Ferdowsi University of Mashhad Press (FUMP)

ISSN-Print: 2588-6142

IJAAF

IRANIAN JOURNAL OF

ACCOUNTING, AUDITING and FINANNCE

Volume 4, Issue 1, Winter 2020

Ferdowsi University of Mashhad

In the Name of God

Iranian Journal of Accounting, Auditing & Finance

This Journal is authorized under the registration No. 17153, by the Ministry of Culture and Islamic Guidance.

Volume 4, Issue 1, Winter 2020

Publisher: Faculty of Economics and Administrative Sciences, Ferdowsi University of Mashhad

Published by: Ferdowsi University of Mashhad Press

Address: Iranian Journal of Accounting, Auditing & Finance

The number of this issue is "Vol. 4, No. 1, winter 2020" that is publishing in the Autumn of 2020.

Address: Mashhad, Azadi Sq., Mashhad, Khorasan Razavi P. Box 9177948951-1357

Website: http://ijaaf.um.ac.ir

E-mail: ijaaf@um.ac.ir

Articles Writing Guide

Received articles will be published after professional referee, and being approved by the editorial board. Submission to this Journal is required to send at least two files include: an "Article cover" and an "Anonymous file of the main article", through systems, http://ijaaf.um.ac.ir/ .Submission of a manuscript implies that the paper has not been published before and it is not under consideration for publication elsewhere. Please pay attention to the following:

1-Article Cover

The file should be typed in Word software (office), and A4 sized page which include:

- Full title of the paper centered in Times New Roman 16.
- Author's name centered in Times New Roman 12 (Bold),
- Author's characteristics centered in Times New Roman 11 (italics), including the authors' name (the name of correspondence author should be marked with an asterisk), academic rank and the name of the institution or university (do not use pseudonym and nickname), complete address, telephone number and fax of correspondence author and e-mail address of all authors.

2- Anonymous file of the main article

The main article should be typed in Word software (office), A4 sized page and utmost in 7500 words (including references), and numbered pages while page margins are as follows: margin from the above 4 cm, from the below 5/6 cm, from the left 5/4 and from the right 5 cm. The line spacing should be set at 1 cm and the beginning of each paragraph indented about 0.3 cm, the entire text should be Justified and include the following:

The first page:

- Full title of the paper, centered in Times New Roman 16.
- Abstract in Times New Roman 11 and utmost 165 words, including four issues: (1) Subject and purpose of the paper, (2) methodology, (3) findings, and (4) conclusions, and Contribution (maximum).
- Utmost 5 keywords in Times New Roman
- Subject classification code in Times New Roman This coding is designed for subject classification in economic literature and how to use it in detail is available on the following website:www.aeaweb.org/journal/jel_class_system.html
- The main titles in manuscript (including abstract, introduction, literature review, methodology, findings and Conclusion) left aligned in Times New Roman 12(Bold) and sub-titles (such as Keywords, subject classification code and other necessary(important) titles) left aligned in Times New Roman 11(bold) and in the left alignment, content of main manuscript in Times New Roman

- As far as possible, do not use any image in the text and if used, it should be high- quality black and white photos.

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.
- *Literature review* A review of the literature investigates only related researches chronologically and the results exploit at the end of the section theory matrix or conceptual model that document research variables and Formulate research hypotheses.
- *Methodology* including Methods, data collection tools, population, sample size and sampling methods, analysis and model testing hypothesis, definition of study variables and operational definition of them can be in presented the same section that model testing is represented and there is no need to repeat.
- *Results* including the findings compare it with the findings of previous and interpretation of compliance or inconsistency of findings with research findings and theories.
- *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;
- *References* are as Section 3-2 and
- *Endnotes* terminology and some necessary explanations provide in the endnote (no footer) and as a two-column table (contains the endnote number and content of endnote with invisible lines (No Border). Numbering the endnotes are as text and doing without the use of EndNote technique.

3- Other important points in the original file

3-1- References inside the text

- In order to reference within the text (APA) method should be used; so the author's last name with the year of publication it is presented in the text respectively. If there are two authors, last names' will be separated by "and" and if more than three people, "et al." will be used
- After the last name of the first author. If the number of resources is more than one, a semicolon (;) will be used to separate them.
- Any reference which is mentioned in the article, must be included in references part.
- If it is required to explain more about terms or words within the text, endnote can be used.

3-2- References

To set the reference list, use the (APA) method, as follows:

Books: Author, A.A. (Year of Publication). *Title of work*. Publisher City, State: Publisher.

When citing a book in APA, keep in mind:

- Capitalize the first letter of the first word of the title and any subtitles, as well as the first letter of any proper nouns.
- The full title of the book, including any subtitles, should be stated and *italicized*.
- Magazines: Author, A.A. (Year of Publication). Title of the Article. *Journal Title*, *Volume* (Issue), pp.-pp.
- When citing a magazine in APA, keep in mind:
- You can find the volume number with the other publication information of the magazine.
- You can typically find page numbers at the bottom corners of a magazine article.
- If you cannot locate an issue number, simply don't include it in the citation.
- Online magazine article: Author, A.A. (Year). Title of the Article. *Magazine Title*, *Volume* (Issue), Retrieved from http://xxxx
- When creating an online magazine citation, keep in mind:
- The volume and issue number aren't always on the same page as the article. Check out the other parts of the website before leaving it out of the citation.
- List of references should not be numbered. If there are 2 or more authors alike, in addition to alphabetical order, the publisher year also should be ordered. In order to avoid the pitfalls of the various sources listed, the beginning of each reference is 0/5 cm protrusion.
- If there are two authors, last names' will be separated by "and" and if more than three people, last names' will be separated by a comma (,) and the last one with "and".

3-3- Charts, Tables and Formulas

Charts' title should be writhen below and tables' title on the top centered in Times New Roman 11 and Bold. Charts and tables render within the text and immediately place after the explaining paragraph. The content of charts and tables in Times New Roman 10

- Tables and images number from No. (1) To refer to the content of the images and diagrams in the text, use the number and appropriate referral.
- Inserting decimal numbers, instead of using slash (/), and show negative numbers by using the minus sign.
- Tables include variables, should contain a column for the symbols used for variables.
- Formulas represent centered in Times New Roman11and render in a two column table with no border and number with figure in parentheses.

3-4- Other notes

- There is no need to spaces before dot, comma, semicolon, colon, question mark, exclamation mark and, but after these signs shall be placed a spaces.
- Use spaces before opening and after the closing parenthesis.
- Articles should not be sent to Persian/English journal or another language at home and/or abroad simultaneously.
- If the format and structure of submitted articles are not same as what mentioned in this guide, it won't be accepted.
- Journal can edit and delete some sections, without any change in its content and received journals will not bring.
- Responsibility for the accuracy of the article is the author.
- The file should be named in English. This name should include the first author's last name and sending date. Articles will be received only by Journal Website.
- In order to expedite the referee process and publishing an article, we will ask respected professors and researchers to ensure technical and literary editing and enforce this guide.

The journal is devoted to research papers. Research paper is extracted from the research project, master's dissertation or thesis.

Receiving the papers is only possible electronically.

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:

- Financial accounting
- Managerial accounting
- Auditing
- Taxation
- Accounting information systems
- Accounting education

Perspectives or viewpoints arising from regional, national or international focus, a private or public sector information need, or a market-perspective are greatly welcomed. Manuscripts that present viewpoints should address issues of wide interest among accounting scholars internationally and those in Asia in particular.

Yours faithfully,

Mahdi Moradi

Editor in Chief

Content

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.39256
Research Article

The Relationship between Management Ability and Audit Fees by Considering Firm Credit and Auditor's Dependency during Financial Crises

Iman Rasaei

Department of accounting and auditing, Sanabad Golbahar Institute of Higher Education, Mashhad, Iran

Mahmoud Mousavi Shiri*

Department of Accounting, Payame Noor University, Tehran, Iran

Abstract

This paper aims to assess the relationship between management ability and audit fees by considering firm credit and auditor's dependency during the financial crisis. Despite the presence of extensive studies on determining factors in audit fees, most of the studies have been concentrated on determining factors at the firm level, and little evidence is available to auditors on the information content of special managerial features. This paper aims to examine the relationship between managerial abilities and audit fees by considering firms' financial crisis conditions.

In this paper, management abilities are considered to form three firm size indices, the firm's sales share in the market and cash. Moreover, the standard deviation of 3-year sales is used for firm credit, and an abnormal audit fee is employed for calculating auditor dependency. For this purpose, a total number of 91 listed firms on the Tehran Stock Exchange is evaluated for 6 years between 2014 and 2019. The panel regression model is used for hypothesis testing, and Chow and Hausman's tests are used for selecting the appropriate model-fitting method. The VIF test is used for analyzing linearity among explanatory variables. The obtained results indicate that financial crisis conditions contribute to the relationship between management abilities (based on firm size measurement) and audit fees. Further, the results indicate the negative impact of firm credit on the relationship between audit fee and management ability (based on cash). According to the results, audit fee dependency on the relationship between management ability (based on measurement, the firm's sales share, and cash) and audit fee is positive. Moreover, the results suggest that financial crisis conditions contribute to firm credit effectiveness in the relationship between management ability and audit fees.

In past research, some factors affecting the auditor fee are debts, management ability, and auditor independence. In this paper, we contribute to the financial crisis as a variable that influences some of these relationships. And we show that relationships make sense by considering this variable.

Keywords: Audit fee, Firm Credit, Auditor Dependency, Financial Crisis, Management Ability

* ***Corresponding Author***: Associate Professor of Accounting, Email: mousavi1973@yahoo.com

1. Introduction

Studying the contributing factors to audit fees is important in terms of their effect on audit quality and auditor dependency. Carcello et al. (2002) declare that audit fee reflects the economic costs of efficient auditors and also claim that from auditors' point of view, they attempt to minimize total costs by balancing the costs of their resources (costs for performing more audit) and the future losses derived from legal liabilities. More audit attempts to lower the risk of auditors' debt losses, and the auditor presents that proportion of the audit process that minimizes total costs. Audit fee contributes to sound planning and implementation of financial auditing. Bozorg-asl (2009) believes that the audit fee is reflective of audit quality for financial statement users. Independent auditing is a significant proportion of the financial reporting system. The report of independent auditors can elucidate the fulfillment of management commitments to investors. Audit fees can be considered a fee incurred by the employer for fulfilling the commitments. Audit fee relies on different factors, the amount of significance of which is different in different countries. One of the audit profession's major challenges is determining the lowest range and rate drop of some audit firms. Considering auditing, however, as homogeneous goods and its non-competitive pricing will jeopardize the independence and quality of audit services. Furthermore, it is worth mentioning that independent auditing is the cornerstone of economic transparency, people's trust in the capital market, and government responsiveness to the people, so it should not be considered a product or general service (Bozorg-asl, 2009). Low audit quality causes the decline of trust of financial statement users, and this will not only lead to failure in achieving audit goals, but to the decline of the credibility of the audit process at larger scales, prevents the optimum allocation of capital in the Securities market, and increase the capital cost and financial supply. Auditing business units' financial statements aim to voice a technical opinion about financial statements' desirability from all significant aspects. Such an opinion is a professional judgment that always deals with audit risk (Hnifeh and Mahmoodi, 2009). According to credibility assumption, the audit profession may claim irresponsibility about financial statements' information content. Still, investors believe that if they suffer a loss due to using deviated financial statements, auditors are responsible and should compensate (Simonic, 1980). In this regard, the amount of receivable fee and the adjustment of audit report due to ambiguity in the continuity of an employer's activity can be among the strategies for covering audit operation risk (Krishnan & Wang, 2015). Auditors should be informed about the approach and executive management method when evaluating the audit risk according to audit standards. To identify and estimate the audit risk, appropriate evaluation of the firm's overall condition is a matter of great importance (COSO, 2013). Auditors should collect more evidence for lowering the risk of failure in exploring significant distortions, leading to an increase in audit costs (Krishnan et al., 2012). Moreover, senior managers' characteristics will be considered for audit admission and planning (Kizirian et al., 2005; Johnson et al., 2013; Krishnan & Wang, 2015, Gerakos et al., 2015). Santanu et al. (2018) declare that firms with more powerful management incur lower audit services costs. Firm management by leaving a direct effect on the general policies plays an important role in the quality and credit of presented information in financial reports and case of the weak performance of the management, the continuity of firm activities may face uncertainty, and this would lead to the adjustment of the audit opinion. Besides, more competent managers are expected to act more wisely in selecting auditors and determining the audit fee and causes the decline of this factor. Previous studies show that more competent management has a positive impact on the results of financial reports (Bamber, Jiang, & Wang, 2010; Dyreng, Hanlon, & Maydew, 2010; Mutsoma & Zhang, 2011). Higher management abilities can increase financial

information quality (Demerjian, Lev, Lewis, & McVay, 2013). Further, a higher management ability can lower the audit fee since it declines the audit risk and leads to a high quality of financial information (Krishnan & Wang, 2015). In the accounting literature, managers' ability is one of the dimensions of firms' human capital classified as intangible assets. For example, Demerjian et al. (2012) define management ability as managers' efficiency, compared to rivals, in converting firm resources to income. Such income generation resources include inventory price, office, distribution, sales costs, fixed assets, operational rents, research and development costs, and the firm's intangible assets (Demerjian et al., 2012).

Higher managerial abilities can bring about more efficient management of daily firm operations, especially in critical periods of operation, when managerial decisions can contribute greatly to firm performance. Besides, in critical periods, more efficient managers require more appropriate decisions for supplying resources (Andreou et al., 2016). A more worthwhile investment in more valuable projects and efficient management of the staff is also among competent managers' characteristics. Hence, in the short run, the management is expected to generate more income using a certain level of resources or earn a certain level of income using lower resources (Demerjian et al., 2012). In contrast, weak decisions and lower management expertise in leadership can direct the firm toward bankruptcy. Moreover, more competent managers enjoy more knowledge and awareness about customers and macroeconomic conditions. They can better understand more complicated standards and implement them correctly (Demerjian et al., 2012). Yuan et al. (2019) claim that when managerial ownership level conforms with the interests of shareholders (e.g., "alignment of interests"), the relationship between managerial ownership and audit firm size and audit costs is negative. On the other hand, when managerial ownership level is in contrast to shareholders' interests (conflict of interests), the relationship is positive. Huang and Sun (2017) posit that high competent Managers lower real earnings management and managers with higher abilities will remarkably reduce real earnings management's effect on firm performance. Most of the opinion leaders (Greening & Johnson, 1996; Gitman, 1998; Lensberg et al., 2006; Newton, 2010) also believe that management weakness and inability are among the major contributing factors to the financial crisis of firms.

Related literature to bankruptcy prediction and financial distress is about a series of related studies, wherein financial distress has little difference. In some studies, the final limit in financial distress means bankruptcy, and, in some studies, other criteria are considered for some paragraphs of the audit report.

Those factors that lead to a firm's bankruptcy do not emerge in a flash, and the financial crisis signs appear earlier than the final bankruptcy. A financial crisis is when the firm is in trouble acquiring sufficient financial resources for continuing the operation and daily affairs (Beaver, 1966; Pastena & Ruland, 1986). In this situation, the firm cannot generate sufficient cash for meeting the needs, including paying back the creditors (Jantadej, 2006). The financial literature emphasizes that firms enter the financial crisis cycle years before the emergence of bankruptcy, and different economic events occur before the bankruptcy.

2. Literature Review and Hypothesis Development

Recent studies show that the audit fee is associated with compensation plans for managers. These plans cause a change in risk-taking (Kannan et al., 2014; Kim et al., 2014). Topical literature reveals that a positive relationship exists between some of the risk concepts and audit fees. Hence, auditors consider their employers' risk features when determining the audit fee and compensate for the related risks via a higher audit

fee. Moreover, the results suggest that auditors should not focus only on risk related to financial statements but should have a wider overview of the employer's commercial behavior (Bedard & Johnson, 2001). The growing literature related to determining factors in audit pricing proved that audit fee is associated with risk factors related to employer's characteristics, including size and complication of the employer (Simunic, 1980; Francis, 1984; Palmrose, 1986), internal control quality (Hoag & Hollingsworth, 2011), commercial risk (Bentley et al., 2013), and corporate governance (Xingze, 2012). A bunch of evidence also demonstrates that the audit fee is more sensitive to risk factors after providing the Sarbanes-Oxley Act. Few studies, however, carried out on how auditors respond to risk factors related to senior management of their employers. Chen et al. (2013) argue that auditors ask for higher fees from firms with risk-taking managers. Krishnan and Wang (2015) develop the previous studies and assess whether auditors respond to risk factors related to employer managers or not and conclude that managers' ability significantly affects audit services pricing. The audit fee is determined based on the auditor's estimated risk from the employer, competition in the audit market, and negotiations between auditor and employer.

Krishnan and Wang (2015) analyze the effect of management ability on audit fees and notice that firms with more competent managers pay lower audit fees. The study of Bills et al. (2015) indicates that an audit firm size has a negative and significant impact on the relationship between management ability and audit fee. Moreover, their study results show that management uncertainty has a positive and significant effect on audit fees. Chen et al. (2015) conclude that auditors estimate higher risks when the managers are highly motivated to keep or increase the stock price. In other words, auditors ask for higher payments from firms with executive managers who are more sensitive to stock return fluctuations. Duellman et al. (2015) illustrate that firms with overconfident managers pay lower audit fees. They also figure out that overconfident managers are less likely to hire industry specialized auditors. Lauck et al. (2014) argue that the new CEO often makes major changes, in the beginning, to change the outlook and strategy of the firm and have an influence in financial and operational reporting and decision-making. They declare that the firm CEO contributes significantly to the audit fee. Johnson et al. (2013) observe a positive and significant relationship between overconfidence of management and audit risk estimation, so in case the auditor detects this personality characteristic of managers and overestimates financial reporting risk due to overconfidence of managers, he can ask for higher payment to be able to pursue his audit measures which are decreasing the risk of detection and significant distortion. Andreou et al. (2013) assess the relationship between management ability and firm performance during the financial crisis in 2008. By evaluating the data related to 2344 firms during 2008-2011, they conclude that management ability is directly associated with firm performance, and during the crisis in 2008, more competent managers, compared with those with lower competency, have managed the firm resources, liabilities, and capital expenditures more efficiently. Garcia et al. (2014) reveal that the less the volatility of firm profit and the smoother with predictability, the higher the commercial credit. In other words, an increase in earnings quality would lead to an increase in credit. Fernando and Molir (2012) show that commercial credit utilization is higher in less-developed countries.

Several conducted studies show a significant relationship between management abilities and the amount of audit fees (Krishnan & Wang, 2015; Duellman et al., 2015). By considering the previous studies on internal setting and credit of the firm and their impact on the relationship between management abilities and audit fee, critical conditions and firm reputation probably contribute to management and auditors' abilities in determining audit fee, so the first three hypotheses of the study are as

follows:

H1: financial crisis conditions contribute to the relationship between management ability and audit fee.

H2: firm credit contributes to the relationship between management ability and audit fee.

H3: financial crisis conditions contribute to firm credit on the relationship between management ability and audit fee.

New York Securities and Exchange Commission (2002) declares that in case the payment of an auditor accounts for more than 15% of the total revenue of a firm, the independence of that firm may be under question because it is probable that the dependence of the audit firm on the employer or special employers becomes extremely high. Auditor dependency means the audit firm should set the audit report following employer management's opinion to survive in the market of audit services. Each audit firm's portfolio comprises employers, each of which has a special but different significance. Such a sign is more evident in today's competitive world, and auditors or audit firms attempt to keep their employer. Heavy dependence on an employer threatens personal benefit and can be seriously detrimental to auditor independence. Auditing financial statements can create economic added value for the firm. By considering the significance of audit services and the impossibility of direct observation of audit quality, finding an effective method for controlling audit quality is vital (Ghosh et al., 2005). Audit fees can be considered significant aspects of audit quality management and control because the basic condition for ensuring the quality of audit services is the payment. When auditors ask for a fee extremely higher than the presented services' final price, society would doubt their work quality. From the investors' point of view, there is a negative and significant relationship between employer's significance and auditor independence. The employer's higher significance for the auditor lowers investors' viewpoint about auditor independence (Ghosh et al., 2005). Choi et al. (2010) demonstrate that abnormal positive audit fee is associated positively with discretionary accruals. Creosol et al. (2002) posit that a dependent audit fee can contribute to auditor independence. Kinney and Libby (2002) claim that abnormal audit fees, compared to normal audit fees, can be better attributed to the employer in the form of rent or economic bribes related to audit services or the auditor's economic dependency on the employer. One of the issues affecting the audit fee and the audit quality is the auditor's economic dependency. Asthana and Boone (2012) and Blankley (2014) declare that economic dependency between auditor and employer leads to a condition where auditors' willingness to exert professional care and unbiased judgment on collected evidence will decline considerably. In the following, we assess auditor dependency on audit fees and the effect on management ability and audit fee.

H4: auditor dependency on audit fees contributes to the relationship between management ability and audit fee.

Several studies have assessed the motives of earnings management in accounting and finance. Studies on the effect of financial motives of earnings management, including low profitability and high leverage (Latridis & Latridis, 2009) have proved earnings manipulation to avoid the decline or concealing losses in firms (Ayers et al., 2006) and most of the similar topics have also been assessed on internal factors of a firm. In contrast to the internal features that lead to earnings manipulation and management, numerous events outside the firm can also be among financial reporting quality drop motives. In the previous studies, the commercial cycle's effect (Strobl, 2013; Li et al., 2013) and periodic economic volatilities (Li et al., 2013, Agarwal et al., 2007) are substantiated on the earnings management. These studies show that earnings quality and financial reporting quality are extremely sensitive to adverse economic conditions, and

financial crises can contribute to financial reporting policies. One of the factors outside the firm, the effect of which is analyzed on financial reporting quality, is the financial crisis (Persakis & Latdidis, 2015).

In critical conditions, firm managers are aware of financial reporting on users' understanding of the firm's financial status and operational performance. Such an effect has raised whether critical conditions strongly motivate the firm managers to improve financial reporting quality to attract investors' trust (Arthur et al., 2015). The answer to this question will explain firms' financial reporting strategies, recognize the behaviors and motives during the crisis, and detect accounting policies used by the managers to survive. Hence, it is probable that the financial crisis influences auditor dependency and management ability, so the following hypothesis is formulated:

H5: financial crisis conditions contribute to auditor dependency on the relationship between management ability and audit fee.

3. Research methodology

This paper is practical, in terms of objective, descriptive-correlational, method, and longitudinal, in terms of time horizon. Since the data used are real and historical, the study can be classified among the retrospective studies.

The study's statistical population includes listed firms on the Tehran Stock Exchange from all industries during 2014-2019. The number of samples of this paper is 91 firms, indicating the real statistical population.

To collect data related to the experimental section and to examine research hypotheses of related data to dependent, independent, and control variables, the audited financial statements of listed firms on Tehran Stock Exchange are gathered from http://www.Codal.ir (comprehensive information databased of publishers), http://www.sahamyab.com, http://www.tse.ir, and other resources using the information bank of Tehran Stock Exchange (Iran bourse, Tadbir Pardaz, and Rah Avard Novin Software).

3.1. Descriptive statistics

The following table shows the obtained descriptive findings from this paper, including mean, median, standard deviation, minimum and maximum observations. It is worth mentioning that the total number of firms understudy is 91, collected during 6 consecutive years.

According to the obtained results from reported descriptive statistics in Table 1 and 2, the lowest payment to auditors is almost 4, and the highest payment is about 10. On average, 4% of firm assets in the population of the study is cash. The highest amount of debt for firms understudy is 1.8 times more than their assets. Moreover, 55% of firms received conditional, rejected, or no opinion from their auditors. According to the bankruptcy measurement function, 6% of the population is in critical condition.

3.2. Inferential statistics

3.2.1. Measuring the variable of auditor dependency (abnormal fee)

The abnormal audit fee is achieved from the residual of the following regression model. To calculate audit fee residual, following Zigia and Zi (2017), the presented regression model of Francis and Wang (2005) is used as follows:

Model (1)

$$LAF= \beta_0 + \beta_1 LTA + \beta_2 CATA + \beta_3 QUICK + \beta_4 LEV + \beta_5 ROA + \beta_6 LAGOP + \beta_7 LOSS + \beta_8 SPECIALIST + \beta_9 BIG + \beta_{10} SWITCH + \varepsilon$$

Table 1. Descriptive statistics

Variables	Year-firm	Sign	Mean	Median	Std. dev.	Minn.	Max.
Audit fee logarithm	546	Ln AF	6.788	6.771	0.904	3.784	9.903
Management ability (firm size)	546	MGR ABILITY1	13.713	13.690	1.528	9.250	19.190
Management ability (sales portion of the firm)	546	MGR ABILITY2	0.010	0.009	0.019	>0.001	0.801
Management ability (cash)	546	MGR ABILITY3	0.042	0.023	0.057	0.001	0.460
Firm credit	546	credit	11.665	11.739	1.811	0.347	17.196
Auditor dependency	546	dependent	0.009	0.014	0.389	-1.861	1.630
Inventory and accounts receivable to total assets	546	INVREC	0.530	0.525	0.200	0.010	0.900
Return on assets	546	ROA	0.061	0.070	0.192	-0.790	0.740
Financial leverage	546	LEV	0.671	0.660	0.305	0.070	1.880
Current assets except inventory to current debts	546	QUICK	0.901	0.760	0.767	0.010	8.390
Sales growth	546	SGROWTH	0.165	0.110	0.522	-1.000	4.420
Tenure	546	ATENURE	3.298	2.000	3.623	1.000	23.000
Institutional ownership	546	INSTO	0.311	0.220	0.302	0.000	0.960

Table 2. Frequency of the dummy variables

Variable	Sign	1		0		Total	
		Frequency	Frequency percentage	Frequency	Frequency percentage	Frequency	Frequency percentage
Firm loss	LOSS	126	23	420	77	546	546
Audit organization	BIG	138	25	408	75	546	546
Financial crisis criterion	DISTRS	31	6	515	94	546	546
Unacceptable opinion	AOPINION	301	55	245	45	546	546

Model residual is calculated by placing the obtained regression coefficients from model fitting reported in the above table in the model.

$$LAF= 0.304 + 0.439*LTA + 0.453*CATA + 0.054*QUICK + 0.045*LEV + 0.419 - *ROA + 0.001*LAGOP + 0.016*LOSS + 0.095*SPECIALIST + 0.203*BIG + 0.014*SWITCH + \varepsilon$$

It is worth mentioning that the above equation will be calculated for each year-company to have 546 observations.

Given the above-fitted model, the regression model residual from the above equation indicates auditor dependency on audit fees. The following related models to hypothesis testing will be analyzed.

Table 3. Results of model fitting for the variable of auditor dependency

Variables	Sign	Regression coefficients	Std. dev.	T-statistic	p-value
Fixed value	*β*	0.304	0.365	0.835	0.404
Total assets logarithm	*LTA*	0.439	0.025	17.896	>0.001**
Current assets to total assets ratio	*CATA*	0.453	0.120	3.787	>0.001**
Current assets except for inventory to current debts	*QUICK*	0.054	0.035	1.572	0.117
Financial leverage	*LEV*	0.045	0.079	0.571	0.568
Return on assets	*ROA*	-0.419	0.098	-4.281	>0.001**
Conditional opinion	*LAGOP*	0.001	0.022	0.059	0.953
Loss	*LOSS*	0.016	0.034	0.466	0.641
Rank A audit firms	*SPECIALIST*	0.095	0.029	3.334	0.001
Audit organization	*BIG*	0.203	0.049	4.153	>0.001**
Auditor change	*SWITCH*	0.014	0.020	0.728	0.467
Coefficient of determination	0.878	F statistic of the model		27.023	
The adjusted coefficient of determination	0.847	The significance level of regression		0.000	

3.3. Hypothesis testing

The regression model of Ferdinand et al. (2018) is used for hypothesis testing as follows:

Ln AF= β_0+β_1 MGR ABILITY + β_2 DISTRS +β_3 MGRABILITY*DISTRS +β_4 credit+β_5 dependent +β_6 MGRABILITY*credit +β_7 MGRABILITY*dependent +β_8 MGRABILITY*DISTRS* credit +β_9 MGRABILITY*DISTRS* dependent +β_{10} LnSIZE + β_{11} INVREC + β_{12} ROA + β_{13} LOSS + β_{14}LEV +β_{15} QUICK + β_{16}SGROWTH + β_{17} BIG + β_{18}ATENURE + β_{19}AOPINION +β_{20}INSTO + ε

Since three measurement methods are considered for the variable of management ability, to better show the regression results due to an excessive number of related variables, each measurement method is put in the model separately, and the model has fitted three times.

