was also found that the estimated coefficient and the t-statistic related to properties of the audit firms had a positive and significant effect on audit quality. In addition the estimated coefficient (0.113) and the t-statistic (3.127) of model (2) related to the audit market concentration variable had a positive and significant effect on the auditors' job stress. The estimated coefficient and the t-statistic of variables such as the auditor size and the audit lag in presenting the audit report in error level of 5% had a positive and significant effect on auditors' job stress, while the estimated coefficient and the t-statistic of auditor specialization and auditor tenure had a negative and significant effect on the auditors' job stress.

## 5 Conclusions

The job stress can affect the quality of work and the organizational performance of various professions including the profession of auditing. Audit is a people-centered profession, so the job stress of auditors cannot be ignored because the auditors' opinions and presenting their reports play a main role in the shareholders and investors' decision-making [27]. Although no enough research has been performed about the job stress and mechanisms to control them in a large-scale statistical sample in Iran, the results of the present research can be a big step in quantitative and conceptual recognition of this issue in the Iranian capital market. The purpose of the present research was to study the effect of audit market concentration on auditors' job stress and audit quality of the Firms listed in Tehran Stock Exchange during the years of 2013- 2017 in which a total of 97 Firms were evaluated. The results of the research in the form of hypothesis 1 showed that the audit market concentration has a negative and significant effect on audit quality.

In fact, in consistent with the results of Boone et al. [7] and Francise et al. [8], it was found that with the increase in audit market concentration, the high workload due to the acceptance of several audit works from the customers simultaneously will be increased the risks of reviewing the financial statements, and this in turn reduce their quality. In other words, the audit market concentration has led audit firms to experience more workloads because they achieve more popularity in the market and allocate more share of market to themselves. The issue causes to reduce the quality of reviewing the financial statements because the time budget pressure in reviewing a financial statement is increasing in a way that the auditors try to present their statement in the shortest possible time so that they can also do other audit works. As mentioned, the result of this hypothesis is consistent with the research of Boone et al. [7]; Francis et al. [8]; and Kordestani et al. [46] which confirm the result of this hypothesis. On the other hand, the result of hypothesis 2 showed that the audit market concentration had a positive and significant effect on auditors' job stress. The results show the fact that when the audit market is concentrated, the bigger audit firms (BIG 4) experience the more complex audit process and because of more workload they suffer, the process of performing work will be associated with more time pressure and this lead to an increase in job stress of the auditors. Indeed, the audit market concentration is usually associated with a large number of the customers compared to other audit firms and this issue causes an increase in risk of reviewing the customers' financial statements. In other words, with the increase of audit market concentration, because of the increased market share, an auditor has usually several customers in a fiscal year. This will reduce the work time of the auditors for each customer and thus increase the time pressure and finally the job stress for auditor. In fact, with a

limitation in time (time pressure), there is not enough time to completely implement the audit procedures. They are likely to increase their workload and as a result ignore some of the audit procedures and it leads to an intense pressure on the auditor.

Moreover, the result of the research is consistent with the research of Liu [12], Lopez and Peters [25] that confirmed the result of this hypothesis. According to the results, it is recommended that the qualified authorities such as the Iranian Official Accountants Community implement plans to control the increased concentration in audit market. Most audit firms in Iran are small. This issue has led the auditors to compete in the field of offering discounts in the audit fees so it is likely to reduce the quality of audit. Accordingly, providing more effective monitoring mechanisms is necessary. It is also suggested that the regulatory institutions such as Supreme Audit Court train the necessary skills to the auditors to control the stress by holding the training courses and the behavioural workshops. It is recommended that by codifying more comprehensive rules, the amount of work done by the audit firms (the maximum customer acceptance) in a fiscal period is monitored so that a balance can be established in auditing financial statements among the audit firms or the high workload can be prevented. These suggestions can allow a standardization of auditors' behaviour and help to improve the audit quality of the Firms' financial statements.

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