Regarding the reported results in Table 4, the variables of management ability, auditor dependency, comparing management ability with the financial crisis, financial crisis, and firm credit, inventory and accounts receivable to total assets, loss, financial leverage, current assets except for inventory to current debts, and audit organization have a positive and significant association with the audit fee. On the other hand, the financial crisis variables, comparing management ability in financial crisis and return on assets, negatively and significantly affect the audit fee. Other fitted variables in the model have no relationship with the dependent variable of the model.

Given the reported results in Table 5, the variables of auditor dependency and comparing management ability and audit dependency have a positive and significant association with the audit fee. On the other hand, the financial crisis variable has a negative and significant relationship with the audit fee.

Table 4. Results of model fitting related to research hypotheses (management ability criterion: firm size)

Variables	Sign	Regression coefficients	Std. dev.	T statistic	p-value
Fixed value	β	1.328	0.182	7.317	>0.001**
Management ability (firm size)	MGRABILITY1	0.380	0.013	28.252	>0.001**
Financial crisis	DISTRS	-0.301	0.134	-2.249	0.025
Comparing management ability with the financial crisis	MGRABILITYDISTRS	-0.046	0.016	-2.901	0.004
Firm credit	CREDIT	-0.031	0.015	-2.035	0.143
Audit dependency	DEPENDENT	1.001	0.003	28.787	>0.001**
Comparing management ability with firm credit	MGRABILITYCREDIT	0.002	0.002	1.903	0.058
Comparing management ability with auditor dependency	MGRABILITYDEPENDENT	0.001	0.001	1.259	0.209
Comparing management ability, financial crisis, with firm credit	MGRABILITYDISTRSCREDIT	0.002	0.001	3.173	0.002
Comparing management ability, financial crisis, with auditor dependency	MGRABILITYDISTRSDEPENDE	0.002	0.002	1.309	0.192
Inventory and accounts receivable to total assets	INVREC	0.173	0.014	12.220	>0.001**
Return on assets	ROA	0.338-	0.017	-20.151	>0.001**
Loss	LOSS	0.017	0.005	3.660	>0.001**
Financial leverage	LEV	0.122	0.014	9.005	>0.001**
Current assets except for inventory to current debts	QUICK	0.080	0.005	16.367	>0.001**
Sales growth	SGROWTH	0.001	0.004	0.163	0.870
Audit organization	BIG	0.114	0.007	16.199	>0.001**
Tenure	ATENURE	0.001	0.001	1.043	0.298
Unacceptable opinion	AOPINION	0.003	0.004	0.755	0.451
Institutional ownership	INSTO	-0.008	0.015	-0.504	0.615
Coefficient of determination	0.71	F statistic of the model		62.305	
The adjusted coefficient of determination	0.68	The significance level of regression		0.000	

Table 5. Results of model fitting related to research hypotheses (management ability criterion: sales share of the firm from the total market)

Variables	Sign	Regression coefficients	Std. dev.	T statistic	p-value
Fixed value	β	1.072	0.104	10.331	>0.001 **
Management ability (sales share)	MGRABILITY2	-0.427	0.938	-0.455	0.649
Financial crisis	DISTRS	-0.019	0.020	-0.949	0.034
Comparing management ability with the financial crisis	MGRABILITYDISTRS	-68.268	0.140	-1.238	0.216
Firm credit	CREDIT	-0.003	0.003	-1.045	0.296
Audit dependency	DEPENDENT	0.996	0.005	19.536	>0.001 **
Comparing management ability with firm credit	MGRABILITYCREDIT	0.043	0.075	0.581	0.562
Comparing management ability with auditor dependency	MGRABILITYDEPENDENT	0.317	0.080	3.958	>0.001 **
Comparing management ability, financial crisis, with firm credit	MGRABILITYDISTRSCREDIT	3.677	4.642	0.792	0.428
Comparing management ability, financial crisis, with auditor dependency	MGRABILITYDISTRSDEPENDE	11.589	41.157	0.282	0.778
Coefficient of determination	0.41	F statistic of the model		13.632	
The adjusted coefficient of determination	0.32	The significance level of regression		0.000	

Table 6. Results of model fitting related to research hypotheses (management ability criterion: cash)

Variables	Sign	Regression coefficients	Std. dev.	T statistic	p-value
Fixed value	β	0.975	0.063	15.507	>0.001**
Management ability (cash)	MGRABILITY3	1.216	0.307	3.961	>0.001**
Financial crisis	DISTRS	-0.043	0.015	-2.968	0.003
Comparing management ability with the financial crisis	MGRABILITYDISTRS	1.559	1.176	1.326	0.186
Firm credit	CREDIT	-0.002	0.002	0.943	0.346
Audit dependency	DEPENDENT	0.998	0.003	31.288	>0.001**
Comparing management ability with firm credit	MGRABILITYCREDIT	-0.088	0.027	-3.314	0.001
Comparing management ability with auditor dependency	MGRABILITYDEPENDENT	0.095	0.045	2.123	0.034
Comparing management ability, financial crisis, with firm credit	MGRABILITYDISTRSCREDIT	-0.066	0.083	-0.803	0.422
Comparing management ability, financial crisis, with auditor dependency	MGRABILITYDISTRSDEPENDE	-0.062	0.316	-0.197	0.844
Coefficient of determination	0.31	F statistic of the model		51.93	
The adjusted coefficient of determination	0.29	The significance level of regression		0.000	

Given the reported results in Table 6, the variables of management ability, auditor dependency, and comparing management ability with auditor dependency have a positive and significant relationship with the audit fee. On the other hand, the financial crisis variables, comparing management ability, and firm credit have a negative and significant relationship with the audit fee.

4. Conclusion and discussion

Three criteria are used and examined for calculating the variable of management ability. The statistical results show that the financial crisis has a negative impact on the relationship between management ability (criterion for computing firm size) and audit fee. Given the obtained results from statistical analyses, the financial crisis has a reduction effect on the relationship between audit fee and firm size. This means larger

firms benefit from a more reduction effect on the financial crisis. Besides, results indicate that the financial crisis does not affect the relationship between cash and sales share and audit fee. Further, the financial crisis directly correlates with firm credit on the relationship between management ability and audit fees.

Auditors determine their payment by estimating the employer's amount of risk and asking for a higher audit fee from employers with risk-taking managers (Chen et al., 2015). The present study results show that the audit fee will enhance by increasing the management ability and that such a result conforms with Krishnan and Wang's (2015) study. They declare that there is a significant relationship between management ability and audit fees. The study results indicate the declining effect of the financial crisis on this relationship, reducing managers' risk-taking power in critical conditions. Among other reasons, we can refer to management weakness as one of the principal reasons for the financial crisis (Grinin and Johnson, 1996; Gitman, 1998; Lessenberg et al., 2006; Newton, 2010), underestimation of auditors, and suggesting lower fees. According to this paper's results, we recommend the investors and other users of financial statements to mind the amount of audit fee since this figure indicates some of the estimations and behavioral recognitions of managers of that firm. In this paper, the results indicate the negative effect of firm credit on the relationship between management ability (criterion for cash calculation) and audit fee. The obtained results suggest that firm credit has a reduction effect on the relationship between cash and audit fee: the more renowned the firm, the less the relationship between these two variables. However, the relationship between firm size and sales share and audit fee is independent of firm credit. One of the factors that have the highest risk for firms is the cash holding by firms. Firms that hold more cash, on the one hand, have the chance of optimal investments for increasing the interests of shareholders and, on the other hand, pave the way for the opportunistic behavior of managers. Hence, auditors make more attempts to prevent probable lawsuit damages and consequently ask for higher fees. The results of this paper are indicative of a positive and significant association between cash and audit fee. Firms with sufficient credit are expected to hold less cash and not exploit the firm credit as a tool in their deals, so the amount of auditor attempt will be lower, and less audit fee would be inquired.

The statistical analysis results also show that auditor dependency directly impacts the relationship between management ability (criterion for calculating sales share and cash) and audit fee. Auditor dependency has a positive effect on audit fees, which means the more the auditor's dependency on audit fees, the stronger the relationship between cash and firm sales and vice versa. Firm size and audit fee have a relationship independent of auditor dependency and audit fee. On the other hand, results show that financial crisis conditions have no role in auditor dependency on the relationship between management ability and audit fee.

There have been some challenges and obstacles, out of control of the researcher, in conducting the study. The followings are some of the limitations of the study:

As for the payable fees to the auditor, all firms do not disclose separately, and this problem would lead to the reduction of the number of sample firms,

Auditors’ fees are disclosed entirely by the firms, so the presented audit fees in this paper include the sum of paid fees to auditors, involving accommodation, hosting, etc.

References

Agarwal, S. Chomsisengphet, S. Liu, C. and Rhee, S. G. (2007). Earnings management behaviors under different economic environments: evidence from Japanese banks. *International Review of Economics and Finance*, 16 (3), 429–443. https://doi.org/10.1016/j.iref.2005.08.003

Andreou, P. Ehrlich, D. and Louca, C. (2016). The Impact of Managerial Ability on Crisis Period Corporate Investment. *Journal of Business Research*, 79,107-122. https://doi.org/10.1016/j.jbusres.2017.05.022

Andreou, P. Ehrlich, D. and Louca, C. (2013). Managerial ability and Firm performance. Evidence from the global financial crisis. *SSRN Electronic Journal*, DOI: 10.2139/ssrn.2633216

Asthana, S. and Boone, J. (2012). Abnormal audit fee and audit quality. Auditing: A *Journal of Practice & Theory*, 31 (3), 1–22. https://doi.org/10.2308/ajpt-10294

Ayers, B.C. Jiang, J.X. and Yeung, P.E. (2006). Discretionary accruals and earnings management: an analysis of pseudo earnings targets. *Accounting Review. 81* (3), 617–652. https://doi.org/10.2308/accr.2006.81.3.617

Bamber, L. Jiang, J. and Wang, I. (2010). What's my style? The influence of top managers on voluntary corporate financial disclosure. *The Accounting Review, 85* (4),1131–1162. Doi:10.2308/accr.2010.85.4.1131

Beaver, W.H. (1966). Financial ratios as predictors of failure. *Journal of Accounting Research*, 4, 71-111. https://doi.org/10.2307/2490171

Bedard, J.C. and Johnstone, K.M. (2001). Earnings manipulation risk, corporate governance risk, and auditors' planning and pricing decisions. *The Accounting Review 79* (2), 277-304. https://www.jstor.org/stable/3203245

Bentley, K.A. Omer, T.C. and Sharp, N.Y. (2013). Business strategy, financial reporting irregularities, and audit effort. *Contemporary Accounting Research*, 30(2), 780-817. https://doi.org/10.1111/j.1911-3846.2012.01174.x

Bills, K.L. Lisic, L.L. and Seidel, T.A. (2015). *Do auditors respond to management uncertainty? Evidence from audit fees*. http://www.ssrn.com.

Blankley, A.I. Hurtt, D.N. and MacGregor, J.E. (2012). Abnormal audit fees and restatements Auditing. *A Journal of Practice & Theory*, 31 (1), 79–96. https://doi.org/10.2308/ajpt-10210

Carcello, J. Hermanson, T. Neal, L. and Riley, R. (2002). Board characteristics and audit fees. *Contemporary Accounting Research, 19* (3), 365-384. https://doi.org/10.1506/CHWK-GMQ0-MLKE-K03V

Chen, Y. Gul, F. Veeraraghavan, M. and Zolotoy, L. (2015). Executive equity risk-taking incentives and audit service pricing. *The Accounting Review*, 90(6), 2205-2234. https://doi.org/10.2308/accr-51046

Choi, J.H. Kim, J.B. and Zang, Y. (2010). Do Abnormally High Audit Fees Impair Audit Quality?. *Auditing A Journal of Practice & Theory*, 29 (2), 73-97. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1586306

COSO. (2013). *Internal Control – Integrated Framework. Executive summary*. www.coso.org.

Demerjian, P. Lev, B. Lewis, M. and MacVay, S. (2012). Quantifying managerial ability: A new measure and validity test. *Management Science*, 58(7), 7884-7892. https://doi.org/10.1287/mnsc.1110.1487

Demerjian, P. Lev, B. Lewis, M. and MacVay, S. (2013). Managerial ability and Earnings quality. *The Accounting Review*, 88(2), 463-498. https://www.jstor.org/stable/23525943

Duellman, S. Hurwitz, H. and Sun, Y. (2015). Managerial Overconfidence and Audit Fees. *Journal of Contemporary Accounting & Economics*, 11(2), 148-165. https://doi.org/10.1016/j.jcae.2015.05.001

Dyreng, S. Hanlon, M. and Maydew, E. (2010). The effects of executives on corporate tax avoidance. *The Accounting Review*, 85 (4), 1163–1189. doi:10.2308/accr.2010.85.4.1163

Ferdinand, A.G. Khedmati, M. Edwin, K. Yang, L. and Navissi, F. (2018). Managerial Ability, Financial Distress, and Audit Fees. *ACCOUNTING HORIZONSAmerican Accounting Association*, 32(1), DOI: 10.2308/acch-51888. pp. 29–51.

Francis, J.R. (1984). The effect of audit firm size on audit prices: A study of the Australian market. *Journal of Accounting and Economics*, 6(2), 133-151. https://doi.org/10.1016/0165-4101(84)90010-7

Francis, J.R. Reichelt, K. and Wang, D. (2005). The pricing of national and city-specific reputations for industry expertise in the U.S. audit market. *The Accounting Review*, 80(1), 113–136. https://www.jstor.org/stable/4093163

Ghosh, A. kallapur, S. and Moon, D. (2005). Audit and Non-Audit fees and Capital Market perceptions of Auditor Independence. *Journal of Accounting and Public Policy*, 28(5), 369-385. https://doi.org/10.1016/j.jaccpubpol.2009.07.001

Greening, D.W. and Johnson, R.A. (1996). Do managers and strategies matter? A study in crisis. *Journal of Management Studies*, 33(1), 25-51. https://doi.org/10.1111/j.1467-6486.1996.tb00797.x

Hay, D.C. Knechel, W.R. and Wong, N. (2006). Audit Fees: A Meta-Analysis of the Effect of Supply and Demand Attributes. *Contemporary Accounting Research*, 23(1), 141–191. https://doi.org/10.1506/4XR4-KT5V-E8CN-91GX

Hnifeh, M. and Mahmoodi, S. (2009). Audit risk and its components. *The Auditor Journal*, 47, 54-59. (In Persian)

Hoag, M.L. Hollingsworth, C.W. (2011). An intertemporal analysis of audit fees and section 404 material weaknesses. *A Journal of Practice & Theory*, 30(2), 173-200. https://doi.org/10.2308/ajpt-50005

Huang X, and Sun L. (2017). *Managerial ability and real earnings management*. Adv Account, 39, 91–104. https://doi.org/10.1016/j.adiac.2017.08.003

Jantadej, P. (2006). *Using the combination of cash flow component to predict financial distress*. Summary of doctoral dissertation. Graduate college. The University of Nebraska.

Johnson, E. Kuhn, J. Apostolou, B. and Hassell, J. (2013). Auditor Perceptions of Client Narcissism as a Fraud Attitude Risk Factor. Auditing: *A Journal of Practice & Theory*, 32(1), 203–219. https://doi.org/10.2308/ajpt-50329

Kannan, Y. Skantz, T.R. and Higgs, J.L. (2014). The Impact of CEO and CFO Equity Incentives on Audit Scope and Perceived Risk as Revealed through Audit Fees. Auditing: A *Journal of Practice and Theory*, 33 (2), 111-139. Doi: 10.2308/ajpt-50666

Karim, W.A. (2010). *Audit Pricing, Audit Concentration and BiG4 Premium in Bangladesh. Available at SSRN:* https://ssrn.com/abstract=1613454

Kim, Y. Li, H., and Li, S. (2014). *CEO Equity Incentives and Audit Fees*. Contemporary Accounting Research, Forthcoming. *Available at SSRN* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2378477

Kinney, W.R. and Libby, R. (2002). Discussion of the Relation between Auditors' Fees for Non audit Services and Earnings Management. *The Accounting Review*, 77, 107-114. https://www.jstor.org/stable/3203327

Kizirian, T. Mayhew, B. and L. Sneathen. (2005). the Impact of Management Integrity on Audit Planning and Evidence. Auditing: *A Journal of Practice & Theory*, 24(2), 49–67. https://doi.org/10.2308/aud.2005.24.2.49

Krishnan, V.G. and Wang, C. (2015). The Relation between Managerial Ability and Audit Fees and Going Concern Opinions. *Auditing: A Journal of Practice & Theory*, 34(3), 139–160. https://doi.org/10.2308/ajpt-50985

Latridis, G. and Kadorinis, G. (2009). Earnings management and firm financial motives: a financial investigation of UK listed firms. *International Review of Financial*

Analysis. 18 (4), pp.164–173. https://doi.org/10.1016/j.irfa.2009.06.001

Lauck, J.R. Rakestraw, J.R. Stein, S.E. (2014). The effect of executives on the pricing of audit services. *Working Paper*, Virginia Tech University.

Li, Q. Wang, H. and Rong, X. (2013). Firm earnings persistence over the business cycle: evidence from listed companies in China. *China Accounting and Finance Review*, 15 (4), 166–203. Doi: 10.7603/s40570-013-0011-x

Palmrose, Z.V. (1986). Audit fees and auditor size: Further evidence. *Journal of Accounting Research*, 24(1), 97-110. https://doi.org/10.2307/2490806

Pastena, V. and Ruland, W. (1986).The Merger/ Bankruptcy Alternative. *The Accounting Review*, 64(1), 288-301. https://doi.org/10.2307/253913

Persakis, A. and Iatdidis, G.E. (2015). Earnings quality under financial crisis: A global empirical investigation. *Journal of Multinational Financial Management*, 30, 1-35.

Santanu M. Bikki, J. and Al-Hayale, T. (2018). Managerial overconfidence, ability, firm governance and audit fees. *Rev Quant Finance Acc*. https://doi.org/10.1007/s11156-018-0728-3.

Simunic, D. (1980). The Pricing of Audit Services*:* Theory and Evidence. *Journal of Accounting Research*, 18(1), 161–190. https://doi.org/10.2307/2490397

Strobl, G. (2013). Earnings manipulation and the cost of capital. *Journal of Accounting Research*. 51 (2), 449–473. https://doi.org/10.1111/1475-679X.12008

Xingze, W. (2012). Corporate governance and audit fees: Evidence from companies listed on the Shanghai stock exchange. *China Journal of Accounting Research*, 5(4), 321-342. https://doi.org/10.1016/j.cjar.2012.10.001

Yuan, G.S. Troshani, I. and Tarca, A. (2019). Managerial ownership, audit firm size, and audit fees*:* Australian evidence. *Journal of International Accounting, Auditing and Taxation*, 35, 18–36. https://doi.org/10.1016/j.intaccaudtax.2019.05.002

Appendix:

The method for measuring the variables of the study:

LnAF: natural logarithm of audit fees

MGR ABILITY: several items assigned to this variable

Firm size, 2- market share of the firm, 3- firm cash

DISTRS: 0 and 1 Variable that according to the presented bankruptcy model of Ohelson et al. (1980), the chance of bankruptcy of the firm is at least 50% 1, otherwise, 0.

Equation (1)

$P' = (1/1 + e^{-¥^{\wedge}}) *¥^{\wedge} = -1.32 - 0.407 * SIZE + 6.03 * TLTA - 1.43 * WCTA + 0.0757 * CLCA - 2.37 * NITA - 1.83 * FUTL + 0.285 * INTWO - 1.72 * OENEG - 0.521 * CHIN$

Credit: this variable is the firm credit index calculated by the firm's three-year sales standard deviation.

DEPENDETN: auditor dependence on the employer, which is measured through abnormal audit fees.

The abnormal audit fee is calculated from the residual of the following regression model. To calculate the residual of the audit fees, following Zigia and Zi (2017), the presented regression model of Francis and Wang (2005) is used as follows:

Model (2)

$$LAF = \beta_0 + \beta_1 LTA + \beta_2 CATA + \beta_3 QUICK + \beta_4 LEV + \beta_5 ROA + \beta_6 LAGOP + \beta_7 LOSS + \beta_8 SPECIALIST + \beta_9 BIG + \beta_{10} SWITCH + \varepsilon$$

Ln SIZE: natural logarithm of total firm assets in the year understudy

INVREC: total inventory and accounts receivable to total assets

ROA: net profit to total assets

LOSS: if the firm is losing 1, otherwise, 0

LEV: total liabilities to total assets

QUICK: current assets expect inventory to current debts

SGROWTH: percentage of changes in sales of the current year to that of the previous year

BIG: if the audit organization is the auditor of the firm 1 and if audit firms are the auditor 0

ATENURE: firm auditor tenure

AOPINION: if auditor opinion is not acceptable 1, otherwise, 0

INSTO: percentage of share held by institutional owners

SIZE: logarithm of total assets

TLTA: logarithm of total debts to total assets

WCTA: working capital divided by total assets

CLCA: current debts divided by current assets

NITA: net profit divided by total assets

FUTL: operational cash divided by total assets

INTWO: if the firm is losing in two consecutive years 1, otherwise, 0

OENEG: 1 if the total debts of the firm are more than total assets; otherwise, 0

CHIN: the difference between the net profit of the current year and that of the previous year divided by the absolute value of this difference

LTA: natural logarithm of total assets in the year understudy

CATA: current assets to total assets ratio

LEV: total debts to total assets

ROA: net profit to total assets ratio

LAGOP: if the firm has received conditional opinion in the previous year 1 and the case received acceptable report 0. Other types of audit reports are eliminated from the sample

SPECIALIST: 1 if the firm auditor in the year under study is among rank A firms; otherwise, 0

SWITCH: if the firm has changed the auditor in the year under study 1, otherwise, 0.

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.39257
Research Article

The Impact of Intangible Assets and Intellectual Capital on Audit Risk

Hosein Mohammadzadeh*

Department of Accounting, Imam Reza International University, Mashhad, Iran

Abstract

The present study is concerned about the impact of intangible assets and intellectual capital on audit risk and fees in listed firms on the Tehran Stock Exchange.

Regression estimation with panel data method is used to estimate the model. This study's statistical sample comprises 128 listed firms on the Tehran Stock Exchange during 2012-2017.

The study results show a positive and significant relationship between the firm's audit fee and intangible assets ratio. The relationship between audit fees and intellectual capital is negative and significant. Moreover, results indicate that a positive relationship exists between audit fee and intangible assets ratio for firms with a high market rate to book value ratio. A positive and significant relationship is evident between audit risk and intangible assets of the firm. Finally, a negative and significant relationship is also found between audit risk and intellectual capital.

The current study may fill the gap in the study, and the study results give direct insight to policymakers.

Keywords: Intellectual Capital, Intangible Assets, Audit Risk

***Corresponding Author**: Department of Accounting, Email: h.mohammadzade64@yahoo.com

1. Introduction

The emergence of the new knowledge-based economy has gained interest in the studies related to intellectual capital. In today's business world, commercial organizations, and firms, in addition to tangible assets, require intangible assets because they are among the main elements of success in every organization. Undoubtedly, intellectual capital is among the principal intangible assets of an organization and is considered a valuable tool for developing an organization's main assets. Intellectual capital originated from science and knowledge and played a significant role in organizations' success. It is the primary productive factor and the most important competitive advantage (Mark & Michel, 2007). In general, firm properties are divided into two groups of tangible assets and intangible assets. Intangible assets are the most critical assets of a firm. The main issue is measuring intangible assets' effectiveness, usually not available in balance sheets and financial statements (Ukiwe, 2011). The market value of firms is generally more than their book value. This occurs because the value of intellectual capital and intangible assets is not reflected totally in balance sheets, leading to the deterioration of information's value and effectiveness. Since most intangible assets are created inside the organization, and firms frequently use unofficial mechanisms such as marketing and confidential transactions to support their ideas, they cannot report such assets in their balance sheets (Salehi et al., 2020). On the other hand, it seems that firms are not generally willing to disclose more information about intangible assets and intellectual capital because this disclosure can affect their competitive advantage, the result of which is that the level of optional disclosure of such properties by firms is low at international level (Pulic, 2003). Hence, the presence of intangible assets would cause the creation of information asymmetry. Gunn et al. (2017) express that higher information asymmetry would lead to higher audit risk. Given the facts mentioned earlier, the question here is: "Is there a significant relationship between intangible assets, intellectual capital, and audit risk or not?". Hence, the present study's main objective is to assess the impact of intangible assets and intellectual capital on audit risk.

2. Theoretical principles, literature review, and hypothesis development

2.1. Intellectual capital

There are different definitions of intellectual capital in different resources. However, a factor that all authors reach a consensus about is that intellectual capital is a type of knowledge that create competitive advantage and shows the intangible value of an organization (Martín-de Castro et al., 2019); however, there is no single definition of the term and no transparent combination between theoretical aspect and practical application of intellectual capital. Most opinion leaders classify intellectual capital into three groups: customer capital, human capital, and structural capital (Xu and Li, 2019). Some of the definitions of intellectual capital are as follows:

Intellectual capital is a combination of four major components of market properties, human properties, spiritual ownership properties, and infrastructure properties (Dunmore, 2006). Intellectual capital is the organization's knowledge, staff, and capabilities to create value-added and lead to a frequent competitive advantage (Runi, 2007).

Intellectual capital is defined as applied information and knowledge for operating to achieve a value (Axtel, 2013).

Intellectual capital is the source of future profits (value) generated by innovation, unique designs of an organization, and human resources (Mark & Michel, 2007; Salehi et al., 2020).

Estvart (1997) classified intellectual capital components into human capital, structural capital, and customer capital. In this classification, human capital is, in fact, the staff of an organization that is the main property of an organization. He referred to the applied

knowledge in information technology and are authorities, and commercial designs and marks by structural capital. By customer capital, he referred to information related to the market for attracting and preserving customers. To some extent, this classification is similar to the primary classification of Bontis (1998) (Jones, 2013).

2.2. Intangible assets

Accounting standard No. 17 defined intangible assets as a discernable nonmonetary property with no objective nature. Intangible assets are those assets that their very nature is no physical. Intangible assets (including brand, intellectual ownership, ideas, business method) are different from monetary and physical properties (like property, vehicles, instruments, securities, and cash). Presently, a considerable proportion of organizational properties are intangible assets that the traditional accounting methods cannot measure. Intangible assets indicate a set of potentialities of an organization that applies as a resource for sustainable competitive advantage, growth, and economic development. In the 1980s, tangible assets account for about 80% of U.S firms' market value (Dunmore, 2006). Along with the knowledge-based economy's dominance, tangible assets' significance declined potentially, and intangible assets gained interest instead. Intangible assets illustrate future growth and profitability opportunities that can increase the firm's market value and be a criterion for major competencies and qualifications and competitive advantage that elucidates the gap between market value and the firm's book value (Han and Han, 2004). Lev (2001) defines intangible assets as a claim for future economic interests with no physical and financial nature. Marr and Schiuma (2001) consider intangible assets a set of knowledge properties that create a chance for an organization's competitive position by creating value-added for main shareholders. Such properties include human capital, relational capital, cultural capital, and intellectual ownership properties.

2.3. Audit risk

One of the main processes in auditing is to determine audit risk. Audit risk means a risk that involves a significant deviation in financial statements, and the auditor did not consciously modify his/her opinion about that. Or in other words, a risk probability that an auditor is unconsciously unable to modify his/her opinion about financial statements with significant error. Risk-based auditing has been the pioneer of a fight against corruption. Correct and scheduled evaluation of risk is the cornerstone of risk-based auditing (Khorwatt, 2008). Audit risk evaluation by auditors can contribute directly to auditing effectiveness and efficiency. The process of evaluating this risk, as the pivotal framework, enhances the audit quality and the effectiveness of total auditing and leads to an essential change in auditing operations (Bell et al., 2005). Risk analysis affects the nature, scheduling, and content of audit policies.

In the main stage of audit planning, inappropriate evaluation of audit risk may result in incorrect and inefficient distribution of resources or ineffective auditing outcomes. Hence, risk analysis in auditing is a crucial function (Leung & Harding, 2008). Decision-making theorists point that even the analysts have difficulties in risk analysis because there is a difference between perceived risk, actual risk, and objective risk and realized risks enjoy from an objective judgmental element (Imoniana & Gartner, 2007). Moreover, a series of complicated qualitative factors affect the audit risk, and auditors cannot keep in mind the relations and mutual interactions. Most of the studies are uncertain about the professional judgment capacity of auditors and declare that professional judgment is under the influence of training and experience of auditors that relies on other complicated temporal issues and is considerably different from person to person and is even under the influence of personality characteristics of auditor and his/her psychological problems,

like optimism and pessimism (Choi, 2008). Different types of audit risk include Alpha type risk (rejecting incorrect) and Beta type risk (accepting incorrect) (Mark & Michel, 2007). Audit risk components also involve intrinsic risk, control risk, and no exploratory risk.

2.4. The relationship between intangible assets and intellectual capital and audit risk

One of the main processes in auditing is to determine the audit risk. Audit risk means a significant risk significant deviation exists in financial statements, and the auditor is not conscious of modifying his opinion about that. In other words, it is a risk probability that the auditor is unconsciously not able to modify his opinion about financial statements with significant error (Lari Dashtbayaz et al., 2020). Risk-based auditing has been the pioneer of a fight against corruption. Correct and scheduled evaluation of risk is the cornerstone of risk-based auditing (Khorwatt, 2008). Audit risk evaluation by auditors can contribute directly to auditing effectiveness and efficiency. The process of evaluating this risk, as the pivotal framework, enhances the audit quality and the effectiveness of total auditing and leads to an essential change in auditing operations (Bell et al., 2005). Risk analysis affects the nature, scheduling, and content of audit policies. In the main stage of audit planning, inappropriate evaluation of audit risk may result in incorrect and inefficient distribution of resources or ineffective auditing outcomes. Hence, risk analysis in auditing is a key function (Leung & Harding, 2008). According to Bontis and Hulland (2002), intellectual capital is knowledge storage in an organization at specific times. In this definition, the relationship between intellectual capital and organizational learning is significant (Choi, 2008). Lavson and Wang (2005) showed a negative relationship between audit fee and profit sustainability in firms with higher stock profit, and paying dividends will cause the decline of a positive relationship between earnings management and audit cost. Moreover, their study results show that auditors receive a lower fee from those firms that pay higher stock profit than firms with lower stock profit. Abdul-Aziz & Nadal (2016) show a negative relationship between internal auditors' budgets and audit fees. A study on the impact of audit partners on audit pricing and audit quality of the U.S., Zimreman & Negi (2016) indicates that experienced audit partners with female gender are more successful in interactions for receiving payment in initial auditing in smaller markets. Hence, reputation (experience) and female gender have a considerable impact on audit fees. However, no significant association was evident in the results between partner experience and gender and audit quality. Within a study entitled "the significance of information asymmetry for selecting auditor, audit costs, and opinion stability: evidence of exploiting external changes in covering analysts," Gun et al. (2017) attempted to figure out whether information asymmetry contributes to three major aspects of the audit process. The study results reveal that information asymmetry, with a higher (lower) chance, would lead to firm demand for high (low)-quality audits. This means that information asymmetry instigates the demand for high-quality audits. Information asymmetry would lead to higher audit costs. That is to say. Worse information asymmetry is an audit risk. Viswanatan (2017) carried out a study on intangible assets in the balance sheet and audit costs to assess the way auditors analyze those intangible assets recorded in the balance sheets. This study was carried out using a sample of COMPUSTAT firms during 2010-2015. The results show that auditors ask for higher fees from firms with a higher proportion of intangible assets. Liu et al. (2017) conducted a study on the impact of human capital on the relationship between the firm's export and innovation to assess human capital's effects, like managers and the best staff on the relationship between firm innovation and export. This study indicates that, firstly, export increases the firm innovation considerably, and secondly, different types of human capital show frequent effects and different mediation. More specifically, retired managers play a determining

and mediatory role in the relationship between export and innovation, while well-educated employees have negative moderating and mutual impacts. Della Torre et al. (2018) carried out a study on workforce erosion, human capital interruption, and organizational performance in different technological areas in 1911 productive Italian firms. They discovered that regardless of organization technology's intensity, negative voluntary turnover contributes to the relationship between human capital and work efficiency. In contrast, no voluntary turnover increases the relationship between human capital and work efficiency and is even more effective in organizations with more condensed technological operations. Debrah et al. (2018) analyzed the relationship between human capital, innovation, and international competition in southern African countries. They figured out that the long-term outlook of Africa relies on the development of human capital. South African countries' sustainability in the world relies on education and work training in the World Market Skills Center. Mthanti and Ojah (2018) carried out a study on firms, human capital, and entrepreneurship orientation: the consequences of growth policies at a macro level in 93 countries during 1980-2008. This study shows that human capital relation is at an appropriate level in different levels of economic development. Akhtardin et al. (2018) assessed the impact of internal control weakness and investment opportunities on audit fees in 194 listed firms on the American Stock Exchange. They revealed a positive and significant relationship between internal control weakness and investment opportunities and audit fees. Regarding the above-said facts, research hypotheses are as follows:

H_1: There is a significant relationship between intangible assets and audit risk.

H_2: There is a significant relationship between intellectual capital and audit risk.

3. Research methodology

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

3.1. Population understudy

The statistical population of this paper is limited to the firms that:

Their financial information is available;

1- Are not affiliated with financial firms (e.g., banks, financial institutions), investment companies or intermediaries; and,
2- Are active during the period of the study.

Hence, the study period includes 5 consecutive years from 2012 to 2016 for listed firms on the Tehran Stock Exchange.

Concerning these limitations, a number of 129 firms were selected for testing the hypotheses of the study.

3.2. Data collection method

The required data of the study are collected based on their types from different resources. The information related to the study's literature and theoretical facts were gathered from library resources, including Persian and Latin books and journals, and Internet websites. The information related to firms (balance sheets and profit and loss statements) is used as the research instrument.

The primary and raw information and data for hypothesis testing were collected using the information bank of Tehran Stock Exchange, including Tadbir Pardaz and Rah Avard-

e Novin, and also the published reports of Tehran Stock Exchange via direct access (by analyzing the released reports in Codal Website and manually collected data) to CDs and also by referring to rdis.ir website and other necessary resources.

3.3. Data analysis method

The data analysis method is cross-sectional and year-by-year (panel data). In this paper, the multivariate linear regression model is used for hypothesis testing. Descriptive and inferential statistical methods are used for analyzing the obtained data. Hence, the frequency distribution table is used for describing data. At the inferential level, the F-Limer, Hausman test, normality test, and multivariate linear regression model are used for hypothesis testing.

3.4. Research model

The following multivariate regression model is used for hypothesis testing:

Model (1)

$$A.Risk_{i,t} = \beta_1 Intang_{i,t} + \beta_2 Big1_{i,t} + \beta_3 Ln\ Asset_{i,t} + \beta_4 Lev_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Ln\ Vers_{i,t} + \beta_7 Loss_{i,t} + \beta_8 New\ Audit_{i,t} + \varepsilon_{i,t}$$

Model (2)

$$A.Risk_{i,t} = \beta_1 VAIC_{i,t} + \beta_2 Big1_{i,t} + \beta_3 Ln\ Asset_{i,t} + \beta_4 Lev_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Ln\ Vers_{i,t} + \beta_7 Loss_{i,t} + \beta_8 New\ Audit_{i,t} + \varepsilon_{i,t}$$

Where

Intangible assets in the balance sheet (Intange): in this paper, intangible assets are computed by dividing the balance sheet into the firm's total assets. Visvanatan (2017) declared in his study that this ratio could be calculated via reported intangible assets in the balance sheet divided by total assets and/or reported goodwill in the balance sheet divided by total assets or intangible assets, except the reported goodwill in the balance sheet divided by total assets.

Intellectual capital (VAIC): it is a group of knowledge properties specific to an organization that is considered the organization's characteristics and leads significantly to enhancing the organization's competitive status by increasing value to key shareholders of that organization. Pulic presented value-added to intellectual capital efficiency to measure the intellectual capital of firms. Pulic believed that intellectual capital consists of three main components interacting with each other for value creation (Pulic, 2004). The Pulic model is used to calculate and measure intellectual capital. To calculate the intellectual capital, first, the value-added of the firm should be computed via the following formula:

VA = Out – IN = OP + EC + D + A

Where

VA: value-added

OUT: outputs

In: inputs

OP: operational earnings

EC: employee costs

D: depreciation of tangible assets

A: depreciation of intangible assets

After calculating the value-added of the firm, intellectual capital is computed via the following formula, where intellectual capital is divided into three components:

VAIC = VAHC + VACE + STVA

Where

VAHC: value-added of human capital

VACE: value-added of applied capital

STVA: value-added of structural capital

Each component of intellectual capital is calculated as follows:

Value-added of human capital:

$$\text{VAHC} = \frac{\text{VA}}{\text{HC}}$$

Where

VAHC: value-added of human capital

VA: value-added

HC: total expenditure of firm employees

Value-added to physical capital applied:

$$\text{VACE} = \frac{\text{VA}}{\text{CE}}$$

Where

VACE: value-added of capital applied

VA: value-added

CE: book value of net tangible assets

The book value of net tangible assets is computed by subtracting total assets from tangible assets

Added-value of structural capital

$$\text{STVA} = \frac{\text{SC}}{\text{VA}}$$

$$\text{SC} = \text{VA} - \text{HC}$$

STVA: added value of structural capital

SC: structural capital

VA: value-added

HC: total expenditure of firm employees

Structural capital is computed by subtracting value-added from total employee costs.

A.Risk: audit risk which is equal to total accounts receivable and good inventory divided by total assets;

Big1: if the audit firm is an audit organization or Mofid Rahbar 1, otherwise, 0;

Lnasset: natural logarithm of firm assets;

Roa: the return of assets which is equal to net profit divided by total assets of the firm;

Lev: financial leverage, which is equal to total debts divided by total assets of the firm;

Lnvers: natural logarithm of firm inventory;

Mtb: book to the market value of equity;

Loss: firm loss which is equal to 1 if the firm under study is losing, otherwise, 0;

New audit: if the auditor is changed within the year under study 1, otherwise, 0.

4. Data analysis

4.1. Descriptive statistics

This section is concerned with the descriptive analysis of research data and presents descriptive statistics for research variables. Descriptive statistics include a set of methods for collecting, summarizing, classifying, and describing numerical facts. Descriptive statistics indices presented in the Table include mean median, maximum, minimum, standard deviation, and Jarque-Bera Test. The main central index expresses the equilibrium and center of gravity, which is an appropriate index for showing data centrality. Standard deviation is one of the most important dispersion parameters and a criterion for the range of dispersion of observations from the mean. One of the main functions of descriptive statistics Table is judging data normality or abnormality. Jarque-Bera is a general test. Regarding the following Table, some variables of the study are

normal, and some are abnormal.

Table 1. Descriptive statistics of quantitative variables

Sing	Variable	No. of observation	Total mean	Standard deviation	Minimum	Maximum
LnAuditFee	Audit fee logarithm	706	7.6050	1.8619	3.2453	14.3905
AuditRisk	Audit risk	768	0.0691	0.1052	0.000	0.9979
Intange	Intangible assets ratio	768	0.2613	0.1796	0.000	0.8619
LnAsset	Assets logarithm	768	14.2469	1.5265	10.5330	19.3743
LEV	Financial leverage	768	0.6113	0.2636	0.0902	4.0027
ROA	Return on assets	767	0.0912	0.5835	-12.2733	2.6182
LnVars	Inventory logarithm	768	0.2418	0.1409	0.000	0.8836
Vaic	Intellectual capital	768	1.5529	0.2893	-0.8400	5.6022
MTB	Market to book value	767	3.3270	8.3363	-114.4768	103.1528

Note: research database

Table 2. Descriptive statistics of qualitative variables

Sing	Variable	No. of observation	Total mean	Standard deviation	Number of 1	No.
LnAuditFee	Large auditor	768	0.2982	0.4578	229	539
AuditRisk	Dummy variable for loss	768	0.1328	0.3396	102	666
Intange	Dummy variable for initial auditors	768	0.3464	0.4761	266	502

4.2. Unit root test

By evaluating all variables' unit-roots, they are at no unit root level (stationary). The obtained LM statistic for each variable is reported in Table 3.

F-Limer test

To estimate the pattern, we should first analyze using the F test whether the data are pooled or panel. This test's null hypothesis expresses that data are pooled, and hypothesis 1 declares that data are panel. After performing the F test, H0 is rejected. The question is that based on which models of fixed effects or random effects does the model is analyzable, determined by the Hausman test. Regarding the pooled test results reported in Table 4, the null hypothesis concerning the pooled data is ejected for both models at 99%. Hence, the model with panel data should be used for estimating the coefficients of these five models.

Table 3. The results of the Hadri unit root test

Variable	Level	Variable	Level
LnAuditFee	0.1785	LnVars	0.1861
AuditRisk	0.9220	Vaic	0.2235
Intange	0.9998	MTB	0.6540
LnAsset	0.2805	Big1	0.8749
LEV	0.7760	Loss	0.2303
ROA	0.3895	NewAudit	0.8965

Note: the null hypothesis is the absence of unit root in variables. LM statistic is reported.
Resource: research findings

Table 4. F-Limer test

	Calculated statistic	p-value
Model 1	4.43	0.0000***
Model 2	5.94	0.0011***

Note: *** is a significant level of 99%; resource: research findings

Hausman test

Table 5 illustrates the results of this test. In this Table, the Hausman test statistic, based on estimation for models 1 and 2, is equal to 57.38 and 25.96, which is larger than χ^2 the table's value, so the null hypothesis is rejected. Hence, the model with fixed effects is more appropriate.

Table 5. Hausman test

	Calculated statistic	p-value
Model 1	57.38	0.0000***
Model 2	25.96	0.0011***

Note: *** is a significant level of 99%; resource: research findings

4.3. Inferential statistics

Model one estimation

The regression equation of model one is as follows:

Model (1)

$$Audit\ Risk_{i,t} = \beta_1 Intang_{i,t} + \beta_2 Big1_{i,t} + \beta_3 Ln\ Asset_{i,t} + \beta_4 Lev_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Ln\ Vers_{i,t} + \beta_7 Loss_{i,t} + \beta_8 New\ Audit_{i,t} + \varepsilon_{i,t}$$

Regarding the estimated regression, the intercept of this model is not significant. In contrast, the impact of intangible assets variables, financial leverage, return on assets, inventory logarithm, and a dummy variable for firm loss on audit risk is positive and significant because its p-value is equal to 0.001, smaller than the significance level of 0.05 with a positive coefficient of 0.1283 which shows that there is a positive and significant relationship between these two variables. In contrast, the effect of variables of assets logarithm, dummy variable of large audit, and the initial auditor's dummy variable on audit risk is negative and significant. It is worth mentioning that the descriptive power of the model is 21.38 %.

Table 6. The results of model one estimation

Variable	Coefficient	Standard deviation	T statistic	p-value
Constant	0.1680	0.0612	2.75	0.006
Vaic	-0.0641	0.0172	-3.72	0.000
Big1	-0.0100	0.0044	2.25	0.025
LnAsset	-0.0116	0.0048	-2.44	0.015
LEV	0.1070	0.0144	7.42	0.000
ROA	0.0044	0.0010	4.49	0.000
LnVars	-0.0033	0.0010	-3.24	0.002
LOSS	0.1100	0.0340	3.24	0.002
NewAudit	-0.0087	0.0043	-2.04	0.041
Number of obs.	767			
Adj. R - squared	14.12			

Resource: research findings

Model two estimation

The regression equation of model two is as follows:

Model (2)

$$Audit\ Risk_{i,t} = \beta_1 VAIC_{i,t} + \beta_2 Big1_{i,t} + \beta_3 Ln\ Asset_{i,t} + \beta_4 Lev_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Ln\ Vers_{i,t} + \beta_7 Loss_{i,t} + \beta_8 New\ Audit_{i,t} + \varepsilon_{i,t}$$

In model 2, the variable of intellectual capital is an independent variable. The results of the estimation of this model are depicted in Table 7.

Table 7. The results of model two estimation

Variable	Coefficient	Standard deviation	T statistic	p-value
Constant	0.1680	0.0612	2.75	0.006
Vaic	-0.0641	0.0172	-3.72	0.000
Big1	-0.0100	0.0044	2.35	0.025
LnAsset	-0.0116	0.0048	-2.44	0.015
LEV	0.1070	0.0144	7.42	0.000
ROA	0.0044	0.0010	4.49	0.000
LnVars	-0.0033	0.0010	-3.24	0.002
LOSS	0.1100	0.0340	3.24	0.002
NewAudit	-0.0087	0.0043	-2.04	0.041
Number of obs.	767			
Adj. R - squared	14.12			

Resource: research findings

Regarding the estimated regression, an intercept of this model is 0.1680, which 99% significant. In contrast, the impact of financial leverage variables, return of assets, and virtual variable of firm loss on audit risk is positive and significant. This is while the effect of intellectual capital variables, intangible assets ratio, assets logarithm, inventory logarithm, dummy variable of large audit, and dummy variable of the initial auditor on audit risk is negative and significant. The second hypothesis of the study states that a significant relationship between intellectual capital and audit risk is accepted. This type of relationship is negative. Its p-value is 0.000, smaller than the significance level of 0.05 with a negative coefficient of 0.064, which shows a negative and significant relationship between intellectual capital and audit risk.

It is worth mentioning that the model's descriptive power is 14.12%, and virtual variables of industry and year were also considered in both models, the coefficients of which are not significant. By comparing the two models, we can say that the first model

has priority over the second one. The first and second model calculated is 0.2138 and 0.1412%, so the first model has more descriptive power than the second one.

5. Conclusion

The present study is concerned about the relationship between intangible assets and audit risk. The results of model testing show that a positive and significant relationship exists between these two variables, which is in line with Zimreman and Negi (2016), Viswanatan (2017), and Akhtardin et al. (2018) because an increase in intangible assets increases the risk of not exploring the auditor which is equal to accepting higher risk from auditor's side. Hence, the auditor asks for a higher fee. Audit fee determines based on the estimated risk of the auditor from an employer, competition in the market, and negotiation between auditor and employer. When planning, the auditor should detect and estimate the risk of significant deviation (including evaluating management qualification, ethical mode of the organization, accounts capabilities, and significant deviation). These factors contribute to the auditor's competency in exploring significant deviations in financial statements, which is considered a significant risk for the audit firm. Auditors usually collect more evidence to lower the risk of not exploring significant deviation. This would cause an increase in audit costs. Such increased cost can be imposed on employers; however, this issue is under the influence of competition limitations in the audit market and bargaining power between auditor and employer (Simonic, 1980).

Moreover, the present study analyzed the relationship between intellectual capital and audit risk. The hypothesis testing results show a negative and significant relationship between intellectual capital and audit risk, which conforms with that of Zimreman and Negi (2016), Viswanatan (2017). Akhtardin et al. (2018) declare a significant association between intellectual capital and intangible assets and audit fees. As mentioned previously, an increase in intellectual capital and intangible assets contributes to an acceptable range of auditors' risks. Since auditing depends on the human workforce, they called "user," the more complicated employers' operation, the higher the need for an experienced and adroit workforce and the higher the workforce's cost. Hence, to supply this cost increase, the auditor asks for higher fees.

Another noteworthy factor in this paper is audit risk. Iranian auditors are negligible about the concept of audit risk when making judgments for determining the fee, which can be due to government dominance over the economy or governmental economy. It can be said that those risks referred to as contributing components to audit risk in related books are not evident in Iran. This occurs due to cultural weakness in responding and asking and the presence of a governmental economy. There is almost no direct beneficiary to reprimand the auditors for their probable errors and negligence. Therefore, we can declare a negative and significant relationship between intellectual capital and intangible assets and audit risk regarding the hypothesis testing. That is to say, audit risk becomes relatively lower, along with an increase in intellectual capital and intangible assets due to the firm's growth.

References

Akhtaruddin, M. and Ohn, J. (2016). Internal control deficiencies, investment opportunities, and audit fees. *International Journal Accounting and Finance,* 6(2),127-144.

Axtel, D. (2013). Three essays on intellectual capital in Mexican SMEs. Thèse de doctorat. Université Laval, Quebec, Canada.

Bell, T.B. Peecher, M.E. and Solomon, I. (2005). The 21st century public company audit: Conceptual elements of KPMG's global audit methodology. *KPMG, LLP,* 8(4),115-

134.

Bontis, N. and Hulland, J. (2002). Managing an Organizational Learning System by Aligning Stocks and Flows. Journal of Management Studies, 39(4), 437-469. https://doi.org/10.1111/1467-6486.t01-1-00299

Choi, C. (2008). A knowledge-based view of cooperative inter organizational relationships. In Cooperative Strategies: European Perspectives, eds. P. Beamish and J. Killing. San Francisco: New Lexington Press.

Debrah, Y. Oseghale, R.O. and Kweku, A. (2018). Human Capital, Innovation and International Competitiveness in Sub-Saharan Africa. Africa's Competitiveness in the Global Economy, 219-248. https://doi.org/10.1007/978-3-319-67014-09

Della Torre, E. Zatzick, Ch.D. Sikora, D. and Solari, L. (2018). Workforce churning, human capital disruption, and organisational performance in different technological contexts. *Human Resource Management Journal*, 28(1), 112-127. https://doi.org/10.1111/1748-8583.12167

Gunn, J.L. Hallman, N. Li, C. and Pittman, J. (2017). The Importance of Information Asymmetry to Auditor Choice, Audit Fees, and Going Concern Opinions: Evidence from Exploiting Exogenous Shifts in Analyst Coverage, *Corporate Governance & Accounting eJournal*, 9(3), 219-241. http://dx.doi.org/10.2139/ssrn.2967125

Han, D. and Han, I. (2004). Prioritization and Selection of Intellectual Capital Measurement Indicators Using Analytic Hierarchy Process for the Mobile Telecommunications Industry. *Expert Systems with Applications*, 26, 519-527. https://doi.org/10.1016/j.eswa.2003.10.010

Imoniana, J.O. and Gartner, I.R. (2007). Towards a Multi-Criteria Approach to Corporate Auditing Risk Assessment in Brazilian Context. *SSRN Electronic Journal*, 8(5), 232-261. DOI: 10.2139/ssrn.1095950

Jones, G. (2013). *Knowledge management in education*. Enhancing learning & education, ISBN: 978-0749434953

Khorwatt, E. (2008). Audit Risk Assessment –the Professional Balancing Act. *Monthly Electronic Bulletin of ASCA*, 3(4), 85-112.

Lari Dashtbayaz, M., Salehi, M., Mirzaei, A. and Nazaridavaji, H. (2020), "The impact of corporate governance on intellectual capitals efficiency in Iran", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 13 No. 4, pp. 749-766. https://doi.org/10.1108/IMEFM-11-2017-0291

Lawson, B. and Wang, D. (2015). The Earnings Quality Information Content of Dividend Policies and Audit Pricing. *Contemporary Accounting Research*, 8(3), 206-235. https://doi.org/10.1111/1911-3846.12179

Leung, E. and Harding, N. (2008). The impact of differences in ambiguity tolerance on accounting standard interpretation: implications and responses. *Afro-Asian Journal of Finance and Accounting*, 1(2), 162-179. DOI: 10.1504/AAJFA.2008.021073

Lev, B. and Gu, F. (2016). *The end of accounting and the path forward for investors and managers*. Hoboken: Wiley Finance. ISBN: 978-1-119-19109-4

Liu, G. Pang, L. and Kong, D. (2017). Effects of human capital on the relationship between export and firm innovation. *Chinese Management Studies*, 11(2), 322-345, https://doi.org/10.1108/CMS-01-2017-0020

Marr, B. and Schiuma, G. (2001). *Measuring and Managing Intellectual Capital and Knowledge Assets in Vew Economy Organizations. in Bourne, M. (Ed.).* Handbook of Performance Measurement, Gee, London, UK. ISBN: 978-1-119-19109-4

Martín-de Castro, G. Díez-Vial, I. and Delgado-Verde, M. (2019). Intellectual capital and the firm: evolution and research trends. *Journal of Intellectual Capital*, 20(4), 555-580. https://doi.org/10.1108/JIC-12-2018-0221

Mthanti, T. and Ojah, K. (2018). Institutions, human capital and entrepreneurial

orientation: implications for growth policy. *Journal of Entrepreneurship and Public Policy*, 7(2), 135-160, https://doi.org/10.1108/JEPP-D-18-00002

Porter, M.E. Kramer, M.R. and Michael, P.E. (2007). Strategy and Society: The Link between Competitive Advantage and Corporate Social Responsibility. *Harvard Business Review*, 84(12), 78–92.

Pulic, A. (2004). Intellectual capital: Does it create or Destroy value?. *Measuring Business Excellence*, 8(1), 62-68. https://doi.org/10.1108/13683040410524757

Runi, R.S. (2007). *Operations Management, 3rd ed*. Upper Saddle River, New Jersey: Prentice Hall Inc, ISBN: 978-0134337623

Stewart, T.A. (1997). Intellectual Capital: The New Wealth of organizations. *Doubleday, New York*, 9(4), 315-346. ISBN-13: 978-0385483810

Ukiwe, A. (2011). The joint impact of brand value and advertising on corporate financial performance and on stock return: A case study of the computer industry. *Retrieved from Proquest digital dissertations database*, 8(2), 212-244. ISBN: 978-1243631848

Visvanathan, G. (2017). Intangible assets on the balance sheet and audit fees. *International Journal of Disclosure and Governance*, 14(3), 241–250. https://doi.org/10.1057/s41310-017-0023-x

Xu, J. and Li, J. (2019). The impact of intellectual capital on SMEs' performance in China. *Journal of Intellectual Capital*, 20(4), 488-509. https://doi.org/10.1108/JIC-04-2018-0074 Salehi, M., Ahmadzadeh, S. and Irvani Qale Sorkh, F. (2020), "The impact of intellectual capital and related party transactions on contractual costs", *International Journal of Productivity and Performance Management*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/IJPPM-03-2020-0088

Zimmerman, A.B. and Nagy, A.L. (2016). Audit Partner Effects on Audit Pricing and Audit Quality in the United States. *Available at SSRN*: http://dx.doi.org/10.2139/ssrn.2825357.

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.39258
Research Article

The Relationship between Corporate Governance and Volatility of Profit and Loss Components

Maryam Seifzadeh*

Department of Accounting, Hormozgan University, Hormozgan, Iran

Abstract

The present study is concerned about the relationship between corporate governance and the volatility of profit and loss components in companies listed on the Tehran Stock Exchange.

This paper's statistical population includes 129 listed companies on the Tehran Stock Exchange during 2012-2017. For testing the study's hypotheses, the multivariate linear regression is used based on the panel data.

The study's findings show no significant relationship between institutional shareholders' ownership percentage and profit volatility and loss. Moreover, the results indicate a negative and significant relationship between the percentage of major shareholders and volatility of profit and loss. The study's findings suggest a positive and significant relationship between board independence, financial expertise, and CEO education, and volatility of profit and loss.

This paper fills the gap by presenting logical reasoning and empirical evidence on the Tehran Stock Exchange and further develops the conducted studies on corporate governance.

Keywords: Corporate Governance, Net Profit, Volatility of Profit, Loss Components.

* ***Corresponding Author***: Department of Accounting, Email: salehimahdi_ir@yahoo.com

1. Introduction

Earnings forecast by the management provides some information about the firm future. One of the factors that should be considered in the earnings forecast is earnings volatility. Sometimes, the managers' earnings smoothness prevents high earnings volatilities, so we can say that earnings volatility is one of the useful resources of earnings forecast (Hundal, 2013).

Corporate governance is an essential part of the operational setting for running a business firm. The studies on corporate governance created contradictory evidence. Some irregularities can be solved by launching a reliable and effective evaluation system in the firm (Seifzadeh et al., 2020). In the broad sense, corporate governance refers to decision-making processes and structures in the organizational framework, aiming to balance managers' and other beneficiaries' behaviors. Corporate governance is a prerequisite for monitoring the firm's management, separating the economic firm from the owner, and finally preserving investors' and other beneficiaries' rights (Salehi et al., 2020a). When corporate governance is appropriate, we expect managers' behavior to align with shareholders' interests. In other words, corporate governance leads to the decline of profit and loss volatilities (Yau Man Ze-To, 2017).

Corporate governance encompasses various aspects of the firm, including the board structure, ownership structure, control, institutional shareholders' presence (Lari Dashtbayaz et al., 2020), compensation plans for managers and employees, capital structure, market competition, product competition, etc. Hence, based on the criteria above, different indices will be created for corporate governance. These indices include about 20-100 criteria from corporate governance mechanisms and depend on each country's economic, social, and cultural context. For example, the indices that covered most of the mechanisms of corporate governance in Europe and England were created by Bauer et al. (2004), Drobetz et al. (2004) in Germany, and Compers et al. (2010) in the U.S. These indices are used for measuring the rank of corporate governance. In this study, the topic of corporate governance is considered by using seven major factors of institutional shareholders' ownership percentage, major shareholders' ownership percentage, the percentage of unbounded members of the board, CEO duality, CEO education, CEO financial expertise, and CEO industry specialization(Salehi et al., 2020b) and this study aims to realize whether the external factors can lower the range of instability (volatility) of profit and loss components or not, for which two main theories of information asymmetry and agency theory have been used (Diallo, 2017).

The mechanisms of corporate governance, including institutional shareholders' ownership percentage, major shareholders' ownership percentage, the percentage of unbounded members of the board, CEO duality, CEO education, and CEO financial expertise, contribute significantly to eliminating information asymmetry the agency costs.

An appropriate corporate governance system can help the firms gain investors' trust and encourage them to invest (Black et al., 2006). According to the conducted empirical studies, the effective incorporation of this system's principles would enhance financial performance (reduce the firm's performance volatility) and increase the firm value. Moreover, corporate governance provides a framework to ensure the financial suppliers will earn an attractive return on their investment (Sloan, 2001). On the other hand, corporate governance can contribute to the firm through supervisory mechanisms and motivational incentives. Further, effective corporate governance can control and decrease managers' self-interest behavior, which leads to the transfer of wealth toward them.

On the other hand, given the influential corporate governance, we can create managers' required motivation to maximize the firm value toward shareholders' interests. Hence, these scholars claim that an effective corporate governance system would enhance the information transparency and lower the information asymmetry, and this would

strengthen the efficiency of the capital market, such that it is expected from earnings volatility and decreased loss to cause the creation of an attractive and safe market for new investors. They also declare that a corporate governance system provides excellent profitable opportunities for the existing investors and would lead to the development of liquidity, market depth, price transparency, and productivity and social welfare (Mama, 2018). Thus, according to the facts above, the present study attempts to assess the relationship between corporate governance and the volatility of profit and loss components. In other words, this study tries to figure out whether corporate governance quality contributes to the volatility of profit and loss components or not. Studies on corporate governance and instability (volatility) of profit and loss components are vital for three reasons: 1. There are limited studies in this field, 2. The instability (volatility) of profit and loss components in Iran is generally high due to adverse economic conditions and the recession of Iranian industries (which are exacerbated by Western countries' economic sanctions). Hence, firms seek to increase corporate governance quality to minimize the instability (volatility) of their profit and loss components, and 3. Understanding the contributing factors to the instability (volatility) of profit and loss components maintains shareholders' interests. It causes the firm's growth and flourishment and finally increases the profitability and satisfaction of shareholders. Hence, limited studies are conducted in Iran to identify the contributing factors to the instability (volatility) of profit and loss components.

2. Theoretical issues

2.1. Corporate governance

Corporate governance is a set of responsibilities and methods applied by the board and bounded managers to determine the strategic path to ensure the objectives, risk control, and wise consumption of resources (Chung and Hsiang, 2007). Corporate governance is not related to the firm's operation but about managing the economic firm, supervising, and controlling executive managers' behavior and responsiveness to all beneficiaries. Corporate governance has various structures, and different criteria can be used for its measurement. This study has considered the topic of corporate governance by using seven major factors of ownership percentage of institutional shareholders, the ownership percentage of major shareholders, the percentage of unbound board members, CEO duality, CEO education, CEO financial expertise, and CEO industry specialization (Duppati et al., 2017).

2.2. Net profit

Accounting profit measures a business firm's performance and indicates business activities and the manner of value creation by economic firms. Net profit in business is the input or earnings of an institute during an accounting period, which is calculated by subtracting the operational costs and tax on income. To put it simply, if the firm's operational costs and tax are subtracted from a certain period, for example, a fiscal year, the calculated figure indicates the firm's net profit from that firm's income. The positivity or negativity of this figure is directly associated with firm performance. Moreover, net profit's positivity would lead to the growth of stock value and finally, the equity.

2.3. Profit and loss volatility

Higher volatility occurs with a higher risk, and it is under the influence of various factors. On the other hand, there is a strong relationship between earnings volatility and future earnings predictability. The earnings predictability is one of the qualitative and time-series characteristics of the earnings. It is defined as the capability of current profits in predicting future long-term and short-term profits. The economic and accounting

factors are among those elements that influence the relationship between volatility and earnings predictability (Brzel and Dang, 2008).

3. Hypothesis development

Earnings volatility is one of the time-series features of earnings quality under the influence of various factors. Higher volatility would lead to a higher risk. Two main reasons for earnings volatility are economic factors, including the fluctuations of the currency rate, the changes that come from the reassessment of properties, changes that occurred due to bank facilities' rate, and firms' accounting methods in the economic setting. One contributing factor to the amount of volatility of profit and loss components is the corporate governance structure. Corporate governance is a supervisory process to ensure that the firm manager is working in line with shareholders' interests (Eika et al., 2014). The mechanisms of corporate governance are classified into two groups outside the organization and inside the organization. Those mechanisms inside the organization refer to institutional shareholders, ownership of major shareholders, the board independence, CEO duality, the education of the board members, financial expertise of the board members, CEO education, CEO financial expertise, and the like and mechanisms outside the organization include all rules, regulations, and requirements the organization must apply in its operation and structure, like those rules related to the financial structure of the firm and manner of management compensation and incentives (Azibi et al., 2011). We predict that an appropriate corporate governance system will increase information transparency, lower the information asymmetry, and enhance capital market efficiency. We expect decreased earnings instability and loss and an attractive and reliable market for new investors. The corporate governance system's presence provides some useful profitability opportunities for existing investors. It would lead to the growth of liquidity, market depth, price transparency, and finally, productivity and social welfare enhancement (Mama, 2018). Hence, the following studies are carried out in this field:

Bealsey (2010) declares that the board's independence and the audit committee's perseverance (number of sessions) positively and significantly affect the audit fee. Dhaliwal et al. (2016) point out that concentrated ownership and the board composition for management supervision are two suitable alternatives for one another and also concluded that there is a relationship between the board composition (CEO independence and duality) and audit fee. Azibi et al. (2011) perceived that the board size, foreign managers, and the average age of managers and CEO duality have a negative effect on the performance. This occurs while the number of committee members and the type of auditor has a positive effect. Brzel and Dang (2008) argue that there is no significant relationship between most corporate governance system variables and audit fees. There is a negative and significant relationship between audit committee independence and audit fee. Bathala et al. (2015) posit that corporate governance is weaker for firms that disclose individuals' transactions, including selling or buying properties, goods, and services. Chung and Hsiang (2007) declare that corporate governance will enhance and increase research and development investment. Gupta et al. (2018) discovered that countries with strong corporate governance have a lower capital cost. These results reveal that establishing a corporate governance system would lead to financial development. Paniagua et al. (2018) state a positive and significant relationship between corporate governance and financial performance. This study's findings show that board independence positively impacts the relationship between corporate governance and financial performance. Kieschnick and Moussawi (2018) argue that there is no relationship between firm age and firm governance. The findings of this study show a positive relationship between firm age and debt ratio. Lqbal et al. (2019) demonstrate that a strong corporate governance system will enhance financial performance. Given the facts

above, the hypotheses of the study are as follows:

H_1: There is a significant relationship between the ownership percentage of institutional shareholders and the volatility of profit and loss statements.

H_2: There is a significant relationship between the ownership percentage of major shareholders and volatility of profit and loss.

H_3: there is a significant relationship between board independence and volatility of profit and loss statement.

H_4: There is a significant relationship between CEO duality and volatility of profit and loss statement.

H_5: There is a significant relationship between CEO education and volatility of profit and loss statement.

H_6: There is a significant relationship between CEO financial expertise and volatility of profit and loss statement.

H_7: There is a significant relationship between CEO industry specialization and volatility of profit and loss statement.

4. Research methodology

4.1. The population under study

The present study's statistical population is all listed firms on the Tehran Stock Exchange during 2012-2017.

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

1. The financial yearend of the firms should be set on March 20, and firms should have no change in their financial period;
2. Firms should be active constantly during the period of the study, and their shares should be transacted (no more than 6 months of transaction halt is accepted);
3. Firms should present the required financial information during the period of the study; and,
4. Firms should not be affiliated with investment companies, banks, insurance, and financial intermediaries.

The required primary and raw information and data for hypothesis testing were collected using the databank related to the Tehran Stock Exchange, including Tadbir Pardaz and Rah Avard-e Novin and also the published reports of Tehran Stock Exchange via direct access (by analyzing the disclosed reports in the Codal Website and then manual collection) to the CDs provided by the Tehran Stock Exchange and also the information of rdis.ir website and other necessary resources.

4.2. Data analysis method

In this paper, the multivariate linear regression method is used for testing the hypotheses. Descriptive and inferential statistical methods are used for data analysis. Such that frequency distribution is used for describing the data, and at the inferential level, to test the research hypotheses, F-Limer, Hausman, normality, and multivariate linear regression tests were employed.

4.3. Research model

In this study, according to the study of Duppati et al. (2017), the following multivariate linear regression model is used based on the panel data:

Model (1)

$$SANI_{TA_{it}} = \beta_0 + \beta_1 INS_{it} + \beta_2 MAJ_{it} + \beta_3 Indepent_{it} + \beta_4 Duality_{it} + \beta_5 CEOEducation_{it} + \beta_6 CEOExpertise_{it} + \beta_7 CEOIndustry_{it} + \beta_8 MTB_{it} + \beta_9 ROA_{it} + \beta_{10} CFO_{it} + \beta_{11} LEV_{it} + \beta_{12} SIZE_{it} + \beta_{13} AGE_{it} + \beta_{14} Restatment_{it} + \beta_{15} ROT_{it} + \beta_{16} BoardChange_{it} + \beta_{17} MT_{it} + \beta_{18} Binter_{it} + \beta_{19} BCO_{it} + \beta_{20} B.OWNER_{it} + \varepsilon_{it}$$

Where the operational definition of variables is as follows:

Dependent variable and its calculation method

1- Profit and loss volatility ($SDNI\_TA_{it}$): in this paper, the standard deviation of net profit to mean total properties within the 5 previous years is used as the criterion for measuring volatility or instability of net profit (Barbedo et al., 2007).
2- Independent variable and its calculation method
3- Ownership percentage of institutional shareholders (INS_{it}): is the ownership percentage of shares available to institutional shareholders, including investment companies, banks, leasing, retirement funds (Guvenen et al., 2014).
4- Ownership percentage of major shareholders (MAJ_{it}): is total ownerships more than 10 percent of the firm i in the year t (Duppati et al., 2017). In Iran, there is no special necessity for the disclosure of major ownerships. However, based on Declaration 131 of the Board of Financial Accounting Standards, if the ownership percentage of a shareholder is 10 percent or more of a total 10 percent of the structure firm ownership, these owners will be named the major shareholders (controllers).
5- The board independence ($independen_t$): the board independence is equal to the number of unbounded members of the board to total board members of the board of the firm i in the year t (Zafar et al., 2014).
6- CEO duality of the firm ($Duality_{it}$): a virtual variable that if the firm manager is the director of the board (duality will be created) 1, otherwise, 0 will be assigned (Chen et al., 2010).
7- CEO education ($CEOEducation_{it}$): a dummy variable that if the CEO has a master's, Ph.D., or higher degree 1; otherwise, 0 will be assigned (Duppati et al., 2017).
8- CEO financial expertise ($CEOExpertise_{it}$): a dummy variable if the CEO has a degree in accounting or finance 1; otherwise, 0 will be assigned (Gupta et al., 2018).
9- CEO industry specialization ($CEOIndustry_{it}$): a dummy variable that if the firm CEO has a specialization in industry 1, otherwise, 0 will be assigned.

Control variable and its calculation method

Firm growth (MTBit): is equal to the market value to book value of equity and growth measurement criterion of the firm.

Return on assets (ROA_{it}): is a variable for performance measurement, which is equal to net profit to the market value of assets (market value of assets is equal to book value of debts plus the market value of equity) (Sloan, 2001).

Operational cash flow (CFO_{it}): is equal to operational cash flow to book value of assets.

Financial leverage (LEV_{it}): is equal to the book value of debts to the book value of assets (Duppati et al., 2017).

Firm size ($SIZE_{it}$): is equal to the natural logarithm of the book value of firm assets (Selik et al., 2012).

Firm age (AGE_{it}): is equal to the natural logarithm of firm age from the establishment date.

Financial restatement ($Restatement_{it}$): is a virtual variable that if the firm i in the year t restated its financial statements 1; otherwise, 0 will be assigned.

Return on equity (ROT_{it}): is equal to net profit to book value of equity.

Change in the board members ($BoardChange_{it}$): is a virtual variable that if in the firm i in the year t at least one of the members has changed 1; otherwise, 0 will be assigned

(Duppati et al., 2017).

CEO tenure (MT_{it}): is equal to the number of years the CEO is the manager of the firm i.

Membership in the board of other firms ($Binter_{it}$): is a virtual variable that if at least one of the board members is at the same the member of another firm 1; otherwise, 0 will be assigned. Information related to this variable will be extracted from the firm's activity report (Mama, 2018).

Board compensation (BCO_{it}): is equal to the board compensation to net sales. Compensation is extracted from the assembly report (Diallo, 2017).

Stock ownership of the board ($B.OWNER_{it}$): is equal to the ownership percentage of stock available to the board members (Huang et al., 2016).

5. Results and analysis

5.1. Descriptive statistics

The results of the descriptive statistics of research variables are depicted in Table 1. Mean is the most significant central index, which shows the balance point and center of gravity of distribution and is an appropriate index for showing the centrality of data. The mean of the variable of ownership percentage of institutional shareholders is almost 0.601. The median is 0.723, minimum 0.000, and maximum 0.990 with a standard deviation of about 0.334. This suggests that the range of institutional ownership in the firms under study is almost 60%. The mean of the major ownership percentage variable is almost 0.687, median 0.741, minimum 0.000, and maximum 0.981 with a standard deviation of about 0.222. This shows that the range of major ownership (more than 10%) in the study firms is 68%. The percentage of unbounded board members is almost 0.732, median 0.800, with a minimum of about 0 and a maximum of 1 with a standard deviation of about 0.172, which shows that the number of unbounded is about 73%, total board members.

Table 1. Descriptive statistics of quantitative variables of the study

Variable	Mean	Median	Std. dev.	Min.	Max.
The volatility of profit and loss (SDNI_Tait)	0.762	0.115	1.573	0.001	6.050
Ownership percentage of institutional shareholders (INSit)	0.601	0.723	0.334	0.000	0.990
Ownership percentage of major shareholders (MAJit)	0.687	0.741	0.222	0.000	0.981
The board independence (Independentit)	0.732	0.800	0.172	0.000	1.000
Firm growth(MTBit)	3.443	2.840	2.066	0.978	8.501
Return on assets(ROAit)	0.183	0.067	0.236	-0.148	0.590
Operational cash flow to property (CFOit)	0.129	0.125	0.168	-0.710	0.923
Financial leverage (LEVit)	0.593	0.597	0.197	0.144	0.934
Firm size (SIZEit)	14.200	13.882	1.517	10.532	19.149
Firm age (AGEit)	6.038	7.238	1.713	2.639	7.240
Return on equity (ROTit)	0.272	0.258	0.253	-0.223	0.694
CEO tenure (MTit)	3.345	2.000	2.586	1.000	13.000
Managerial compensation to net profit (BCOit)	0.001	0.0005	0.003	0.000	0.066
Ownership percentage of the board stock (BOWNERit)	0.214	0.012	0.287	0.000	0.954

According to Table 1, the mean market value to book value of equity is about 3.443, and its median is about 2.840. The amount of standard deviation is 2.066, the minimum and maximum values are 0.978 and 8.501, respectively. This indicates that the amount of market value of equity is, on average, about 2.4 times more than the book value. The mean of the variable of return of assets is about 0.183, with a median of about 0.067. The standard deviation value is 0.236, the minimum and maximum values are -0.148 and

0.590, respectively. The mean of the variable of operational cash flow to book value of assets is about 0.129, with a median of about 0.125. Its standard deviation is about 0.168 with minimum and maximum values of -0.710 and 0.923. This indicates that the amount of firms' operational cash is about 95% of the book value of assets on average.

According to Table 1, the mean managerial compensation to sales is about 0.001, with a median of about 0.0005. Its standard deviation is 0.003, and the minimum and maximum values are 0 and 0.066, respectively. This shows that the amount of managerial compensation is, on average, about 1% of net profit. The mean of the variable of ownership percentage of the CEO is about 0.214, with a median of about 0.012. Its standard deviation is 0.287, the minimum and maximum values are 0 and 0.954, respectively, so the range of managerial ownership in the firm is about 21%.

Table 2. Descriptive statistics of qualitative variables of the study

Variable	Condition	Absolute frequency	Frequency percentage
CEO duality (Dualityit)	**1 = with duality**	159	25%
	0 = with no duality	486	75%
	Total	645	100%
CEO education (CEOEducation)	**1 = with education**	277	63%
	0 = with no education	368	57%
	Total	645	100%
CEO financial expertise (CEOExpertise)	**1 = with financial expertise**	147	77%
	0 = with no financial expertise	495	23%
	Total	645	100%
CEO industry specialization	**1 = with specialization**	239	27%
	0 = with no specialization	406	63%
	Total	645	100%
Financial restatement (Restatementit)	**1 = with restatement**	531	82%
	0 = with no restatement	114	18%
	Total	645	100%
Change in board members (BoardChangeit)	**1 = with change**	186	29%
	0 = with no change	459	71%
	Total	645	10%
Membership in the board of other firms (Binterit)	**1 = with members**	177	27%
	0 = with no members	468	73%
	Total	645	100%

Table 2 shows the results of the qualitative variables. The percentage of relative frequency for the variable of CEO duality is about 75%. This is indicative of the presence of CEO duality in 75% of firms under study. Moreover, the percentage of relative frequency for the variable of CEO education is about 63%, which shows about 63% of managers in the firms under study have a master's degree or higher. The percentage of relative frequency for the variable of CEO specialization is about 77%, which shows about 77% of managers in the firms under study have a finance certificate.

5.2. Inferential statistics

The appropriate model is selected among simple linear regression, simple linear regression with the time factor, fixed effects panel method, random effects panel method, pooled data panel method, adjusted regression (EGLS). After model fitting, the estimated coefficients and their significance will be reported.

Unit root test (variables durability)

In time-series data, some tests like Dicky-Fuller and adjusted Dicky-Fuller will be used for analyzing the durability of variables (unit root test). However, as for the panel data, such tests cannot be used for analyzing the durability of variables, but a kind of cumulative durability of variables should be examined. Hence, the tests of Im, Pesaran,

and Shin should be used. According to this test, the level of significance should be less than 5%. In this paper, model (1), which is presented in section 3, will be used to test the research hypotheses. As shown in Table 4, the level of significance and related t statistic to the study variables indicates the research variables' durability.

Table 3. The results of the test of Im, Pesaran, and Shin

Variable	T statistic	Sig.
SDNI_Tait	-6.6408	0.0000
INSit	-7.4701	0.0000
MAJit	-10.093	0.0000
Indepentit	-12.849	0.0000
Dualityit	-12.188	0.0000
CEOEducationit	-10.464	0.0000
CEOExpertiseit	-12.252	0.0000
CEOIndustryit	-10.362	0.0000
MTBit	-13.876	0.0000
ROAit	-9.3108	0.0000
CFOit	-13.335	0.0000
LEVit	-10.929	0.0000
SIZEit	-7.8284	0.0000
AGEit	-2.7747	0.0000
Restatmentit	-16.768	0.0000
ROTit	-15.161	0.0000
BoardChangeit	-26.765	0.0000
MTit	-13.341	0.0000
Binterit	-15.667	0.0000
BCOit	-14.694	0.0000
B.OWNERit	-12.405	0.0000

5.3. Analyzing the autocorrelation of research variables

The panel method should be examined for using the panel methods of the basic hypothesis. The condition for using the panel method is that the model residuals have not autocorrelation.

Table 4. Breusch-Godfrey test

Null hypothesis (H0)	Chi-square statistic	P-value	Result
Serial autocorrelation does not exist	1.851	0.224	H0 is accepted, and H1 is rejected

Provided that the model residuals have autocorrelation, the panel method cannot be used, and the adjusted panel method should be employed. The adjusted panel methods have no basic hypothesis, and the R^2 coefficient will not be reported for them. The Breusch-Godfrey test is used for examining the autocorrelation of model errors, the null hypothesis of which indicates that there is no autocorrelation among model errors, and there is an autocorrelation among errors in the opposite hypothesis. The results of this test are depicted in Table 4, which shows that there is no autocorrelation problem in the research model.

Test of collinearity of research variables

Table 5. The result of the collinearity test among variables using the VIF test

Variable	VIF
INSit	2.025366
MAJit	1.634802
Indepentit	1.102096
Dualityit	1.056701
CEOEducationit	1.143841
CEOExpertiseit	1.169176
CEOIndustryit	1.357756
MTBit	1.271993
ROAit	2.349639
CFOit	1.342081

LEVit	1.825078
SIZEit	1.929391
AGEit	1.156083
Restatmentit	1.066910
ROTit	1.532211
BoardChangeit	1.551879
MTit	1.786334
Binterit	1.080074
BCOit	1.235277
B.OWNERit	1.200789

Practical experiences show that if the variance inflation factor (VIF) is larger than 5, a probable risk exists. If it is larger than 10, serious risk should be considered, and this shows the regression coefficients were not estimated rigidly due to multivariate collinearity. When the dispersion is close to 0, there is a high multi-linearity correlation, and the standard deviation of the regression is inflated. Table 5 illustrates the results of the variance inflation factor for the research models. As can be seen, the variance inflation factor of all variables is less than 5. It shows no collinearity problem, so this classic regression hypothesis (lack of collinearity among independent variables of the study) is accepted.

Variance heterogeneity test

One of the tests for examining the variance heterogeneity is the White test. According to the results of Table 6, since the level of significance is less than 5%, there is variance heterogeneity. The adjusted regression method should be used in the research model to solve the problem of variance heterogeneity. This method is also used in this paper.

Table 6. The results of the White test

Null hypothesis (H0)	F statistic	Level of significance	Result
Serial autocorrelation does not exist	3.604	0.000	H1 is accepted, and H0 is rejected. So there is no variance heterogeneity

F-Limer (Chow) and Hausman test

The F-Limer test shows that at a 5% error level, between panel regression method and pooling method, the pooling regression method should be used (p<001.0)

Table 7. F-Limer test

Null hypothesis (H0)	F statistic	Level of significance	Result
Panel method is prioritized to the pooling method	384.16	0.000	H0 is rejected. (pooling method is better)

Now, the most appropriate model should be selected between fixed effects and random-effects models. If the significance level is less than 5%, the fixed effects method, and if it is more than 5%, the random effects method is prioritized.

Table 8. Hausman test

Null hypothesis (H0)	F statistic	Level of significance	Result
Use of panel with random effects is prioritized to the fixed effects method	23.304	0.000	H0 is rejected. (fixed effects method is better)

Provided that in the Hausman test (Table 8), the significance level is less than 5%, the

fixed effects method is prioritized. Given the obtained results from the Hausman test, since the level of significance is less than 5%, the panel with fixed effects is more appropriate for the model of the study.

5.4. Analyzing the results of the hypotheses of the study

Table 9. The results of the research hypothesis

$SDNI\_TA_{it} = \beta_0 + \beta_1 INS_{it} + \beta_2 MAJ_{it} + \beta_3 Indepent_{it} + \beta_4 Duality_{it} + \beta_5 CEOEducation_{it} + \beta_6 CEOExpertise_{it} + \beta_7 CEOIndustry_{it} + \beta_8 MTB_{it} + \beta_9 ROA_{it} + \beta_{10} CFO_{it} + \beta_{11} LEV_{it} + \beta_{12} SIZE_{it} + \beta_{13} AGE_{it} + \beta_{14} Restatment_{it} + \beta_{15} ROT_{it} + \beta_{16} BoardChange_{it} + \beta_{17} MT_{it} + \beta_{18} Binter_{it} + \beta_{19} BCO_{it} + \beta_{20} B.OWNER_{it} + \varepsilon_{it}$

Dependent variable: volatility of profit and loss (SDNI_TA)

Variable	Coefficient	Std. dev.	T statistic	Level of significance	VIF
Fixed value	-1.645850	0.187583	-8.774003	0.0000	-
INSit	0.039703	0.033056	1.201088	0.2302	2.025366
MAJ_{it}	-0.207619	0.051930	-3.998027	0.0001	1.634802
$Indepent_{it}$	0.218481	0.050217	4.350761	0.0000	1.102096
$Duality_{it}$	0.028655	0.020484	1.398872	0.1623	1.056701
$CEOEducation_{it}$	0.109777	0.021677	5.064219	0.0000	1.143841
$CEOExpertise_{it}$	0.198141	0.034608	5.725315	0.0000	1.169176
$CEOIndustry_{it}$	0.039251	0.018230	2.153069	0.0317	1.357756
MTB_{it}	0.015191	0.004665	3.256296	0.0012	1.271993
ROA_{it}	1.239581	0.119789	10.34800	0.0000	2.349639
CFO_{it}	0.161218	0.068398	2.357044	0.0187	1.342081
EV_{it}	-0.528377	0.074586	-7.084134	0.0000	1.825078
$SIZE_{it}$	0.130684	0.014380	9.087871	0.0000	1.929391
AGE_{it}	0.016292	0.006258	2.603315	0.0095	1.156083
$Restatment_{it}$	-0.011708	0.017876	-0.654935	0.5128	1.066910
ROT_{it}	-0.230149	0.039217	-5.868551	0.0000	1.532211
$BoardChange_{it}$	0.018601	0.019250	0.966263	0.3343	1.551879
MT_{it}	0.008839	0.004483	1.971592	0.0491	1.786334
$Binter_{it}$	0.020261	0.020443	0.991101	0.3220	1.080074
BCO_{it}	1.073708	1.230503	0.872576	0.3832	1.235277
$B.OWNER_{it}$	-0.042874	0.029743	-1.441469	0.1500	1.200789
The adjusted coefficient of determination	0.368944		F statistic	19.82558	
Durbin-Watson statistic	1.837498		Level of significance	0.000000	

In Table 9, the coefficient of the variable of ownership percentage of institutional shareholders (INSit) is equal to 0.039, and the t statistic is 1.201. Given the significance level (0.230), no observation is evident between independent and dependent variables. This result shows no significant relationship between the ownership percentage of institutional shareholders and the volatility of profit and loss, so the first hypothesis is rejected.

The study's second hypothesis declares a significant relationship between the ownership percentage of major shareholders and volatility of profit and loss. In Table 9, the coefficient of the variable of ownership percentage of major shareholders (MAJit) is equal to -0.207, and the t statistic is -3.998. This result shows a negative and significant relationship between ownership concentration and volatility of profit and loss. In other words, earnings volatility is lower in companies where the range of ownership of more than 10% is higher, so the second hypothesis is accepted negatively.

The study's third hypothesis declares a significant relationship between board

independence and volatility of profit and loss. In Table 9, the coefficient of the variable of board independence (Indepentit) is equal to 0.218. T statistic is 4.350, which is significant at (0.000) level, and since it is less than the prediction error (5%), the significance of the independent variable is confirmed at more than 95% confidence level. This result shows a positive and significant relationship between board independence and volatility of profit and loss. In other words, the volatility of profit and loss components is higher in companies where the number of independent members of the board is higher, so the third hypothesis is accepted positively.

The study's fourth hypothesis declares a significant relationship between CEO duality and volatility of profit and loss. In Table 9, the variable of CEO duality (Dualityit) is equal to 0.109. The t statistic is 1.398 that, given the significance level (0.162), no observation is evident between independent and dependent variables. This result shows no significant relationship between CEO duality and volatility of profit and loss, so the fourth hypothesis is rejected.

The study's fifth hypothesis declares a significant relationship between CEO education and volatility of profit and loss. In Table 9, the coefficient of the variable of CEO education (CEOEducationit) is equal to 0.109. T statistic is 5.064, which is significant at (0.000) level, and since it is less than the prediction error (5%), the significance of the independent variable is confirmed at more than 95% confidence level. This result shows a positive and significant relationship between CEO education and volatility of profit and loss. In other words, the volatility of profit and loss components is higher in companies where the CEO has a master’s degree, so the fifth hypothesis is accepted positively.

The study's sixth hypothesis declares a significant relationship between CEO financial expertise and profit volatility and loss. In Table 9, the coefficient of the variable of CEO financial expertise (CEOExpertiseit) is equal to 0.198, and the t statistic is 5.725, which is significant at (0.000) level. Since it is less than the prediction error (5%), the independent variable's significance is confirmed at more than 95% confidence level. This result shows a positive and significant relationship between CEO financial expertise and volatility of profit and loss. In other words, the volatility of profit and loss components is higher in companies where the CEO has a certificate in finance or accounting, so the sixth hypothesis is accepted positively.

In Table 9, the coefficient of the variable of CEO industry specialization (CEOIndustryit) is equal to 0.039, and the t statistic is 2.53, which is significant at (0.031) level. Since it is less than the prediction error (5%), the independent variable's significance is confirmed at more than 95% confidence level. This result shows a positive and significant relationship between CEO industry specialization and volatility of profit and loss. In other words, the volatility of profit and loss components is higher in companies where the CEO has a specialization in the industry, so the seventh hypothesis is accepted positively.

The results of control variables of the study also show that there is a positive and significant relationship between the variables of firm growth (MTB), return on assets (ROA), operational cash flow (CFO), firm size (SIZE), firm age (AGE), CEO tenure (MT), and volatility of profit and loss (SDNI_TA). Moreover, the results show a negative and significant relationship between financial leverage (LEV) and return on equity (ROT) and profit and loss volatility. The study results show no significant relationship between other control variables and volatility of profit and loss. Besides, the F statistic (Fisher) and the level of significance of (0.000) indicate the model's significance.

6. Conclusion

This paper's findings show no relationship between the firm's institutional shareholders' ownership percentage and the volatility of profit and loss, indicating no

significant relationship between these two variables. This result is in contrast with that of Duppati et al. (2017). Moreover, the present study is concerned about the relationship between the ownership percentage of major shareholders and volatility of profit and loss. This study suggests a negative and significant relationship between ownership concentration and volatility of profit and loss. In other words, earnings volatility is lower in firms with more than 10% of ownership. This finding is in contrast with the results of Duppati et al. (2017).

On the other hand, the present study analyzes the relationship between board independence and profit and loss volatility. The study's findings show a positive and significant relationship between board independence and profit and loss volatility. In other words, the volatility of profit and loss is higher in companies where the number of independent members is higher. This result is in line with that of Duppati et al. (2017). Moreover, the present study assesses the relationship between CEO duality and volatility of profit and loss. The results of hypothesis testing show that there is no significant relationship between these two variables. This result reveals no meaningful relationship between CEO duality and volatility of profit and loss, which contrasts with that of Duppati et al. (2017). This study also evaluates the relationship between CEO education and volatility of profit and loss, showing a positive and significant relationship between CEO education and volatility of profit and loss. In other words, in companies where the CEO has a master's degree, the volatility of profit and loss is higher. This result is in line with that of Duppati et al. (2017). This paper also investigates the relationship between CEO financial expertise and volatility of profit and loss. The hypothesis testing results demonstrate a positive and significant relationship between CEO financial expertise and profit volatility and loss. In other words, in companies where the CEO has a finance or accounting certificate, the volatility of profit and loss is higher. This result conforms with that of Duppati et al. (2017).

On the other hand, this study assesses the relationship between CEO industry specialization and volatility of profit and loss and found a positive and significant relationship between these two variables. In other words, the volatility of profit and loss is higher in firms where the CEO has a specialization in the industry. This finding is in line with that of Duppati et al. (2017).

References

Azibi, J. Tondeur, H. and Rajhi, M. (2011). Auditor choice and institutional investor characteristics after the Enron scandal in the French context. *International Journal of Economics and Accounting*, 2(1), 32-52. https://ideas.repec.org/a/ids/ijecac/v2y2011i1p32-52.html

Barbedo, C.H. Camilo-Da-Silva, E. and Leal, R. (2007). Probability of Information-Based Trading, Intraday Liquidity and Corporate Governance in the Brazilian Stock Market. *Available at SSRN:* https://ssrn.com/abstract=978759

Bathala, C.T. Moon, K.P. and Rao, R.P. (2015). Managerial ownership, debt policy, and the impact of institutional holdings: an agency perspective. *Financial Management*, 23(3), 38–50. DOI: 10.2307/3665620

Bauer, R. Guenster, N., and Otten, R. (2004). Empirical evidence on corporate governance in Europe: the effect on stock returns, firm value and performance. *Journal of Asset Management*, 5(2), 91–104. https://doi.org/10.1057/palgrave.jam.2240131

Black, B. Jang, H. and Kim, W. (2006). Does corporate governance predict firms' market values? *Evidence from Korea*. *The Journal of Law, Economics & Organization*, 22(2), 366-413. https://dx.doi.org/10.1093/jleo/ewj018

Brzel, J.F. and Dang, L. (2008).The effect of ERP system implementations on the

management of earnings and earnings release dates. *Journal of Information Systems*, 22(2), 1-21. https://doi.org/10.2308/jis.2008.22.2.1

Chen, G. Firth, M. N.Gaoa, D. and M.Ruid, O. (2006). Ownership structure, corporate governance, and fraud: evidence from China. *Journal of Corporate Finance*, 12(3), 424- 448. https://doi.org/10.1016/j.jcorpfin.2005.09.002

Chung, H. and Hsiang, L. (2007). Earnings management and corporate governance in Asia's emerging markets. *Corporate Governance An International Review*, 15(5), 15–40. https://dx.doi.org/10.1111/j.1467-8683.2007.00624.x

Dhaliwal, D. Judd, J.S. Serfling, M. and Shaikh, S. (2016). Customer concentration risk and the cost of equity capital. *Journal of Accounting and Economics*, 61(1), 23–48. https://doi.org/10.1016/j.jacceco.2015.03.005

Diallo, D. (2017). Corporate governance, bank concentration, and economic growth. *Emerging Markets Review*, 32, 28-37. https://doi.org/10.1016/j.ememar.2017.05.003

Drobetz, W. Schillhofer, A. Zimmermann, H. (2004). Corporate governance and expected stock returns: Evidence from Germany. *European Financial Management*, 10, 267–293. https://doi.org/10.1111/j.1354-7798.2004.00250.x

Duppati, G. Sune, A. and Samanta, N. (2017). Corporate governance, research and development volatility and firm performance - Evidence from Spain and Ireland. *Cogent Economics & Finance*, 5(1), https://doi.org/10.1080/23322039.2017.1317117

Gupta, K. Krishnamurti, CH. Tourani-Rad, A. (2018). Financial development, corporate governance and cost of equity capital. *Journal of Contemporary Accounting & Economics*, 14(1), 65-82. https://doi.org/10.1016/j.jcae.2018.02.001

Huang, H. Lobo, G. Wang, C. and Xie, H. (2016). Customer concentration and corporate tax avoidance. *Journal of Banking and Finance*, 72, 184–200. https://doi.org/10.1016/j.jbankfin.2016.07.018

Kieschnick, R. and Moussawi, R. (2018). Firm age, corporate governance, and capital structure choices. *Journal of Corporate Finance*, 48, 597-614. https://doi.org/10.1016/j.jcorpfin.2017.12.011

Lari Dashtbayaz, M., Salehi, M., Mirzaei, A. and Nazaridavaji, H. (2020), "The impact of corporate governance on intellectual capitals efficiency in Iran", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 13 No. 4, pp. 749-766. https://doi.org/10.1108/IMEFM-11-2017-0291

Lqbal, S. Nawaz, A. and Ehsan, S. (2019). Financial performance and corporate governance in microfinance: Evidence from Asia. *Journal of Asian Economics*, 60, 1-13. https://doi.org/10.1016/j.asieco.2018.10.002

Mama, H.B. (2018). Innovative efficiency and stock returns: Should we care about nonlinearity?. *Finance Research Letters*, 24, 81-89. https://doi.org/10.1016/j.frl.2017.07.001

Paniagua, J. Rivelles, R. and Sapena, J. (2018). Corporate governance and financial performance: The role of ownership and board structure. *Journal of Business Research*, 89, 229-234. https://doi.org/10.1016/j.jbusres.2018.01.060

Salehi, M., Araianpoor, R., and Dalwai, T (2020). Corporate Governance and Cost of Equity: Evidence from Tehran Stock Exchange, Journal of Asian Finance Economics and Business 7(7):149-158.

Salehi, M., BehrouziYekta, M. and Rezaei Ranjbar, H. (2020), "The impact of changes in cash flow statement items on audit fees: evidence from Iran", *Journal of Financial Reporting and Accounting*, Vol. 18 No. 2, pp. 225-249. https://doi.org/10.1108/JFRA-09-2018-0074

Seifzadeh, M., Salehi, M., Abedini, B. and Ranjbar, M.H. (2020), "The relationship between management characteristics and financial statement readability", *EuroMed Journal of Business*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/EMJB-12-2019-0146

Sloan, R. (2001). Financial accounting and corporate governance: A discussion. *Journal of Accounting and Economics*, 32, 1-3. https://doi.org/10.1016/S0165-4101(01)00039-8

Yau Man Ze-To, S. (2016). Asset liquidity and stock returns. *Advances in Accounting*, 12, 100-124. https://doi.org/10.1016/j.adiac.2016.08.002

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.39259
Research Article

The Impact of Severe Managerial Remuneration Cut on Audit Fees Regarding Audit Quality: Evidence from Iran

Mostafa Hashemi Tilehnouei*, Hamid Karimi

Department of Management, East Tehran Branch, Islamic Azad University, Tehran, Iran

Abstract

The present study examines the impact of managerial remuneration and its severe cut on audit fees by considering the moderating role of audit quality in companies listed on the Tehran stock exchange. To measure audit quality, three criteria were used, including auditor size, tenure, and expertise. The statistical population includes 92 firms, and the study was done from 2007 to 2016. Testing the hypotheses is conducted in Stata14 software through panel data with the fixed-effect method. The results showed that auditor size and tenure mitigate the relationship between managerial remuneration and audit fees. In return, the results also suggested that auditor expertise does not affect the relationship between managerial remuneration and audit fees. The obtained results also indicated that audit quality criteria such as size, tenure, and expertise do not affect the relationship between severe managerial remuneration cut and audit fees. In other words, audit quality does not moderate the positive relationship between severe managerial remuneration cut and audit fees.

Keywords: Managerial Remuneration; Severe Managerial Remuneration Cut; Audit Fees; Audit Quality

*_Corresponding Author_: Department of Accounting, Email: mostafahashemi82@gmail.com

1. Introduction

Pricing audit services is one of the favorite subjects of most audit researchers, and there have been many studies in this area. Some researchers argue that business and audit risks affect audit fees and higher risk related to higher fees (Lyon & Maher, 2005). The empirical evidence suggests that auditors consider firms' managers' characteristics for estimating audit and business risk. Kim et al. (2015) and Wysocki (2010) found that auditors consider stock options (like bonus shares) for managers in increasing audit risk. As a result, they may manipulate decisions related to pricing. Hribar et al. (2012) found that selfish CEOs provide more aggressive reports, which causes auditors to increase their audit fees. Other managers' characteristics are related to audit fees, including Narcissism (Johnson et al., 2012; Judd et al., 2015), Sex (Huang et al., 2014), tenure, and financial knowledge (Lari Dasht Bayaz & Oradi, 2017). Generally, the current literature shows that auditors consider managers' effective characteristics in financial reporting quality as a criterion for determining audit fees.

With the increasing complexity of corporate operations, on the other hand, the amount of managerial remuneration would be increased. This increase results from the increased complexity of financial reporting systems. When a firm's operations are vast and complex, the financial reporting process's demand for monitoring would be increased. Consequently, these firms need more audit services and pay higher audit fees (Wysocki, 2010). It can be said that the amount of a manager's pay may affect management investment decisions influencing risk. Risk can be restricted based on the remuneration paid to managers (Calex et al., 2006). Due to a severe decrease in the manager's payment, the operational risk, earnings management, and audit risk would be increased in return. As a result, auditors demand higher audit fees.

Auditor service quality is also affected by accepting the recommended auditor fees (Baradaran Hassanzadeh et al., 2016). Public Company Accounting Oversight Board (2015) states that audit quality and audit fees directly correlate. Therefore, this study's main goal is to examine the impact of severe managerial remuneration cuts on audit fees by considering the moderating role of audit quality in companies listed on the Tehran stock exchange.

2. Research background

The audit fee structure is a suitable subject for research in audit background. The audit aims to give credit to financial reporting and build trust in the users of financial statements. On the contrary, an auditor's economic interests are provided by fees (Sajadi et al., 2015). Getting acquainted with effective factors on audit fees is very important for auditors, employers, and people seeking to make policy and legitimacy in the audit profession (Nikbakht & Tanani, 2010). This issue was highlighted in recent years in our country, especially after establishing the Iranian Association of Certified Public Accountants. The audit labor market monopoly has been broken, and severe competition has formed between the auditors (Rajabi & Mohammadi, 2008). In this condition, a successful auditor is the one who can provide the best estimation about his/her fees regarding the common characteristics of a case to not only keep the high audit quality but also do it with low cost (Nikbakht & Tanani, 2010).

Griffin et al. (2011) consider audit fees the most important aspect of audit quality control and management. Audit service fees is a necessity for ensuring audit quality. Although higher audit fees always do not mean higher audit cost with higher quality, audit institutions receive the standard charge for their duties. Naturally, their fees are higher than those charges.

Researchers tried to measure the relationship between audit quality and audit fees regarding the importance of the subject. Among them, Palmrose (1986) found a direct

relationship between audit quality and audit fees (Nikbakht et al., 2016). Darogheh Hazrati & Pahlavan (2012) examined the relationship between audit quality and audit fees. The results showed that there is a direct and significant relationship between audit quality and audit fees. Nikbakht et al. (2016) found a positive and significant relationship between audit fees and audit quality. Prawitt et al. (2010) investigated the relationship between internal audit cooperation and audit fees. They reported the negative and significant relationship between internal audit and audit fees. These results are aligned with Felix's (2001) research.

Generally, the research about the effective factors on audit fees can be divided into four categories:

1- The research is seeking out the effective factors on audit fees.

2- The research examines the role of reputation and history of an audit institution and its expertise.

3- The research is dealing with audit risk or related factors.

4- The research deals with other factors, such as audit quality, the relationship between audit and non-audit services (Nikbakht & Tanani, 2010).

Having examined the Malaysian firms, Tee et al. (2017) concluded that the institutional owners play an important monitoring role, especially in firms with political connections through demanding higher audit quality. It can be found that institutional owners demanding more monitoring in firms with political connections need higher audit fees. Gul et al. (2018) show that higher managerial ability in distressed firms may increase audit fees and vice versa. Kalelkar & Khan (2017) examined the relationship between CEO financial knowledge and audit pricing. The results showed that the firms having the knowledged CEOs save the firm's costs through decreased audit fees.

Huang et al. (2014) investigated the relationship between CEO tenure and audit pricing. The results demonstrated that audit fees in firms whose CEO forcibly fired are higher than those whose CEO voluntarily resigned. They did not find any difference between audit fees in firms with CEO change and without change. Eshleman & Guo (2014) examined the relationship between abnormal audit fees and earnings quality. Their results indicated that abnormal audit fees positively impact audit quality.

Lari Dasht Bayaz (2017) examined the impact of audit committee characteristics on audit fees. The results showed a positive and significant relationship between financial expertise and audit committee independence with audit fees. There is no significant relationship between audit committee size and audit fees. In other research, Lari Dasht Bayaz & Oradi (2017) investigated the impact of CEO tenure and knowledge on audit fees. The results also showed that CEO tenure has a positive and significant impact, and CEO financial knowledge has a negative and significant impact on audit fees.

Jafari et al. (2012) examined the relationship between agency cost variables and audit fees. Their findings showed that there is a significant relationship between agency cost indices and audit fees. Alavi Tabari et al. (2012) investigated the impact of agency issues resulting from firms' free cash flows on independent audit service pricing. The results showed that audit fees in firms with high free cash flows and various growth opportunities are higher than those with low free cash flows and various growth opportunities. In firms with high free cash flows and various growth opportunities, the average audit fees would be increased concerning increased debts.

Mousavi & Hazrati (2011) examined the role of a firm's free cash flows on audit firms. This research aimed to determine whether a significant relationship exists between free cash flow and audit fees? The multivariate regression method and the Pearson correlation coefficient between 300 firm-year from 2003 to 2008 showed that firms with high free cash flow have higher audit fees. As well, debt amount and dividend statistically correlated to audit fees.

3. Research Hypotheses

As a firm's operations are vast and complex, the demand for monitoring the financial reporting process would be increased. These firms need various audit services that cause more rewards due to higher risk conditions for managers. This causes institutions to consider increased managers' rewards as an increased risk, so they increase their fees (Kales et al., 2006).

In another approach, it is assumed that if the agreements about rewards are suitably determined and if reward schemes are well diversified, the managers have incentives to do their best. It can be supposed that there is an adverse relationship between managers' rewards and audit fees (Wysocki et al., 2010). Vafeas and Waegelein (2007) state that when managerial remuneration is determined based on their performance, they tend to invest in big projects with long-term returns. These long-term goals may lead to decreased earnings management incentive in managers, consequently decrease additional audit services. If a reward is a profitability-based factor, most probably managers tend to manage earnings (Giang et al., 2009). Bedard & Johnstone (2004) state that conditional rewards based on accounting figures may increases earnings manipulation by managers and audit fees. According to the above literature, the research hypothesis can be determined based on the following cases:

H_1: auditor size moderates the impact of managerial remuneration on audit fees.

H_2: auditor tenure moderates the impact of managerial remuneration on audit fees.

H_3: auditor expertise moderates the impact of managerial remuneration on audit fees.

H_4: auditor size moderates the impact of severe managerial remuneration cut on audit fees.

H_5: auditor tenure moderates the impact of severe managerial remuneration cut on audit fees.

H_6: auditor expertise moderates the impact of severe managerial remuneration cut on audit fees.

4. Research Methodology

4.1. Statistical population

This research's statistical population is the listed companies in the Tehran stock exchange from all industries from 2007 to 2016. Elimination sampling method was used for selecting a sample of the study, and the selected companies should meet the following conditions:

1) The firms should not be a part of financial intermediary, holding, and banks, because these firms naturally are different from the other firms in terms of activity and classification of financial statements.

2) Trading the firms on the Tehran stock exchange should not be stopped for more than 6 months during the study.

3) The firms should be listed at least before starting the study on the Tehran stock exchange.

4) Their fiscal year must be ended on 19 March.

Regarding the above condition, 92 firms were selected for the current study.

It is assumed that the selected firms are a random sample in a period, so the obtained results can be generalized to stock markets.

4.2. Model and definitions of the research variables

The research hypotheses test model is the regression model with panel data, and a suitable fit method is selected based on tests such as the F-Limer test, Hausman test, Wings, and Wald tests.

$$LNAFEE_{it} = \beta_0 + \beta_1 TDC_{it} + \beta_2 BIG_{it} + \beta_3 TDC * BIG_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 DA_{it} + \beta_7 LIQ_{it} + \beta_8 DACC_{it} + \beta_9 LOSS_{it} + \beta_{10} TURNOVER_{it} + \beta_{11} ARL_{it} + \beta_{12} OPINION_{it} + \beta_{13} AGE_{it} + \varepsilon_{it} \quad (1)$$

$$LNAFEE_{it} = \beta_0 + \beta_1 TDC_{it} + \beta_2 TENURE_{it} + \beta_3 TDC * TENURE_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 DA_{it} + \beta_7 LIQ_{it} + \beta_8 DACC_{it} + \beta_9 LOSS_{it} + \beta_{10} TURNOVER_{it} + \beta_{11} ARL_{it} + \beta_{12} OPINION_{it} + \beta_{13} AGE_{it} + \varepsilon_{it} \quad (2)$$

$$LNAFEE_{it} = \beta_0 + \beta_1 TDC_{it} + \beta_2 SPEC_{it} + \beta_3 TDC * SPEC_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 DA_{it} + \beta_7 LIQ_{it} + \beta_8 DACC_{it} + \beta_9 LOSS_{it} + \beta_{10} TURNOVER_{it} + \beta_{11} ARL_{it} + \beta_{12} OPINION_{it} + \beta_{13} AGE_{it} + \varepsilon_{it} \quad (3)$$

$$LNAFEE_{it} = \beta_0 + \beta_1 PAYCUT_{it} + \beta_2 BIG_{it} + \beta_3 PAYCUT * BIG_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 DA_{it} + \beta_7 LIQ_{it} + \beta_8 DACC_{it} + \beta_9 LOSS_{it} + \beta_{10} TURNOVER_{it} + \beta_{11} ARL_{it} + \beta_{12} OPINION_{it} + \beta_{13} AGE_{it} + \varepsilon_{it} \quad (4)$$

$$LNAFEE_{it} = \beta_0 + \beta_1 PAYCUT_{it} + \beta_2 TENURE_{it} + \beta_3 PAYCUT * TENURE_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 DA_{it} + \beta_7 LIQ_{it} + \beta_8 DACC_{it} + \beta_9 LOSS_{it} + \beta_{10} TURNOVER_{it} + \beta_{11} ARL_{it} + \beta_{12} OPINION_{it} + \beta_{13} AGE_{it} + \varepsilon_{it} \quad (5)$$

$$LNAFEE_{it} = \beta_0 + \beta_1 PAYCUT_{it} + \beta_2 SPEC_{it} + \beta_3 PAYCUT * SPEC_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 DA_{it} + \beta_7 LIQ_{it} + \beta_8 DACC_{it} + \beta_9 LOSS_{it} + \beta_{10} TURNOVER_{it} + \beta_{11} ARL_{it} + \beta_{12} OPINION_{it} + \beta_{13} AGE_{it} + \varepsilon_{it} \quad (6)$$

4.3. Dependent variable

$LNAFEES_{it}$ (audit fees): is the natural logarithm of audit fees.

4.4. Independent variable

TDC_{it} (managerial remuneration): is the natural logarithm of total paid to the firms' managers.

$PAYCUT_{it}$ (severe managerial remuneration cut): is a dummy variable which is regarded 1 if there is a severe decrease in managing payments, otherwise 0. The severe decrease of managers' rewards: according to Bryan & Mason's (2016) research, if managers' rewards can be decreased to 25% during the current year, it can be regarded as a severe decrease.

4.5. Moderating variables

BIG_{it} (Audit firm size): if a firm was audited by an Iranian audit organization, the number is 1, otherwise 0.

$TENURE_{it}$ (auditor tenure): If a firm hasn't changed its auditor during the past four years, the number is 1, otherwise 0.

$SPEC_{it}$ (auditor expertise): In this research, market share is used as an index for an auditor specialization in an industry because it shows industry priority to other auditors. The higher the auditor's market share, the auditor's industry expertise, and experience

would be higher than its competitors. Taking the most market share means the auditor is successfully better than other competitors in terms of audit quality. Auditors' market share is calculated based on the following formula:

$$\text{Auditor's market Share} = \frac{\text{Total assets of all employers of each audit firm in each industry}}{\text{total assets of all employers in this industry}} \quad (7)$$

The audit firms are regarded as industry expertise whose market share is more than [1/2×(1/number of available firms)] (Palmrose, 1986). After calculating an audit firm's market share, a firm can be regarded as an expert whose value is higher than the above equation. If an auditor is regarded as an expert, SPEC is 1, otherwise 0 (Reichelt & Wang, 2009).

5. Findings

5.1. Interpretation of findings and hypotheses

Regarding table 1, the average audit fees in available firms are about 999 million Rials. The maximum and minimum amount of paid audit fees are 6650 and 135 million Rials, respectively. Concerning the research's independent variables, the results show that the average managers' reward is 1346 million Rials, and 22% observations indicate the severe managerial remuneration cut. Auditor size is 0.223. The result shows that Iranian audit organizations took the responsibility of auditing for 22% of firms. The average auditor tenure (more than 4 years) is 0.360, and about 39% of auditors are experts in the related industry. 42% of the available firms received modified audit opinions, and the average audit report delay is about 70 days.

Table 1 shows that the average firms' size is 13.769. ROA, debt ratio, and current ratio are 0.184, 0.559, and 1.388, respectively. Additionally, the results indicate that loss and earnings management in the current firms are 0.032 and 0.010, respectively, and the average firm size is 36 years.

H_1:

Testing the moderating role of auditor size on the impact of managerial remuneration on audit fees are dealt with in this hypothesis. The preliminary findings showed that managerial remuneration positively and significantly impacts the audit fees. In other words, accounting risk and audit fees increased along with increasing managerial remuneration. This subject is aligned with current literature and background. The preliminary results of H_1 have a negative regression coefficient (-0.077) and probability (0.072). Hence, this hypothesis has been accepted at a 90% confidence level. This result demonstrated that increased use of Iranian audit organization (auditor size) as criteria for audit quality mitigates the positive relationship between managerial remuneration and audit fees when a firm's auditor is the Iranian audit organization, the audit risk of estimating the managerial remuneration decreases, causing auditors to request fewer fees.

H_2:

This hypothesis was defined to test the impact of managerial remuneration on the audit fees, taking into account auditor tenure's moderating role. In this section, the preliminary results showed that managerial remuneration affects positively and significantly audit fees. The results of testing the hypothesis have a negative regression coefficient (-0.055) and probability (0.033). Hence, H_2 was confirmed at a 95% confidence level. This result showed that increasing auditor tenure as a criterion for audit quality increases the positive relationship between managerial remuneration and audit. In other words, when an auditor's tenure in a firm is increased, his estimation of managerial remuneration risk is decreased. Consequently, audit fees are decreased.

Table 1: Descriptive statistics of the research variables*

Variable kind	Variable	Observation	Mean	Median	SD	Max.	Min.
Quantitative	Firm size	920	1346.563	1004	1100.016	6000	100
	ROA	920	0.184	0.160	0.148	0.750	-0.080
	Debt ratio	920	0.559	0.580	0.177	0.910	0.110
	Current ratio	920	1.388	1.230	0.758	5.10	0.34
	Earnings management	920	0.010	0	0.055	0.34	-0.09
	Audit report delay (days)	920	70.519	64	26.130	1119	24
	Firm age (from the date of incorporation)	920	36.248	37	13.695	62	9
			Frequency (%)				
Qualitative	severe managerial remuneration cut	828	188 (0.227)				
	Auditor size	920	206 (0.223)				
	Auditor tenure	920	332 (0.360)				
	Auditor expertise	920	361 (0.392)				
	Loss	920	30 (0.032)				
	Audit opinion	920	389 (0.422)				

*In this study, using the Barker (2014) approach, appropriate treatment has been performed with outliers and extreme observations. In this approach, instead of deleting the outliers and extreme observations, they are winsorized and replaced by the 1st and 99th percentiles (Aflatouni, 2016). In addition, based on the central limit theorem, coefficients in data with a high number of observations (920 firm-year observations) are considered normal. However, the distribution of components is not normal (Greene, 2011).

Table 2: The results of the first hypothesis test

Variable	Coefficient	SD	Z-statistics	Z-probability
Fixed value	-0.156	0.357	-0.44	0.661
Managerial remuneration	0.097	0.025	3.87	*0.000
Auditor size	0.998	0.306	3.25	*0.001
Managerial remuneration* auditor size	-0.077	0.043	-1.80	***0.072
Firm size	0.273	0.017	15.50	*0.000
ROA	0.362	0.095	3.81	*0.000
Debt ratio	0.516	0.142	3.62	*0.000
Current ratio	0.088	0.031	2.80	*0.005
Earnings management	-0.592	0.163	-3.62	*0.000
Loss	0.199	0.054	3.67	*0.000
Audit report delay	0.030	0.042	0.72	0.473
Audit opinion	-0.030	0.024	-1.28	0.201
Firm age	0.429	0.055	7.70	*0.000
Wald statistics[1]	719.16			
The significance level of Wald statistics	*0.000			

1. When Generalized Least Square (GLS) method is used for removing heteroscedasticity and

serial autocorrelation in Stata software, coefficient of determination and F-statistics are not reported anymore, and Wald statistics and their significance are reported, which indicate the whole significance of the fitted model.

* Significance of 1% error level ** significance of 5% error level ***significance of 10% error level.

Table 3. The results of the second hypothesis test

Variable	Coefficient	SD	Z-statistics	Z-probability
Fixed value	-0.904	0.361	-2.50	**0.012
Managerial remuneration	0.416	0.181	2.30	**0.021
Auditor Tenure	0.416	0.181	2.30	**0.021
Managerial remuneration*auditor tenure	-0.055	0.025	-2.14	**0.033
Firm size	0.303	0.017	17.55	*0.000
ROA	0.447	0.096	4.65	*0.000
Debt ratio	0.445	0.143	3.10	*0.002
Current ratio	0.065	0.031	2.10	**0.036
Earnings management	-0.547	0.162	-3.37	*0.001
Loss	0.212	0.052	4.07	*0.000
Audit report delay	0.082	0.042	1.91	***0.056
Audit opinion	-0.017	0.024	-0.72	0.471
Firm age	0.500	0.053	9.43	*0.000
Wald statistics	654.41			
The significance level of Wald statistics	*0.000			

* significance in 1% error level, ** significance in 5% error level, *** significance in 10% error level.

H_3:

This hypothesis seeks to test the moderating role of auditor expertise on the impact of managerial remuneration on audit fees. In this section, the preliminary results showed that managerial remuneration positively and significantly impacts audit fees. This hypothesis's findings have a negative regression coefficient (-0.051) and probability amount (0.124). Hence, the third hypothesis was not confirmed. These results showed that auditor expertise as criteria for audit quality does not impact the positive relationship between managerial remuneration and audit fees. It can be concluded that expert auditors do not pay more attention to managerial remuneration risk for determining their fees.

Table 4. The results of the third hypothesis test

Variable	Coefficient	SD	Z-statistics	Z-probability
Fixed value	-0.708	0.357	-1.98	**0.048
Managerial remuneration	0.108	0.026	4.03	*0.000
Auditor expertise	0.553	0.236	2.34	0.019
Managerial remuneration*auditor expertise	-0.051	0.033	-1.54	0.124
Firm size	0.286	0.016	16.87	*0.000
ROA	0.383	0.095	4.01	*0.000
Debt ratio	0.461	0.146	3.15	*0.002
Current ratio	-0.515	0.169	-3.05	*0.002
Loss	0.204	0.053	3.86	*0.000
Audit report delay	0.067	0.042	1.59	0.111
Audit opinion	-0.018	0.024	-0.76	0.448
Firm age	0.491	0.055	8.93	*0.000
Wald statistics	731.08			
The significance level of Wald statistics	*0.000			

* significance in 1% error level, ** significance in 5% error level, *** significance in 10% error level.

H_4:

In this hypothesis, the effect of severe managerial remuneration cut on the audit fees is examined by considering the auditor's size. In this section, the preliminary results showed that severe managerial remuneration cuts positively and significantly impacts audit fees. This hypothesis's findings have a positive regression coefficient (0.015) and probability amount (0.825). Hence, the hypothesis was not confirmed. These results showed that an auditor size as criteria for audit quality doesn't impact the positive relationship between severe managerial remuneration cut and audit fees. It can be concluded that the audit organization pays not more attention to severe managerial remuneration cut risk for determining their fees.

Table 5. The results of the fourth hypothesis test

Variable	Coefficient	SD	Z-statistics	Z-probability
Fixed value	-0.004	0.467	-0.20	0.983
severe managerial remuneration cut	0.084	0.036	2.32	**0.020
Auditor size	0.409	0.062	6.55	*0.000
severe managerial remuneration cut *auditor size	0.015	0.071	0.22	0.825
Firm size	0.320	0.024	13.29	*0.000
ROA	0.286	0.145	1.97	*0.048
Debt ratio	0.498	0.193	2.57	**0.010
Current ratio	0.112	0.043	2.58	*0.010
Earnings management	-0.343	0.244	-1.40	0.161
Loss	0.221	0.083	2.65	*0.008
Audit report delay	0.032	0.059	0.55	0.580
Auditor opinion	-0.049	0.036	-1.37	0.170
Wald statistics	365.48			
The significance level of Wald statistics	*0.000			

* significance in 1% error level, ** significance in 5% error level, *** significance in 10% error level.

H_5:

Testing the impact of a severe managerial remuneration cut on audit fees about auditor tenure is dealt with in this hypothesis. In this section, the preliminary results showed that a severe managerial remuneration cut does not significantly impact audit fees. This hypothesis's findings have a positive regression coefficient (0.095) and probability amount (0.134). Hence, this hypothesis was not confirmed. These results showed that an auditor tenure as criteria for audit quality doesn't impact the relationship between severe managerial remuneration cut and audit fees. It can be concluded that the auditors with long-term tenure pay no attention to the risk of severe managerial remuneration cut risk for determining their fees.

H_6:

Testing the impact of a severe managerial remuneration cut on audit fees about auditor expertise is dealt with in this hypothesis. In this section, the preliminary results showed that severe managerial remuneration cuts positively and significantly impacts audit fees. This hypothesis's findings have a positive regression coefficient (0.034) and probability amount (0.590). Hence, this hypothesis was rejected. These results showed that auditor expertise as criteria for audit quality doesn't impact the relationship between severe managerial remuneration cut and audit fees. It can be concluded that the expert auditors pay no attention to the risk of severe managerial remuneration cut risk for determining

their fees.

Table 6. The results of the fifth hypothesis test

Variable	Coefficient	SD	Z-statistics	Z-probability
Fixed value	-0.676	0.458	-1.47	0.140
severe managerial remuneration cut	0.048	0.041	1.17	0.241
Auditor tenure	-0.036	0.037	-0.98	0.328
severe managerial remuneration cut *auditor tenure	0.095	0.063	1.50	0.134
Firm size	0.346	0.023	14.65	*0.000
ROA	0.340	0.144	2.35	**0.019
Debt ratio	0.435	0.197	2.20	**0.028
Current ratio	0.085	0.042	2.00	**0.045
Earnings management	-0.284	0.246	-1.16	0.248
Loss	0.212	0.083	2.55	**0.011
Audit report delay	0.084	0.060	1.41	0.159
Auditor opinion	-0.037	0.036	-1.03	0.305
firm age	0.493	0.067	7.27	*0.000
Wald statistics	339.39			
The significance level of Wald statistics	*0.000			

* significance in 1% error level, ** significance in 5% error level, *** significance in 10% error level.

Table 7. The results of the sixth hypothesis test

Variable	Coefficient	SD	Z-statistics	Z-probability
Fixed value	0.575	0.459	-1.25	0.211
severe managerial remuneration cut	0.079	0.040	1.94	***0.052
Auditor expertise	0.175	0.045	3.89	*0.000
severe managerial remuneration cut *auditor expertise	0.034	0.063	0.54	0.590
Firm size	0.338	0.023	14.21	*0.000
ROA	0.297	0.145	2.05	**0.040
Debt ratio	0.428	0.197	2.17	**0.030
Current ratio	0.093	0.043	2.15	**0.032
Earnings management	-0.257	0.246	-1.05	0.295
Loss	0.216	0.084	2.58	**0.010
Audit report delay	0.092	0.059	1.55	0.121
Auditor opinion	-0.038	0.036	-1.06	0.289
firm age	0.465	0.069	6.67	*0.000
Wald statistics	356.66			
The significance level of Wald statistics	*0.000			

* significance in 1% error level, ** significance in 5% error level, *** significance in 10% error level.

The results showed that managerial remuneration and its severe cut causes increased audit fees, and audit quality impacts the relationship between managerial remuneration and audit fees.

6. Conclusion and Recommendations

There has not been any research about audit quality's possible influence on the relationship between managerial remuneration and its severe cut on audit fees at domestic

and international levels. In contrast, there are researches about the impact of managerial remuneration (Sajadi et al., 2015, Gaal et al., 2003, Bedard & Johnstine 2004) and its severe cut (Bryan & Masu, 2016) on audit fees. The obtained results about the positive impact of managerial remuneration on audit fees are similar to the researches of Sajadi et al. (2015), Gaal et al. (2003), Bedard and Johnstone (2004). The researches about the impact of the severe cut of managerial remuneration on audit fees are similar to the researches of Bryan & Masu (2016). They also found that the severe cut of managerial remuneration positively and significantly impacts audit fees.

According to the results of the impact of increased audit fees due to managerial remuneration, it is recommended to auditors and members of boards of directors:

1. To consider managerial remuneration as one of the effective factors on audit risk and audit fees.
2. Consider long-term performance-based remuneration plans for managers to decrease fraud risk in a firm and build investors' confidence about making efficient management decisions.
3. It is recommended that the board of directors pay attention to increased audit fees through increased unit rates to improve audit quality.
4. To disclose information on audit fees in notes attached to financial statements in order to risk forecasting for investors and other stakeholders to be possible.

References

Aflatouni, A. (2016). *Statistical Analysis in Finance and Accounting Researches*. Tehran: Termeh Publication. (In Persian)

Alavi Tabari, S. Robatmili, M. and Robatmili, M. (2012). Agency Problems and Audit Fees Further Tests of the Free Cash Flow Hypothesis. *Accounting and Auditing Review, 19*(2), 97-122. (In Persian)

Baradaran Hassanzadeh, R. Hossein Babaei, G. and Faryadi, A. (2016). The Impact of Some Corporate Governance Mechanisms on the Auditor's Report Content. *Accounting and Auditing Review, 23*(2), 155-172. (In Persian)

Barker, T. (2014). *Disaggregation in Econometric Modelling*. Routledge.

Bedard, J.C. and Johnstone, K.M. (2004). Earnings Manipulation Risk, Corporate Governance Risk, and Auditors' Planning and Pricing Decisions. *The Accounting Review, 79*(2), 277-304. https://www.jstor.org/stable/3203245

Bryan, D.B. and Mason, T.W. (2016). Extreme CEO Pay Cuts and Audit Fees. *Advances in Accounting, 33*, 1-10. https://doi.org/10.1016/j.adiac.2016.02.001

Darogheh Hazrati, F. and Pahlavan, Z. (2012). The Relationship Between Audit Report Quality and Audit Fees of Accepted Companies in Tehran Stock Exchange. *Management Accounting, 5*(14), 13-24. (In Persian)

Eshleman, J.D. and Guo, P. (2014). Abnormal Audit Fees and Audit Quality: The Importance of Considering Managerial Incentives in Tests of Earnings Management. *Auditing: A Journal of Practice & Theory, 33*(1), 117-138. https://doi.org/10.2308/ajpt-50560

Felix, W.L. Gramling, A.A. and Maletta, M.J. (2001). The Contribution of Internal Audit as a Determinant of External Audit Feess and Factors Influencing this Contribution. *Journal of Accounting Research,* 39(3), 34-513. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=284197

Greene, W. (2011). *Econometric Analysis*. Seventh ED. United States of America: Prentice-hall publication.

Griffin, P.A. and Lont, D.H. (2011). Audit Fees around Dismissals and Resignations: Additional Evidence. *Journal of Contemporary Accounting & Economics, 7*(2), 65-

81. Doi: 10.1016/j.jcae.2011.10.001

Gul, F.A. Khedmati, M. Lim, E.K. and Navissi, F. (2018). Managerial ability, financial distress, and audit fees. *Accounting Horizons, 32*(1), 29-51. https://doi.org/10.2308/acch-51888

Hribar, P. Kim, J. Wilson, R. and Yang, H. (2012). Counterparty Responses to Managerial Overconfidence. *Research Collection School Of Accountancy*, https://ink.library.smu.edu.sg/soa_research/1233

Huang, T.C. Huang, H.W. and Lee, C.C. (2014). Corporate Executive's Gender and Audit Fees. *Managerial Auditing Journal*, 29(6), 527–547. https://doi.org/10.1108/MAJ-03-2013-0837

Jafari, A. Jafari, H. Rasaeian, A. and Pourhosseini, R. (2012). Investigating the Relationship between Agency Costs Variables and Audit Fees. *Audit Knowledge*, 12(24), 133-144. (In Persian)

Johnson, E.N. Kuhn Jr, J.R. Apostolou, B.A. and Hassell, J. M. (2013). Auditor Perceptions of Client Narcissism as a Fraud Attitude Risk Factor. *Auditing: A Journal of Practice & Theory*, *32*(1), 203-219. https://doi.org/10.2308/ajpt-50329

Judd, J.S. Olsen, K.J. and Stekelberg, J. (2015). CEO Narcissism, Accounting Quality, and External Audit Fees. *Accounting Horizons*, 31(4), 33-52. https://doi.org/10.2308/acch-51810

Kalelkar, R. and Khan, S. (2016). CEO of Financial Background and Audit Pricing. *Accounting Horizons*, 30(3), 325-339. https://doi.org/10.2308/acch-51442

Kim, Y. Li, H. and Li, S. (2015). CEO Equity Incentives and Audit Fees. *Contemporary Accounting Research*, 32(2), 608–638. https://doi.org/10.1111/1911-3846.12096

Lari Dasht Bayaz, M. (2017). Audit Committee Characteristics and Audit Fees: Evidence from Tehran Stock Exchange. *Empirical Research in Accounting*, 6(4), 69-94. (In Persian)

Lari Dasht Bayaz, M. and Oradi, J. (2017). The Investigation of the Association between CEO Tenure and Financial Expertise to Audit Fees. *Accounting and Auditing Review*, 24(1), 81-102. Doi: 10.22059/acctgrev.2017.61845 (In Persian)

Lyon, J. and Maher, M. (2005). The Importance of Business Risk in Setting Audit Fees: Evidence from Cases of Client Misconduct. *Journal of Accounting Research, 43*(1), 13–151. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=316485

Nikbakht, M. and Tanani, M. (2010). Test of Factors Influencing Financial Audit Fees. *Journal of Financial Accounting Research*, 2(2), 111-132. https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=185716 (In Persian)

Nikbakht, M. Shabanzadeh, M. Kenarkar, A. (2016). Relationship between Audit Fees and Auditor Experience with Audit Quality. *Journal of Management Studies and Accounting*, 2(1), 190-208. (In Persian)

Palmrose, Z.V. (1986). Audit Fees and Auditor Size: Further Evidence. *Journal of accounting research, 24*(1), 97-110. https://www.jstor.org/stable/2490806

PCAOB. (2015). Improving the Quality of the Audit for the Protection and Benefit of Investors, Public Company Accounting Oversight Board Strategic Plan. Available in: www.pcaobus.org.

Prawitt, D.F. Sharp, N.Y. and Wood, D.A. (2010). Reconciling Archival and Experimental Research: Does Internal Audit Contribution Affect the External Audit Fees?. *Behavioral Research in Accounting*, 23(2), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1034208

Rajabi, R. and Mohammadi Khashooei, H. (2009). Agency Costs & Independent Audit Services Pricing. *Accounting and Auditing Review*, 15(53), 35 -52. https://www.sid.ir/en/journal/ViewPaper.aspx?id=134432 (In Persian)

Reichelt, K.J. and Wang, D. (2009). National and Office-Specific Measures of Auditor

Industry Expertise and Effects on Audit Quality. *Journal of Accounting Research*, 48(3), 647-686. https://doi.org/10.1111/j.1475-679X.2009.00363.x

Sajadi, S. Rashidi Baghi, M. Abobakri, A. and Shiralizade, M. (2015). The Relationship between Auditing Feess and Board Compensation. *Empirical Research in Accounting*, 5(17), 39-58. https://www.sid.ir/en/journal/ViewPaper.aspx?id=601057 (In Persian)

Tee, C.M. Gul, F.A. Foo, Y.B. and Teh, C.G. (2017). Institutional Monitoring, Political Connections and Audit Fees: Evidence from Malaysian Firms. International Journal of Auditing, 21(2), 164-176. Doi: 10.1111/ijau.12086

Vafeas, N. and Waegelein, J.F. (2007). The Association between Audit Committees, Compensation Incentives, and Corporate Audit Fees. *Review of Quantitative Finance and Accounting*, *28*(3), 241-255. Doi: 10.1007/s11156-006-0012-9

Wysocki, P. (2010). Corporate Compensation Policies and Audit Fees. *Journal of Accounting and Economics*, *49*(1-2), 155–160. https://doi.org/10.1016/j.jacceco.2009.11.002

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.39260
Research Article

Scheme of Recent Advances in the Field of Accounting and Economics: Application of Macro Accounting Theory in Economic Forecasting

Vahid Bekhradi Nasab, Ehsan Kamali*, Khadije Ebrahimi Kahrizsangi

Department of Accounting, Najafabad Branch, Islamic Azad University, Najafabad, Iran

Abstract

Macro accounting introduces the cost stickiness behavior of all companies as aggregate cost stickiness. This theory states that since the periods of aggregate cost stickiness are more likely to be reserved for resources by companies facing with fall in sales (declining sales), periods of this sequence are associated with low unemployment. Every certain unemployment rate creates a certain increase in wages because wage costs represent General, administrative and sales costs. Based on this, the present study has applied macro accounting information to forecast the unemployment rate. The statistical population of this study includes all companies listed on the TSE. Macro accounting emphasizes economists' view of seasonal accounting. Therefore, data collection every quarter, and observations include 44 times (2008: Q1-2018: Q4). The method of model VAR. Also, to study the forecast's accuracy, the methods of the mean absolute value of error, mean of square error, and criterion of the average percentage of the absolute value of error have been used. Evidence suggests that aggregate cost stickiness forecast changes in the unemployment rate in the future. Reducing the cost stickiness by 1% reduces the unemployment rate by 0/34% in the next quarter. Another result of the research is the accuracy of the regression pattern's forecast in the short term.

Keywords: Macroaccounting, Cost Behavior, Aggregate Cost Stickiness, Unemployment Rate Forecast, Vector Auto Regression.

* ***Corresponding Author***: Department of Accounting, Email: Ehsankamali_Acc@yahoo.com

1. Introduction

Employment and unemployment are among the most important issues that must be considered to create a prosperous society—because the first condition for economic growth and development of any society is job creation. As a result, the unemployment rate is one of the most important economic indicators. Forecasting the unemployment rate is one of the most important tasks that policymakers deal with. The rise in unemployment is often considered a part of the statistics center and government's concerns and monetary and financial policies. However, it is difficult to forecast unemployment accurately.

Additionally, the press has continuously criticized the accuracy of the Statistics Center's forecasts for making policy decisions. Therefore, its forecast has been at the center of researchers' attention in recent years. Numerous macroeconomic researchers have forecast the unemployment rate using information such as the price of gold, oil, and other components. However, a severe wave of accounting research under the heading of macro accounting seeks to use accounting information and data in the financial statements to forecast economic Indicators. For example, researchers such as Fildes and Stekler (2002) and Stekler (2007) call for research, exploration, and synthesis of additional information sets in macroeconomic forecasting models. The proposal of Aloi & Hoefele (2019), Rouxelin et al. (2019), and Goldena et al. (2020) to include additional information in macroeconomic forecasting models, study the behavior of costs in the macro accounting literature under the heading of cost stickiness to The title is a new aspect of unemployment forecasting. The subject of this research is conducted by Aloi & Hoefele (2019) and Rouxelin et al. (2019), growing research in the field of macro accounting and the study of cost behavior under the title of cost stickiness by Anderson et al. (2003). A growing body of literature in accounting, beginning with Anderson et al. (2003), studies cost stickiness. Costs are considered sticky if "[they] increase more when activity rises than they decrease when activity falls by an equivalent amount." Cost stickiness captures the asymmetry in managers' decision to commit resources when facing uncertain future activity levels and resource adjustment costs (Banker and Byzalov 2014).

Previous research has shown that if the volume of activity (demand and sales) of the company changes, managers' decisions about adjusting resources are not made symmetrically; therefore, adjusting resources is asymmetric. Consequently, costs do not behave symmetrically. Asymmetric behavior of costs means a different response of costs to changes in activity (sales) in terms of fall and increased sales. In other words, if the direction of change in the level of activity (sales) affects the cost response, the cost behavior becomes asymmetric. Now, suppose the cost response to the increase in activity level be more severe and faster than the cost response to the activity level decrease. In that case, this behavior is called cost stickiness. If the cost behavior is the opposite, i.e., the cost response to the decrease in activity level, it is more severe and faster than the cost response. To increase the level of activity, the term anti-stick cost is used. In companies, costs are considered sticky if they "increase more when activity increases than when activity decreases by an equivalent amount." Cost stickiness causes asymmetry in managers' decisions to perform resources when not facing uncertain future activity levels and resource adjustment costs (Banker and Byzalov, 2014). Estimating cost behavior concerning the activity level, regardless of cost behavior (cost stickiness), is misleading. Macro accounting in management accounting, by identifying and Forecasting how costs will behave in relation to changes in activity level or income level, can perform its management task well. In the study of cost behavior, it is possible to forecast how management incentives to achieve the zero earning pattern will affect wage costs (Dierynck et al., 2012).

Speed of changes in wages costs compared to changes in company activities, it is important that users view their financial statements, From the traditional and symmetrical form of changing costs in exchange for changing activities, There is a gap and the existence of an alternative model in the behavior of costs has become apparent to everyone. The human resources parameter is considered as one of the important factors in management decisions. Increasing the cost of wages versus increasing activities will be faster than reducing wages to reduce activities. This asymmetric cost behavior stems from the fact that management is cautious about conserving the resources used. In addition, management may have entered into contracts that would be costly for the company to breach. Reducing or eliminating costs such as wages costs by firing employees or changing their working hours also needs to be addressed more carefully because employees' dismissal causes the company to lose credibility in the labor market.

Managers manage earnings to bring reported earnings closer to the target earning level, avoid the loss, report the company's situation optimally from the point of view of future profitability, and align the reported earning with the forecast of earning analysts. In this regard, and given zero earning reporting (avoiding loss reporting), managers are more willing to eliminate wage costs when sales decrease and are very willing to limit wage costs increases when sales increase. As a result, it is expected that there will be incentives to achieve the zero earning pattern to compensate for the factors that lead to asymmetric cost behavior. Hence, companies that succeed in achieving the zero earning pattern provide a symmetrical model of wage costs compared to other companies because they spend fewer resources in response to increased sales and save fewer resources in response to declining sales (Dierynck et al., 2012).

In cost stickiness analysis, the focus is on operating costs (cost of goods sold and general and administrative costs). Labor costs or salaries or wages are the main components of this category of costs for most companies. The starting point for the present study is Okun Law (1963), which examines the relationship between GDP and the unemployment rate changes. As periods of Aggregate cost stickiness are more likely to be reserved by companies facing declining sales, periods of this sequence are expected to be associated with relatively low unemployment. Research shows that the stickiness of sales, general and administrative costs in the period after the decline in sales is reversed, and the decline in sales in two consecutive periods reduces the stickiness of the cost of goods sold and sales, general and administrative costs in the period They become second, and the greater the amount of assets, the higher the stickiness of the cost of goods sold and the higher the cost of sales, public and administrative. But there is no evidence of study duration, economic growth, and the number of employees, employment, and unemployment rates with cost stickiness (Anderson et al.,2003). Anderson et al. (2003) empirically document that sales costs, public and administrative, are cohesive. Anderson et al. (2003) document empirically that SG&A costs behave in a sticky manner: costs increase by 0/55% when sales increase by 1% but decrease by only 0/35% when sales decline by 1%. The researchers ascribe this effect to deliberate managerial decisions about committed resources when there is uncertainty about future demand for their firms' products. Proportionality and symmetry between costs and activities emphasize that a 1% increase will follow a 1% increase in activity in cost. A 1% decrease in activity will be accompanied by a 1% decrease in cost (Calleja et al., 2006).

In contrast, asymmetric cost behavior models assume that managers affect resource adjustment and, consequently, asymmetric cost behavior. Costs represent the consumption of resources, and resources are provided for various activities. Because activities take place to produce goods and services, resources are learned on-demand

from demand, and therefore costs do not follow real demand (Anderson and Lanen, 2007). Such behavior of cost is called "cost asymmetry". Subramaniam & Weiidenmier (2003) confirmed the asymmetric behavior of costs and showed that total expenditures increase by 0/93% for a 1% increase in revenues. But only a 0/85% decrease in revenue versus a 1% decrease in revenue. Also, the research of Dirink et al. (2012) confirms that a 1% increase in income leads to an increase of 0/60% in wage costs, and a 1% decrease in income is associated with a 0/34% decrease in wage costs. Anderson et al. (2005) showed that wage costs respond to declining activity faster than increasing activity. Anderson et al. (2005) provided evidence that managers tend to delay operating costs when demand decreases. At the same time, they are accelerating the elimination of wage costs. These results reflect that managers make different adjustments to different cost groups when making rational decisions to eliminate costs and clear the gap between wage and other costs in different circumstances. Studies by Anderson et al. (2003) and Subramaniam & Weiidenmier (2003) confirm this concept and show the relationship between asymmetric cost behavior with assets, the number of employees, length of the study period, length of sales decline, and economic growth. The intensity of the cost response to the increase in the volume of activity and demand is different from its reaction to the decrease in activity volume. In other words, the change in demand (decrease or decrease in activity level) is a determining factor in the rate of change in costs in response to that change, and the rate of decrease in costs in the event of a decrease in sales is less than in the case of an increase. Costs increase when sales increase but do not decrease as much when sales decrease. The macro accounting theory states that the reaction and behavior of costs forecast the unemployment rate.

The difference between developing countries' economic environment and developed countries has explained the need for the present study related to macro accounting in Iran as a developing country. Also, regarding the importance and necessity of research, it can be said that this study contributes to several streams of theoretical literature. First, it helps with cost accounting literature on sticky expenses. In other words, this is the first study that uses cost stickiness as a forecaster of the real business cycle and thus links cost stickiness to macroeconomic variables. Because the evidence in the present study shows that cost stickiness helps to forecast future unemployment rates. Thus, the growing literature in accounting is expanded to examine the aggregate earning of companies in Forecasting real business cycles. Second, the present study contributes to the macroeconomic literature in Forecasting the unemployment rate. Because the evidence in the present study showed that cost stickiness improves the ability to forecast the unemployment rate. Besides, the results suggest some professional macroeconomic producers at least partially ignore that cost stickiness. Finally, this research contributes to the literature on the cost cycle and production prices. Carlton & Perloff (2005) and Nekarda & Ramey (2013) state that experimental findings have been mixed to date. While most studies prove immobility or metamorphosis, there is a large literature on procedural anticipated real marginal cost. This study studies aggregate cost stickiness, which is available for a long series at a relatively high frequency. This measure places asymmetry in cost behavior about adjustment costs. Findings indicate that unemployment increases or decreases (unemployment changes), anti-unemployment cost stickiness (inverse relationship). Management uses different approaches to adjusting wage costs. Reducing the number of employees or changing their working hours is one thing that the manager can consider in making decisions. Dismissing employees imposes various costs on companies, including paying for redundancies, losing employee morale, and losing credit in the job market. As a result, corporate executives who report high earning, as defined by this study, are less likely to fire their employees when they are down. Given the cost of completion, it is expected that high-

earning companies will change the number of employees asymmetrically in response to changes in activity levels. They increase the number of employees when the activity rate increases. This increase is more than the decrease in the number of employees when the activity level decreases. Managers of high-earning companies are more likely to reduce their working hours instead of firing employees when they face reducing activity. Therefore, the working hours per employee when the activity level decreases, more than it increases following the increase in the company's activity level. In periods of increased activity, high-earning companies respond to the need for labor by hiring new employees instead of increasing each employee's working hours (Chen et al., 2012,2013). In contrast, corporate executives who avoid reporting losses are less concerned about costs such as losing employee morale and losing credit in the job market. Therefore, they are more likely to take measures such as firing employees to reduce their costs. The managers of low-earning companies symmetrically adjust both the number of employees and their working hours in response to activity level changes (Dierynck et al., 2012).

In Iran, professional forecasters provide an important source of macroeconomic forecast data, which is done quarterly. Forecasters are anonymous and come from a wide range of industries (including finance, investment banking, commercial banking, payment services, hedge funds, mutual funds, financial service providers, and asset management associations) and non-financial (Such as manufacturers, universities, forecasting companies, investment consultants, research companies and consulting firms) that are selected. This review is typically posted at the end of each calendar quarter's first quarter (for the last quarter). Forecasters are usually asked to forecast 32 economic variables for the current quarter to the next three periods. Forecast summaries are usually published by the middle of next month. Forecasters use a combination of mathematical, statistical, and subjective estimates when making their forecasts that reflect the forecaster's personal and professional judgment. Mathematical models include those seeking statistical patterns in particular time-series characteristics of the variables of interest and those of a structural nature that uses links among several macroeconomic variables capturing different economic sectors. One such relationship is the empirically documented association between output growth and unemployment changes (Okun 1963; commonly referred to as Okun’s Law). The feasibility study of macroeconomic forecasting indicators using the power of forecasting accounting information is a fundamental issue. Numerous solutions and ideas have been presented in recent years through numerous research in macro accounting. For example, Nallareddy & Ogneva (2017), Nallareddy & Ogneva (2015) In two different studies, Konchitchki & Patatoukas (2014) and Konchitchki & Patatoukas (2014), In two different studies, Nallareddy & Sadkay (2016) and Hann et al. (2017), Aggregate accounting earnings, Nallareddy & Ogneva (2017), Aggregate stock returns, Konchitchki & Patatoukas (2014) In different researches as well as researches Zambrana (2017), Aggregate profitability rate (or Financial and tax incentives affecting the profitability ratio), Abdalla (2016), Aggregate Book-to-Market rate, Do & Nabar (2018), Laurion & Patatoukas (2016), Crawley (2015), Aggregate accounting conservatism, Aloi & Hoefele (2019) and Rouxelin et al. (2018), Aggregate Cost Stickiness and Nallareddy & Ogneva (2017), growth of labor employment in companies In the field of macro accounting to forecasting macroeconomic indicators.

An important issue in the macro accounting literature and has not yet been answered is why the relationships between accounting and economic information are not used to forecast macroeconomic indicators. They have also not been considered in previous research. The present study is to what extent the figures in the financial statements such as cost stickiness as an accounting output can forecast the unemployment rate. In other

words, does cost stickiness in unemployment forecasting models improve the performance of the unemployment rate forecast? In fact, by measuring the variable parameter approach over time (Vector auto regression) from aggregate cost stickiness for all companies, the concept of sticky costs is projected. In the research, the theoretical foundations, research method, findings, discussion, and conclusion are stated.

2. Theoretical principles and hypotheses development

Keynes (1963) argues that wages are down due to structural factors such as trade union contracts and minimum wage laws. When aggregate demand for goods and services is declining, production units react to declining sales, declining production, and layoffs, not to wages. According to Keynes (1963), prices are sticking down. An unemployed person wants to work for a normal wage, but there is no job for him. Unemployment is caused by price and wage stickiness and increases and decreases during business cycles. On the other hand, in wage stickiness and recession, producers are forced to reduce their employment because lower prices reduce producers' incomes. If wages remain stable, producers' costs will also remain constant (or sometimes increase). In this way, their profitability is reduced. On the other hand, with lower prices and no reduction in nominal wages and real wages, producers' employment level decreases. Classics believe that unemployment does not occur without wage and price stickiness, and while ignoring seasonal unemployment, unemployment is more or less equal to natural unemployment. Keynes (1963) believes that, First, there is unemployment due to the stickiness of wages and prices, which is an undeniable fact. Second, due to the monetary illusion in a recession, unemployment can be higher than normal, and there may be some periodic unemployment.

In economics Science, Okun Law (1963) is an empirically observed relationship between unemployment and production losses in a country. The Gap Version states that for every 1% increase in the unemployment rate, a country's GDP is reduced by almost more than 2% relative to its potential GDP. The "difference version" describes the relationship between quarterly changes in unemployment and seasonal changes in real GDP. In the original statement of the Okun Law (1963), a 2% increase in output equals a 1% decrease in the periodic unemployment rate, a 5% increase in labor force participation, a 5% increase in each employee's working hours, and a 1% increase in output per working hour (Labor productivity). Okun Law (1963) states that an increase of one unit in the periodic unemployment rate is associated with two percentage points of negative GDP growth. The relationship varies depending on the country and the period examined and decided by the companies' managers. Managers' decisions direct changes in costs at the same time as changes in the volume of activities. Managers may knowingly reduce costs when they are unsure about future demand, and this reduction will not be proportional to the reduction in activity volume. This asymmetric behavior is also present in wages costs, one of the most important components of a company's costs. Wage cost changes must be very prudent. Managers' motivation is one of the most important factors influencing the behavior of this cost. According to Okun Law (1963), unemployment changes increase as corporate activity volume decreases, and production increases. Labor costs and wages are the main components of sales, general and administrative costs in operating costs (cost of goods sold, and general and administrative costs). Sales costs, general and administrative, are sticky (Anderson et al., 2003). By increasing sales by 0/55%, sales costs, general and administrative, increase by 1%. But if sales decrease by 0/35%, sales, general and administrative costs will decrease by only 1%. Researchers link the forecast of unemployment rates using aggregate cost stickiness to deliberate management decisions about committed

resources when there is uncertainty about future demand for corporate products.

Contradictory theories have been put together for relatively long periods in both economics and accounting, but empirically these theories have not been applied to macroeconomics in practice. The field of accounting has not been able to present its data and knowledge in the framework of a parent theory or a general theory and a broader intellectual framework. Macro accounting has emerged in late 2019 to develop many small and large theories in its context and become a mother theory under the theory of macro accounting. As a branch of the social sciences, accounting is responsible for explaining, explaining, and guiding economic behaviors. This knowledge field requires a scientific theory or a set of scientific theories to forecast and interpret the phenomena and events in it. Forecast and interpretation that is theoretically based on a logical truth and practically based on objective phenomena. Accounting thinkers have made great efforts over the past few decades to build accounting theories. Despite the progress made, unfortunately, this field of knowledge has not adequately explained and forecast the existing phenomena in the economic and financial field. In many cases, this inability has manifested itself in the fact that economic forecasts have always been flawed. One of the reasons for the accounting discipline's inability to present accounting information is its reliance on grammatical theories.

Prior to 1970, theorizing in accounting was rejected due to the lack of comprehensive and sufficient theories. With the knowledge of economic and financial theories, the attempt to theorize in accounting took a new direction. After 1970, empiricism and a focus on the more systematic use of empirical evidence became prevalent. Efforts to use accounting information in economic forecasting continued from the 1970s until the final decades of 2019, when macro accounting emerged. After much positive accounting research, accounting data's importance became more prominent during these years. Macro accounting based on objective observations states that macroeconomic variables can be forecast based on accounting information. In this case, accounting information's role and position are emphasized more than before, and accounting information becomes retrospective to prospective. The argument in this approach is based on inductive logic. This approach starts by observing and measuring the desired phenomena and ends with their conclusion and generalization. One of the arguments put forward in macro accounting is forecasting the unemployment rate using aggregate cost stickiness (accounting information). Unfortunately, forecasters did not include aggregate cost adhesion information in their forecasts when forecasting unemployment. The cost stickiness of employing companies reveals two main types of information that can help forecast future unemployment. In the first stage, the degree of cost stickiness indicates the magnitude of the adjusted cost, including dismissal and hiring costs, common in the employer's legal and operational environment. Second, the degree of cost stickiness reflects management expectations about the product's future state and the labor market. When cost aggregation is more cumulative, companies retain employees even if sales decline. Therefore, unemployment is not expected to increase or even decrease in the coming quarters. unemployment is expected to rise in the short term if, on the other hand, companies show a desire to lay off employees when sales decline. So the stickiness of aggregate costs with changes in the unemployment rate in the next quarter is negative. In other words, the high level of cost stickiness as macro accounting information is associated with the subsequent decline in the macro-level unemployment rate. Based on this, the research hypothesis is as follows.

Hypothesis: aggregate cost stickiness forecasts future unemployment rate changes.

3. Research Methodology

The research methodology, the type of research, hypotheses, statistical population,

data collection, and research method has been studied.

3.1. Research type

The present study is developmental research in terms of results. In terms of the implementation process, it is a quantitative study, and in terms of research purpose, it is a descriptive study. It is a quantitative study in terms of the implementation process and a descriptive study in terms of research purpose. In terms of implementation, it is inductive research, and in terms of the time dimension, it is longitudinal research. It is analytical in terms of causal method and practical in terms of purpose. The data collection method is library and statistics. Information related to the research model's variables is extracted as a seasonal time series from the Codal site and the Statistics Center of Iran. The econometric tools used in the Eviews software research and the estimation method used, the Johansen & Juselius method and the time domain of the research, the time interval of 2008-2018, and the research's spatial realm are also Iran.

3.2. Data collection

The data required to collect accounting information is the Codal website, and the economic information is the website of the Central Bank of the Islamic Republic of Iran. In other words, the information on the aggregate cost stickiness using the interim financial statements of companies listed in the Tehran Stock Exchange during the period 2008-2018 and the unemployment rate using the data of the first quarter of 2008 to the fourth quarter of 2018 (2008: Q1- 2018: Q4) has been collected.

3.3. Statistical population

The statistical population of this research includes all companies listed on the Tehran Stock Exchange. Data collection was done seasonally. Concerning the fact that on 25 July 2007, stock exchange publishers were obliged to submit financial statements in the form of audited periods, the research period has started since 2008. Under paragraph 4, article 7 of the Guidelines for Exchange Publishers in Presenting Audited Financial Statements, listed publishers are required to prepare and disclose financial statements within the audited six-month periods. As a result, due to the data's seasonality and the models' fit in a time series, the observations reach 44 times (2008: Q1 to 2018: Q4).

3.4. Vector Autoregression (VAR) Model from Stock and Watson (2001)

Next, we run a vector autoregression (VAR) model, a generalization of a single-variable time-series autoregression (AR) model. The unemployment rate is modeled as a function of other variables in the system and their lags and lags, allowing for analysis of the effects of shocks on one or more variables in the system (e.g., Sims 1980a, 1980b; Blanchard and Watson 1986). We build on Stock and Watson (2001). They estimate a VAR model in which the evolution of the unemployment rate follows Taylor's (1993) rule, which stipulates how much the central bank should change the nominal interest rate in response to changes in inflation, output, or other economic conditions. The SW model substitutes growth in output for growth in unemployment, based on Okun's Law. We add our main variable of interest (aggregate cost stickiness) to their system. Additionally, we estimate the following recursive VAR system:

$AZ_t = \phi Z_{t-k} + \varepsilon_t$

Where $Z_t = (Inf_t, UR_t, IR_t, CostStickiness_t)$ is a vector of variables that includes (in this order) inflation (Inf), unemployment rate (UR), federal funds rate (IR), and cost stickiness (CostStickiness).

In this research, the SVAR model has been used instead of the VAR model for the forecast. In this model, the unemployment rate is a function of Aggregate cost

stickiness. Accordingly, the SVAR model is specified in Equation (2).

Equation (2):

$$ChUR_t = \alpha_1 + \alpha_2 AggregateCostStickiness_{t-1} + \varepsilon_t$$

$$AggregateCostStickinesst = \alpha 2_{k-1} + \acute{\eta}_t$$

ChURt+k is an Unemployment rate change in the t + k period, CostStickinesst is a Cost Stickinesstin period t, and εt+k is Random sentences. In this Equation, the coefficient α_2 is the VAR coefficient. α_2=(α1k,vec,(α1k,1),…,(α1k,k)).

3.5. Research variables

The measurement of variables is in Table (1) presented.

Table 1: Definitions of variables

Variable	Rol in model	Definition
ChUR	Dependent variable	Equation (1): $ChUR_t = \frac{UR_t - UR_{t-1}}{UR_{t-1}}$
Cost Stickiness model	-	Estimated coefficients obtained from running the following ordinary least squares regression cross-sectionally each quarter t using Compustat quarterly data for quarters q in Equation (2): $Log\left[\frac{(COGS + SG\&A)_{iq}}{(COGS + SG\&A)_{iq-4}}\right] = \beta_0 + \beta_1 Log\left[\frac{SALES_{iq}}{SALES_{iq-4}}\right] + \beta_2 I\_Decrease_{it} \times Log\left[\frac{SALES_{iq}}{SALES_{iq-4}}\right] + \varepsilon_{it}$
Aggregate Cost Stickiness	Independent variable	β2 coefficient estimates × –1, normalized by subtracting its sample mean and dividing by standard deviation in Equation (3): $AggregateCostStickiness = \frac{[\beta 2\ Coefficient\ Estimates \times (-1)] - Sample\ Mean}{Standard\ Deviat}$

Dependent variable

ChUR: According to investment demand theory, it is possible to forecast the unemployment rate using the Aggregate Cost Stickiness. The Statistics Center of Iran measures the unemployment rate in the census system with different criteria. The unemployment rate of the population of ten years and more in the whole country (by seasons) is the most important unemployment measure. The unemployment rate, according to the definition of the Statistics Center of Iran, is the ratio of unemployed or job seekers to the population of working age, which is expressed as a percentage. This index measures the part of the labor force that has not been engaged in any activity during the research period that has lost its previous job or is looking for work. In the present study, changes in this rate have been used as a dependent variable.

3.5.1.Independent variable

Aggregate Cost Stickiness: According to investment demand and investment consumption theories, it is possible to forecast the unemployment rate using the Aggregate Cost Stickiness. The trend of Aggregate Cost Stickiness in the company, Signal provides a valuable signal of the declining trend of the company's earnings and the company's earning, an important signal of the future state of the economy to the

capital market. Therefore, as accounting information, a company's expenses and stickiness transmit comprehensive, complete, and important information from the financial statements (income statement) to the market. First, cost stickiness has been measured following the studies of Aloi & Hoefele (2019), Rouxelin et al. (2019), and Goldena et al. (2020) as described in Equation (2). Equation (2) with ordinary least squares regression and Cross-sectionally for each chapter. In equation (2) COGS, cost of goods sold, SG&A, selling, general and administrative expenses, SALES, Sales revenue and I_Decrease, The sales reduction Dummy variable is assigned the one if the quarterly changes in sales are smaller (sales reported in the current quarter compared to the previous four quarters) and otherwise the zero **.**

4. The results

The research findings are presented in two parts time variable over a short time and time-variable over a long time.

4.1. Descriptive Statistics

Table (2) reports descriptive statistics for the research variables used in the analysis.

Table 2: Descriptive Statistics

Variables	Mean	Median	Max.	Min.	SD
Unemployment rate	0.11	0.11	0.14	0.09	0.01
ΔUnemployment rate	-0.003	0.008	0.24	-0.19	0.09
β1 Coefficient Estimates	0.6	0.5	0.88	0.49	0.05
B2 Coefficient Estimates	-0.12	-0.11	-0.1	-0.26	0.1
Aggregate Cost Stickiness	2.84	2.89	4.76	-1.03	1.03

The maximum unemployment rate is 0/14 and is related to the 1389Q4, and the minimum unemployment rate is 0/09 and is related to the 1387Q3 and the 1393Q2. For the variable of changes in the unemployment rate, the maximum is 0/24, and the minimum is -0/19, which are related to the 1387Q4 and the 1387Q1, respectively. The estimated coefficients β1 and β2 of the cross-sectional Aggregate Cost Stickiness have a mean of 0/6 and -0/12. Therefore, for every 1% increase in sales revenue, companies show an average increase of 0/6% in their operating costs. At the same time, only 0/39% (0/11% -0/5%) costs are reduced for every 1% decrease in sales revenue. The normal measurement of cost stickiness in a given quarter (specified quarter) is between -0/03 and 4/76.

4.2. Augmented Dicky Fuller Test (Stationary)

In this step, the static status of the variables is checked. In this study, the Augmented Dickie-Fuller test was used. The results of this study are presented in Table (3).

Table 3: Augmented Dicky Fuller results

Variables	Prob				1st difference			
	t-Statistic	Test critical values			t-Statistic	Test critical values		
		99%	95%	90%		99%	95%	90%
ΔUnemployment rate	-10.06	-3.59	-2.93	-2.6	-5.14	-2.63	-1.95	-1.65
Aggregate Cost Stickiness	1.44	-3.6	-2.93	-2.6	-3.46	-2.62	-1.94	-1.61

Table (3) shows the mana unemployment rate and cost stickiness with a mana differentiation step.

4.3. Determine the optimal interrupt

determining the optimal interrupt, the criteria of the likelihood ratio (LR), Akaike (AIC), Bayesian Schwartz (SC), and Hannan Quinn (HQ) tests were used according to Table (4).

Table 4: Determine the optimal interrupt

interrupt	LR	AIC	SC	HQ
0	NA	-1.96	-1.9	-1.95
1	4.75	-2.06	-1.93	-2.01
2	0.87	-2.03	-1.87	-1.97
3	5.06	-2.13	-1.92	-2.05
4	5.37	-2.24	-1.98	-2.15

According to Table (4), the Bayesian Schwartz criterion (observations less than 100) indicates the existence of 4 interruptions in the time-varying model. Accordingly, the time-varying model fits the description of Equation (7).

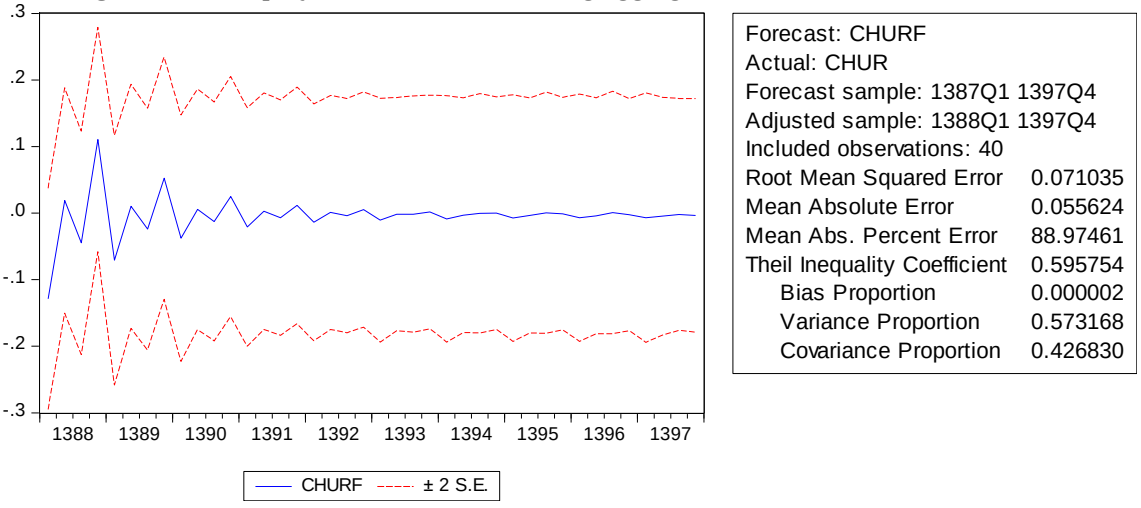
Equation (7):

$$CHUR = -0.26 * CHUR_{t-1} - 0.19 * CHUR_{t-2} - 0.15 * CHUR_{t-3} + 0.34 * CHUR_{t-4} + 0.001 * COSTSTICKINESS - 0.003$$

Unemployment rate forecasting using aggregate cost stickiness based on time variables over a short period

The trend of unemployment rate forecasting using aggregate cost stickiness over a short period is presented in Figure (1) **.**

Figure 1: Unemployment rate forecast using aggregate cost stickiness in a short time



Unemployment rate forecasting trend using aggregate cost stickiness over a short period with two high and low standard deviations indicates the unemployment rate forecast accurately **.**

Performance of Unemployment Rate Forecast Using Aggregate Cost Stickiness Based on Time Variables over Short-Term Time

In this section, the unemployment rate amounts are compared with the forecast of the unemployment rate using the aggregate cost stickiness over a short period in Table (4).

Table 4: Unemployment Rate Amounts and Unemployment Rate Forecasts Using Aggregate Cost Stickiness in the Short-Term

Time	Unemployment Rate	Unemployment Rate Forecasts Using Aggregate Cost Stickiness	Time	Unemployment Rate	Unemployment Rate Forecasts Using Aggregate Cost Stickiness
1387Q1	-0.19	Lag1(NA)	1392Q3	-0.009	-0.003
1387Q2	0.05	Lag2(NA)	1392Q4	0.01	0.01
1387Q3	-0.07	Lag3(NA)	1393Q1	0.01	0.01
1387Q4	0.24	Lag4(NA)	1393Q2	-0.12	-0.11
1388Q1	-0.12	-0.12	1393Q3	0.09	0.01
1388Q2	0.01	0.01	1393Q4	-0.08	0.01
1388Q3	0	0	1394Q1	-0.06	-0.08
1388Q4	0.19	0.11	1394Q2	0.009	0.003
1389Q1	-0.04	-0.07	1394Q3	-001	-0.01
1389Q2	0.007	0.01	1394Q4	0.09	0.01
1389Q3	-0.12	-0.12	1395Q1	0.03	0.07
1389Q4	0.05	0.17	1395Q2	0.03	0.03
1390Q1	-0.18	-0.03	1395Q3	-0.03	-0.03
1390Q2	-0.1	-0.05	1395Q4	0.01	0.09
1390Q3	0.05	0.01	1396Q1	0.007	0.006
1390Q4	0.16	0.12	1396Q2	-0.07	-0.04
1391Q1	-0.1	-0.02	1396Q3	0.016	0.015
1391Q2	-0.04	-0.02	1396Q4	0.01	0.02
1391Q3	-0.1	-0.06	1397Q1	0	0
1391Q4	0.09	0.01	1397Q2	0.008	0.008
1392Q1	-0.16	-0.11	1397Q3	-0.04	-0.04
1392Q2	-0.01	0.09	1397Q4	0.03	0.03

The evidence in Table (4) shows that the time-varying model can forecast the unemployment rate using aggregate cost stickiness in observations in a short time.

4.4. Convergence test

the purpose of estimating the time-varying model is to determine the number of long-term relationships in the model. The pattern contains a variable, and therefore a long-term relationship is possible. Testing this problem, according to Johansen's method, effect statistics, and maximum eigenvalue was used, the results of which are presented in Table (5).

Table 5: Convergence test results in the unemployment rate forecasting model

Hypothesis0	opposite Hypothesis	Effect statistics	Critical value	Maximum eigenvalue statistics	p-value
R=0	R>0	32.36	4.12	0.54	0.0000

Both the effect statistic and the maximum eigenvalue confirm a minimum long-term relationship at the 95% confidence level in the model. According to the results of Table (5), according to which both the effect statistic and the maximum eigenvalue confirm the existence of a long-run relationship in the unemployment rate forecast model, a

long-run relationship is estimated under the Johansen model.

Estimation of Johansen model

Johansen's model shows long-term relationships and helps a lot in policymaking. Johansen test is used to investigate the co-integration relationship between variables.

Table 6: Results of Johansen's Cointegration Test

Statistics	No intercept& No Trend	intercept& No Trend	intercept& No Trend	intercept& Trend	intercept& Trend
Effect statistics	1	1	1	1	1
Maximum eigenvalue statistics	1	1	1	1	1

The Johansen co-integration test results from the constrained to the non-constrained state are presented in Table (6). The results confirm the existence of at least 1 co-integration vector.

structural constraints

According to the convergence order test results, the long-run relationship is related to Forecasting the unemployment rate in the most constrained state as described in Equation (8) and the output of the results as described in Table (7).

Equation (8)

$$ChURt + k = \alpha 1kAggregateCostStickinesst + \varepsilon t + k$$

Table 7: Results of Johansen model estimation related to the unemployment rate forecast

Variable	Coefficient	T-statistic
Cost stickiness	-0.34	-2.47

The results show that in the long run, the aggregate cost stickiness can forecast the unemployment rate. In this model, the significant relationship between aggregate cost stickiness and unemployment rate means that their coefficients are reliable at a 1% error level. These results also show a direct relationship between the aggregate cost stickiness and the unemployment rate in the long run.

Unemployment rate forecasting using aggregate cost stickiness based on time variables over a long period

The trend of unemployment rate forecasting using aggregate cost stickiness over a long period is presented in Figure (1) **.**

Performance of Unemployment Rate Forecast Using Aggregate Cost Stickiness Based on Time Variables over Long-Term Time

In this section, the unemployment rate amounts are compared with the forecast of the unemployment rate using the aggregate cost stickiness over a long period in Table (4).

The evidence in Table (6) shows that in the long run, the time-varying model has the ability to forecast the unemployment rate using aggregate cost stickiness in observations.

4.5. Research Hypothesis

The research hypothesis examines the forecast of changes in the unemployment rate using aggregate cost stickiness.

Assessing the forecast power of the time-varying model and comparing it in the short and long term in Table (9) indicates the difference in the accuracy of this model's forecast for the aggregate cost stickiness. As shown in Table (9), the short-term time-varying model has the least error in Forecasting the unemployment rate.

Figure 1: Unemployment rate forecast using aggregate cost stickiness in a long time

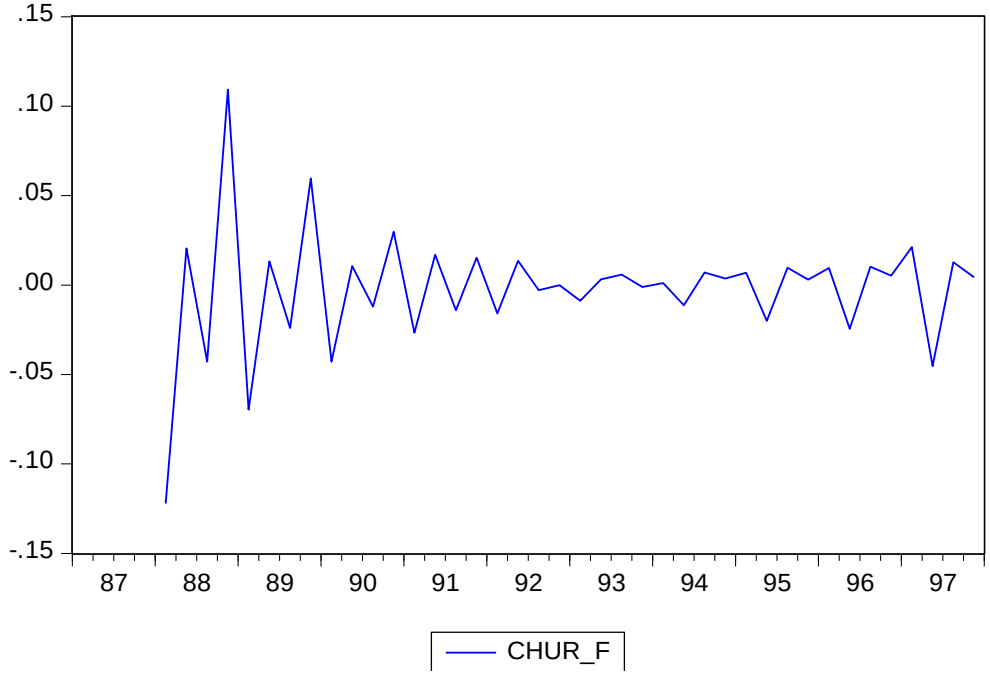


Table 4: Unemployment Rate Amounts and Unemployment Rate Forecasts Using Aggregate Cost Stickiness in the long-Term

Time	Unemployment Rate	Unemployment Rate Forecasts Using Aggregate Cost Stickiness	Time	Unemployment Rate	Unemployment Rate Forecasts Using Aggregate Cost Stickiness
1387Q1	-0.19	Lag1(NA)	1392Q3	-0.009	-0.002
1387Q2	0.05	Lag2(NA)	1392Q4	0.01	0.01
1387Q3	-0.07	Lag3(NA)	1393Q1	0.01	0.01
1387Q4	0.24	Lag4(NA)	1393Q2	-0.12	-0.12
1388Q1	-0.12	-0.12	1393Q3	0.09	0.09
1388Q2	0.01	0.02	1393Q4	-0.08	0.001
1388Q3	0	0	1394Q1	-0.06	-0.01
1388Q4	0.19	0.19	1394Q2	0.009	-0.008
1389Q1	-0.04	-0.06	1394Q3	-0.01	-0.01
1389Q2	0.007	0.006	1394Q4	0.09	0.09
1389Q3	-0.12	-0.12	1395Q1	0.03	0.06
1389Q4	0.05	0.05	1395Q2	0.03	0.02
1390Q1	-0.18	-0.18	1395Q3	-0.03	-0.009
1390Q2	-0.1	-0.1	1395Q4	0.01	0.003
1390Q3	0.05	0.05	1396Q1	0.007	0.009
1390Q4	0.16	0.16	1396Q2	-007	-0.06
1391Q1	-0.1	-0.1	1396Q3	0.016	0.015
1391Q2	-0.04	-0.04	1396Q4	0.01	0.005

1391Q3	-0.1	-0.1	1397Q1	0	0.02
1391Q4	0.09	0.01	1397Q2	0.008	0.04
1392Q1	-0.16	-0.01	1397Q3	-0.04	-0.01
1392Q2	-0.01	-0.01	1397Q4	0.03	0.004

Table 9: Accuracy of unemployment rate forecast

Model	VAR- Short term	VAR- Long term
MSE	0.071035	0.070817
MAE	0.055624	0.0566711
MAPE	77.97461	1454.225
Theil	0.595754	0.585917

The findings show that cost stickiness leads to the forecast of unemployment over time series. In other words, cost stickiness can help improve the performance of the future unemployment rate model. Table (9) shows that reducing unemployment by 1% will reduce the unemployment rate by 0/34% in the next quarter. The results also showed that the time-varying model has the least error in Forecasting the unemployment rate in the short run. As a result, it can be said that the aggregate cost stickiness forecast changes in the unemployment rate in the future.

5. Conclusion

In the present study, an attempt was made to highlight the importance of macro accounting. Macro accounting emphasizes the use of accounting information in economic forecasting. The present study showed that accounting information contains information about the unemployment rate as an economic indicator, which confirms the value of accounting information as a qualitative feature. Looking at the macroeconomic structure of each country and the different markets in each economy, it can be seen that one of the most basic markets in any economy is capital markets. The stock market is one of the capital market components and is a function of it as part of the economy. In developing countries, the economy's impact is deeper than in developed countries due to the stock market's impact and the lack of attention to the figures published in the capital market. In the present study, the relationship between the aggregate cost stickiness and macro unemployment rates was examined, and the focus is on Forecasting changes in unemployment rates. Due to this fact, forecasting changes in the unemployment rate is one of the most complex and important macroeconomic policymakers' tasks. Cost stickiness influences companies' decisions about hiring employees, retaining employees, terminating work, firing, resigning, and cost stickiness, reflecting future unemployment rates. The results of the present study contribute to the growing literature in macro accounting. Findings show that in the designed model, the aggregate costs stickiness is an indicator of effectiveness in Forecasting the unemployment rate. Cost stickiness reflects the level of adjusted costs associated with the workforce that meet the company's expectations and the manager of future activities. The main reasons for changing the decisions of capital market participants lie in the adjustment costs of companies.

Because of the Estimation of the aggregate cost stickiness model, the evidence showed that managers refrain from adjusting costs because they do not adjust costs during these periods and maintain the company's financial resources, experiencing declining sales sticky periods. Subsequently, the forecast model results showed that the country is associated with low unemployment during periods of this sequence. In the observed observations, including all companies listed in the Tehran Stock Exchange, resources are equipped only to produce goods and services. The amount of resource supply depends not only on the current level of demand but also on future production

and sales expectations. Adjusting resources entails costs for the company. Adjustment costs at the level of microeconomics and listed companies are a signal to the macroeconomy. Because when demand declines, managers face the costs of maintaining unused resources on the one hand and the costs of adjusting resources on the other. They consciously strike a balance between these two types of costs and only reduce resources if it is in the company's best interest as a whole. If the company's resources are kept above the required level, costs will be imposed on the company. Cost adjustment periods increase future unemployment. Adjustment costs will also be imposed on the company if resources are reduced. These costs include selling the company's assets, paying compensation to dismissed employees, and penalties for contract breaches. In addition to direct financial costs, there are also indirect costs such as demoralization or residual labor loyalty. In addition, adjustment costs include the cost of adding resources if demand increases again. Such as the cost of purchasing assets, the cost of recruiting and training new employees, and the cost of negotiating future contracts.

Certainly, the unemployment rate will rise with the payment of compensation to the fired employees. The fines resulted from the contracts' violation and the overflow of the unemployed labor force to society. Even if managers expect a temporary reduction in demand (activity), the costs of reducing resources and increasing them again are likely to outweigh the costs of temporarily maintaining additional resources. In this case, managers may prefer to bear the cost of maintaining additional resources to avoid higher adjustment costs. Therefore, cost stickiness at the micro-level reduces representation problems and capital intensity, and contributes to the manager's goals, such as maximizing the company's value in the long run. At the macro level that has not been considered so far, The aggregate cost stickiness helps forecast the unemployment rate. Because the results showed that stickiness is more likely to be reserved by companies facing declining sales during periods of aggregate cost, periods of this sequence are associated with low unemployment. The results of the present study are consistent with the researches of Aloi & Hoefele (2019), Rouxelin et al. (2019), and Goldena et al. (2020).

So far, the theoretical literature has not examined the power of Forecasting cost stickiness for macroeconomics. The present study is one of the first studies that seek to forecast macroeconomic indicators using accounting information. Accordingly, the present study and similar research in macro accounting will confront accounting and economics thinkers with the idea to look at accounting information from the perspective of macroeconomics under macro accounting. Predators of macroeconomic indicators are very interested in Forecasting macroeconomic indicators with the least error. Therefore, the way forecast can forecast macroeconomic indicators is crucial. In the present study, integrating a new set of information on the behavior of public, administrative, and sales costs in the forecasting model adds to the literature on the unemployment rate forecast in macroeconomics and macro accounting. General, administrative, and sales costs, can be a good starting point for analyzing the future state of economic statistics at the country's macro level, such as the unemployment rate. For example, when the public, office, and sales costs are on the rise, it tells the company's story of aggregate periods. High aggregate periods increase the total number of employees working in these companies. With the downward trend in public, administrative and sales costs and consequently the decline in profits between shareholders and employees of the company as stakeholders, the business unit's demand and the people overshadow this event. Because cost stickiness is negatively related to the future unemployment rate over the forecast horizon of the fourth quarter of the year, which improves the forecast performance well. According to consumer demand theory, increasing the upward trend

of public, office, and sales costs and reducing companies' profits is equal to reducing consumption. For this reason, the unemployment rate continues to rise to the extent that the reduction of public, administrative, and sales costs reduces the trend of the general level of demand and consumption. Therefore, it is recommended to forecasters to pay attention to the accounting information of listed companies, which play an important role in Forecasting macroeconomic indicators.

Advancing this new field, studies called macro accounting. It is necessary for the future for accounting thinkers to explore other variables and the efficiency of accounting information that can send timely signals of the future state of the economy to the market. Some suggestions are as follows.

1. Assessing the accuracy of the unemployment rate forecast using accounting earning and aggregate accounting earning.

2. Assessing the accuracy of the unemployment rate forecast using accounting earning and aggregate accounting earning and The ratio of stock market value to the book value of stocks aggregate.

Stock publishers are required to prepare and disclose only the financial statements between the audited 6 month periods. Therefore, the present study's main limitation is using some unaudited quarterly financial statements of companies listed on the Tehran Stock Exchange.

Using the time series model in forecasting, especially with higher intervals, requires historical information for several periods. The more information available, the more reliable the results of the format model estimate. Due to interim financial statements in data collection, access to information before 2008 was impossible. Therefore, in order to spread the results, it is necessary to consider this important issue.

References

Abdalla, A.M. (2016). The Power of Aggregate Book-to-Market Innovations: Forecasting, Nowcasting, and Dating the Real Economy. *SSRN Electronic Journal*, Doi: 10.2139/ssrn.2871535

Aloi, M. Hoefele, A. (2019). Wage stickiness, offshoring and unemployment, *Economics Letters*, Elsevier, vol. 177(C), 56-59.

Anderson, M.C. Banker, R.D. and Janakiraman, S.N. (2003). Are selling, general, and administrative costs"sticky"?. *Journal of Accounting Research*. 41(1), 47–63. https://doi.org/10.1111/1475-679X.00095

Anderson, S.W. and Lanen, W. (2007). *Understanding Cost Management: What Can We Learn From the Evidence on "Sticky" Costs*. *SSRN Electronic Journal*, Doi: 10.2139/ssrn.975135

Anderson, S.W. Chen. C.X. and Young, S.M. (2005). Sticky Costs as Competitive Response: Evidence on Strategic Cost Management at Southwest Airlines. *SSRN Electronic Journal*, http://www.doc88.com/p-993992687658.html

Banker, R.D. and Byzalov, D. (2014). Asymmetric cost behavior. *Journal of Management Accounting Research*, 26 (2), 43–79. https://doi.org/10.2308/jmar-50846

Banker, R.D. Byzalov, D. Ciftci, M. and Mashruwala, R. (2014). The moderating effect of prior sales changes on asymmetric cost behavior. *Journal of Management Accounting Research*, 26 (2), 221–242. https://doi.org/10.2308/jmar-50726

Calleja, K. Steliaros, M. and Thomas, D.C. (2006). A note on cost sickness: Some international comparison. *Management Accounting Research*, 17(2), 127-140.

https://doi.org/10.1016/j.mar.2006.02.001

Carlton D. and Perloff, J. (2005). *Modern industrial organization.* (4th edition) Boston, MA:

Chen, C.X. Lu, H. and Sougiannis, T. (2012). The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs. *Contemporary Accounting Research.* 29 (1), 252–282. https://doi.org/10.1111/j.1911-3846.2011.01094.x

Chen, C.X. Gores, T. and Nasev, J. (2013). Managerial overconfidence and cost stickiness. *SSRN Electronic Journal*, Doi: 10.2139/ssrn.2208622

Crawley, M.J. (2015). Macroeconomic Consequences of Accounting: The Effect of Accounting Conservatism on Macroeconomic Indicators and the Money Supply. *The Accounting Review*, 90(3), 987-1011. ttps://doi.org/10.2308/accr-50998

Dierynck, B. Landsman. W.R. and Renders, A. (2012). Do Managerial Incentives Drive Cost Behavior? Evidence about the role of the zero earning benchmark for labor cost behavior in private Belgian Firms. *The Accounting Review*, 87(4), 1219-1246. https://www.jstor.org/stable/23246275

Do, C. and Nabar, S. (2018). Macroeconomic effects of aggregate accounting conservatism: A cross-country analysis. *Journal of International Financial Management & Accounting*, 30(2), 83-107. https://doi.org/10.1111/jifm.12093

Fildes, R. and Stekler, H. (2002). The state of macroeconomic forecasting. *Journal of Macroeconomics.* 24 (4), 435–468. https://doi.org/10.1016/S0164-0704(02)00055-1

Goldena, J. Mashruwalab, R. and Pevznerc, M. (2020). Labor adjustment costs and asymmetric cost behavior: An extension. *Management Accounting Research*, 46, https://doi.org/10.1016/j.mar.2019.07.004

Hann, R.N. Li, C. and Ogneva, M. (2017). Another Look at the Macroeconomic Information Content of Aggregate Earnings: Evidence from the Labor Market. *Research Collection School Of Accountancy*, 51-62. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2993654

Konchitchki, Y. and Patatoukas, N. P. (2014). Accounting earnings and gross domestic product. *Journal of Accounting and Economics*, 57(1), 76–88. https://doi.org/10.1016/j.jacceco.2013.10.001

Keynes, J.M. and Keynes, J.M. (1936). *The General Theory of Employment, Interest and Money*. *'Chapter 2*. The Postulates of the Classical,

Konchitchki, Y. and Patatoukas, N.P. (2014). Taking the Pulse of the Real Economy Using Financial Statement Analysis: Implications for Macro Forecasting and Stock Valuation. *The Accounting Review*, 89(2), 669-694. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2365633

Laurion, H. and Patatoukas, P.N. (2016). *From micro to macro: Does conditional conservatism aggregate up in the National Income and Product Accounts*. University of California at Berkeley, Haas School of Business, version,

Nallareddy, S.A. and Sadkay, G. (2016). Uncertainty and Sectoral Shifts: The Interaction between Firm-Level and Aggregate-Level Shocks, and Macroeconomic Activity. *Management Science*, 64(1), https://doi.org/10.1287/mnsc.2016.2581

Nallareddy, S. and Ogneva, M. (2015). Predicting Restatements in Macroeconomic Indicators using Accounting Information.

Nallareddy, S. and Ogneva, M. (2017). Predicting Restatements in Macroeconomic Indicators using Accounting Information. *THE ACCOUNTING REVIEW*, 92(2), 151–182. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2444014

Nekarda, C.J. and Ramey, V.A. (2013). The cyclical behavior of the price-cost markup.

Working Paper 19099, *National Bureau of Economic Research*, https://www.nber.org/papers/w19099

Okun, A.M. (1963). Potential GNP: Its measurement and significance. In *Proceedings, Business and Economic Statistics Section of the American Statistical Association*, 89–104.

Rouxelin, F.W. and Yehuda,W.N. (2018). Aggregate Cost Stickiness in GAAP Financial Statements and Future Unemployment Rate. *The Accounting Review*, 93(3), 299-325. https://doi.org/10.2308/accr-51939

Subramaniam, C. and Watson, M.W. (2016). Additional Evidence on the Sticky Behavior of Costs. *Advances in Management Accounting (Advances in Management Accounting)*, 26, 275-305. https://doi.org/10.1108/S1474-787120150000026006

Zambrana, R. (2017). *Taking the pulse of the real economy using financial statement analysis: THE EUROPEAN PERSPECTIVE*. Nova School of Business and Economics (NSBE). http://hdl.handle.net/10362/36557.

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.63059
Research Article

The Relationship between Auditors Stress with Audit Quality and Internal Control Weakness

Zohreh Talebkhah*

Faculty of Economics and Administrative Sciences, Torbate Heydarieh Branch, Islamic Azad University, Torbate Heydarieh, Iran

Abstract

The present study is concerned about the relationship between auditors' work stress with audit quality, internal control weakness, and the impact of being a primary auditor on the relationship between auditors' work stress and audit quality in listed companies on the Tehran Stock Exchange.

The study's statistical sample involves 111 listed firms on the Tehran Stock Exchange from 2012 to 2018, and the Stata Software is used for data analysis.

The findings argue that auditors' stressful work environment is likely to deteriorate the quality of audit services. Moreover, we articulate that being the primary auditor plays a moderating role in the association between audit work stress and audit quality. Finally, the results show that job stress does not let auditors understand internal controls to identify material weaknesses and recommend efficient solutions.

We expect this study to contribute to practical issues on auditors' work stress and provide some scientific evidence for improving the supervisory policies. We hope this study proposes a quantitative method to contribute to work stress decrease and the system for dealing with the stress reaction.

Keywords: Auditor's Stress, Auditor's Pressure, Audit Quality, Internal Control Weakness

* ***Corresponding Author***: PHD Student of Accounting, Email: TalebkhahZ1@mums.ac.ir

1. Introduction

Due to the nature of auditors' performance, their work is influenced by a stressful environment (Campbell et al., 1988). The most destructive impact of work stress on auditors' performance is their works' inappropriate quality (prepared audit report) (Choo, 1995). This is because audit quality is deeply dependent on the judgment and health of the staff of audit firms (Otley and Pierce, 1996). This occupation usually defines by a heavy workload, numerous deadlines, and excessive time pressure. This issue creates stressful situations for the auditors that, if not detected on time, not controlled, and have no appropriate attitude, would depreciate the system (Goolsby, 1992). Agoglia et al. (2010) and Lo'pez and Peters (2012) argue that the stress of work or budget schedule would lead to performance and audit quality drop. Yan and Xie (2016) indicate that auditors in China suffer from work stress, derived from the time limit, human resources, responsibility risk, etc. The stress is peaked in the high season, namely when the auditor works more than 10 hours a day.

In sum, individual work stress creates the combinational effects of time pressure, workload, cost control, performance evaluation, and legal risks and responsibilities. This stress and occupational depreciation influence auditors' psychological activities and behavioral decisions, affecting the audit performance. Usually, the observed effects go up in proportion to the growth of stress. However, according to the motivation theory, when there is an effective occupational control on work needs, the effect of pressure on audit quality may be limited or even profitable (McClenahan et al., 2007). Hence, the central question of the study is whether there is a relationship between the work stress of auditors and audit quality or not.

To analyze the audit risk during the first audit of a new customer, the auditor should have a comprehensive understanding of the customer's operational characteristics, accounting policies, and industry development and acquire other information. In this case, the auditor needs more effort to first audit a new customer, including work hours, human and cash resources, etc. The more the auditor's customers, the higher the workload would be, and the less is the work hours and audit resources for each customer, especially new customers. This is how a direct conflict occurs between work demand and work control. Moreover, the higher the intensity of difference, the more is probably the work stress and its negative consequences on audit performance. Hence, in non-primary inspections for regular customers, given the workload and a certain level of stress, the effectiveness of wok control on work demand improves by the upcoming audits, and the accumulation of experience and knowledge can be obtained through acquaintance with and dominance on personal information of the customer and the industry. The enhancement of effectiveness would decrease work stress's negative effects on audit quality (Yan and Xie, 2016). Hence, the second question is whether the auditor's first audit influences the relationship between auditors' work stress and audit quality.

This is the first study in Iran's audit business environment involving audit job stress consequences on auditors' performance. Since accounting and auditing professions have a short history in this geographic area, there are many academic gaps. For example, lack of academic and professional bodies may expose a significant amount of job pressure and stress to the practitioners due to the work overload besides tight time budgets and role ambiguity and conflict for those newly employed by audit firms. Therefore, we are motivated to fulfill such a profound gap implying the role of audit work stress on the quality of audit services. Furthermore, previous studies examining job stress's potential role rely on audit quality as a dependent factor. Whereas in addition to such a factor, we estimate the potential role of other elements such as being a primary auditor and the knock-on influence of work stress on detecting material internal control weaknesses and

providing an efficient recommendation for a firm's financial operation improvement. Therefore, this study's outcome seems to provide some useful contributions in terms of academics and practice.

2. Theoretical issues and related literature

Accounting, especially auditing, has long been recognized as a highly stressful occupation (Campbell et al., 1988). Hard efforts, the time limit for personal life, and passing official accounting tests have been among auditors' common and permanent challenges. One of the most critical factors affecting the level of job pressure and performance, suggested by previous studies, is the potential and inevitable conflict between assigned duties related to work and family responsibilities (Jeffrey and Saroj, 1985; Boles et al., 1997). It is also suggested that such an issue is more likely to deteriorate for those possessing their own families (Lo and Ramayah, 2011). In other words, such a conflict is the consequence of incompatibility between work and family has an adverse influence on employees' health and well-being (Kinnunen et al., 2006; Noor, 2003). It is supposed that such a conflict is under lack of balance between work, housework, and child-care responsibilities, which may lead to severe pressure and stress at work, resulting from some negative outcomes (Posig and Kickul, 2004; Karatepe and Tekinkus, 2006). The underlying assumption refers to two demands simultaneously, which cannot be performed equally, consequently causing incompatibility of function and discomfort in both positions and work stress. According to the above discussion, since audit work requires excellent effort besides a tight time budget, it is expected that audit job performance causes some inevitable conflicts among auditors and their families, which in turn may deteriorate the audit quality. In this regard, Zhao and Namasivayam (2012) show that individuals engaging in the conflict between work and family are more likely to have ambiguity, causing reduced organizational commitment. Venkatesh et al. (2019) argue that children's Internet addiction affects parents' job outcomes, and the effects are mediated by family-to-work conflict. Putra and Sudana (2019) show that auditor's role conflict positively impacted the auditor's stress and showed that core self-evaluations weakened the auditor's role conflict. Farrastama et al. (2019) find that job stress has a positive and significant effect on counterproductive work behavior. Amiruddin (2019) finds that work-family conflict and role ambiguity have a considerable impact on work stress. Furthermore, his core testing suggests that only time pressure significantly influences audit quality reduction behavior.

The other factors affecting the stress level are role conflict and role ambiguity, which provide arguments among researchers about its association (Ahmad & Taylor, 2009; Rodriguez-Escudero et al., 2010; Javady et al., 2012). Role conflict is defined as opposing roles of employees or members of organizations, in which they must obey all regulations and laws and be loyal to their organizations, besides that. As a professional member, they must follow ethical codes and professional performance standards (Siegel and Marconi, 1989). Robbins & Judge (2008) define that role conflict happens when role responsibilities are less likely to comply with each other. Role conflict is also defined as a situation in which employees have more than one role in their work atmosphere and society where the job assigns have contrary expectations or goals against each other and are in conflict to specific rules or values from each part, which in turn may lead to a battle for those who are engaged.

Consequently, such a job condition refers to time budget pressure in task performance caused by a lack of clarity or understanding of one's proper role in an organization (DeZoort and Lord, 1997). Richard et al. (2019) find that role stressors, including role ambiguity, role conflict, and role overload, positively and significantly affect job burnout. Also, job burnout has a positive and significant impact on reduced

audit quality practices. Ferry et al. (2019) find that role conflict and ambiguity affect the auditors' independence, while spiritual intelligence moderates the impact of role conflict and role ambiguity on the auditor's independence. Umar et al. (2017) also articulate that pressure affects dysfunctional audit behavior, while information technology does not affect dysfunctional audit behavior. These results also indicate that dysfunctional audit behavior is having an adverse impact on fraud detection. Shofiatul, Baridwan, and Hariadi (2016) showed that the role conflict positively affects auditor desertion tendency, though the impact of role ambiguity on desertion is not significant. Utami and Nahartyo (2013) found a positive relationship between role conflict and role overload and occupational depreciation, but role ambiguity has no meaningful relationship with occupational depreciation. By evaluating the role of more understanding of uncertainty and conflict as the sub-factors of stress in occupational performance, MohdNor (2011) revealed that occupational performance is only influenced by role ambiguity. There is no relationship between role conflict and occupational performance. Soo Young Kwon (2014) perceived that audit firms' change would increase audit work hours and increase auditors' payment. Moreover, audit quality is remained unchanged and even reduced in some cases.

Forooghirad and Bazazzade (2018) argue that the increased auditors' stress has a negative impact on audit quality, in which such an effect is more intense for first audit works. Yan and Xie (2016) discovered that, in general, the decrease of audit quality is not due to the work stress of auditors, and understanding work stress relies on the auditors' characteristics. The auditors of international audit firms and those who have some common interests respond more to the work stress than industrial experts. When facing the state-owned firms, auditors are more inclined to respond. The results of this study show that audit firms pay more attention to the work stress of auditors. Chen and Silverthorne (2008) show that control position in accountants (the position of internal or external control) play a significant role in predicting the amount of job satisfaction, stress, and performance of auditors in Taiwanese audit firms. Besides, people with higher internal control positions experience lower stress levels and higher job satisfaction levels and performance levels. Moreover, if the occupational stress is not controlled appropriately, job satisfaction would be little, work performance will be weak, and the physical effect will be negative. Larson et al. (2004) analyzed how work stress contributed to occupational depreciation and job satisfaction of internal auditors and discovered that some organizational stress factors compared with individual stress factors (time pressure, role ambiguity, role conflict, and role overload), are the source of more stress for internal auditors.

Yan and Zhi (2016) propose a negative relationship between work stress and audit quality in being the new clients' primary auditor. Dody and Tiara (2018) support the idea by ensuring auditor tenure and auditor reputation affect audit quality. A provided meta-analysis by Salehi, Fakhri, and Daemi Gah (2019) illustrates no significant relationship between these two variables, in general. But, considering audit quality based on several measurements into four sub-groups of discretionary accrual, fraudulent reporting, type of comment, and other quality criteria, they show that discretionary accrual and fraudulent reporting confirm a positive relationship, kind of auditor opinion, and other quality criteria show no significant correlation.

Narayanaswamy et al. (2019) articulate that mandatory audit firm rotation does not appear to have improved audit quality, reduced audit costs, and increased audit market competition. Maria et al. (2018) support the idea that auditors' long-term tenure on discretionary accruals in Spain affects auditors' quality and independence.

Financial statements of audited reports of auditors are among such documents that have attracted more attention to investors recently. Carlo and Davide's (2019) findings

particularly emphasize the role of Internal Audit as an important corporate governance mechanism and on the new challenges faced by external auditors in the form of higher audit requirements. Chan et al. (2019) suggest that additional audit effort effectively reduces the risk of financial misstatements for clients with weak internal controls, which in turn requires overload stress for auditors to perform their duties.

Auditing the internal control dominant on financial reporting is carried out to make a statement about an economic unit's internal control effectiveness. Although the aim of such an audit is different from auditing financial statements, these two audits will perform in an integrated manner, so the auditor should schedule and perform in such a way to fulfill the objectives of both audits. In such a case, it is expected that material weaknesses in internal controls are likely to expose additional risk to external auditors, which may require more significant effort and time to moderate such risks. Therefore it may exert further pressure considering tight audit budgets.

To achieve the objectives of the study and given the proposed literature, the following hypotheses are formulated:

H_1: Audit work stress play a deteriorating role in audit quality.

H_2: Being the primary auditor plays an intensifying role in determining the association between auditors' work stress and audit quality.

H_3: Audit work stress play a deteriorating role in internal control weaknesses.

3. Research methodology

3.1. Statistical population

The investigated data include listed firms on the Tehran Stock Exchange for the period of 2012-2018. Since the Securities and Exchange Organization has disclosed internal control weaknesses compulsory, it is required to analyze the forward-looking data such as estimating the discretionary accruals and operational cash flow. Thus research models should be analyzed for such a period. Also, the data of 2010, 2011, and 2018 are considered for calculating the standard deviation of return on assets and estimating the model of discretionary accruals. To test the study's hypotheses, multivariable linear regression analysis and panel method are used for analyzing the research model. First, the appropriate method for model fitting is selected. Using the F-Limer and Hausman tests and by analyzing the primary hypotheses of the regression, including the test of normality Jarque-Bera, variance homogeneity test of Breusch-Pagan, and autocorrelation test of Breusch-Godfrey, the appropriate method for fitting the selected model is simple linear regression, simple linear regression with the time factor, panel method with fixed effects, panel method with random effects, and panel method with pooled data.

The statistical sample of this study is selected by screening the statistical population, such that only companies with the following conditions are selected for the study:

Table 1: final volume of the sample

Characteristic	No.
Total no. of listed firms on the Stock Exchange at the end of 2017	523
No. of firms that were not active during 2011-2017 in the Stock Exchange (were omitted from the Stock Exchange or entered the Over-the-counter market	(151)
No. of firms listed on the Stock Exchange after 2010	(38)
No. of firms that were affiliated withholdings, investment, financial intermediaries, banks, and leasing companies	(66)
No. of firms that changed their fiscal year during 2010-2017	(11)
No. of firms that their fiscal year not ended on March	(67)
No. of firms that have more than three months of transaction halt during 2010-2017	(68)
No. of firms that their required information was not available or defected	(11)
Total no. of sample firms	111

3.2. Variables measurement

To measure the qualitative variables of this paper, such as audit quality and material internal control weaknesses as dependent as well as audit work stress as independent, and other control variables, the following quantifiers are applied:

3.2.1. Audit quality (discretionary accruals)

The absolute value of discretionary accruals ($|DAC|_{it}$) is computed using the following equation (Francis et al., 2005):

$$\triangle WC_{it} = \beta_0 + \beta_1 CFO_{it-1} + \beta_2 CFO_{it} + \beta_3 CFO_{it+1} + \beta_4 \triangle REV_{it} + \beta_5 PPE_{it} + \varepsilon$$

$\triangle WC_{it}$: Changes in working capital of the firm i in the year t

CFO_{it-1}: Operational cash of the firm i in the year t-1

CFO_{it}: Operational cash of the firm i in the year t

CFO_{it+1}: Operational cash of the firm i in the year t+1

$\triangle REV_{it}$: Income changes of the firm i in the year t

PPE_{it}: Net fixed assets of the firm i in the fiscal year t

The above model is administered for each industry-year to analyze the information. The absolute value of model residual, which indicates optional obligations, will be used as the audit quality agent. Having considered the most reliable and accurate measurement of audit quality based on Iran's business environment's requirements and features by prior literature, including Sajadi et al. (2012) and Forooghirad and Bazazzade (2018), we employed such a measurement in this paper.

3.2.2. Internal control weakness (ICMW)

This study's independent variable is the presence or absence of significant internal control weak points based on the audit report. Since in auditor report, only the significant weak points of internal control dominant on financial reporting are inserted, and other weak points that presented by the auditor in management letter is avoided, this paper only considered the dominant significant weak points of internal control on financial reporting, which is presented by the auditor's report. In case the firm has an internal control weakness, this variable is 1; otherwise, 0 will be assigned.

3.3. Moderator variable

The study's moderator variable is the first audit (FST) of auditor for the firm i, calculated using the dummy variable of auditor change. If the auditor audits the first year of the firm i 1, otherwise, 0 will be considered (Yan and Zhi, 2016).

3.4. Independent variable

The independent variables of the study include work stress (WS) of the auditor and the interactive effect of the first audit with work stress of auditor (FST*WS), which is measured as follows:

In the sample under study, work stress is measured among the listed firms by the auditor given the number of firms and commercial complication of each firm, so work stress is calculated via the following equation:

$$WS = \frac{\sum_{i=1}^{m} \sum_{j=1}^{n} TA_{ij}}{m}$$

WS: work stress of auditor

TA_{jj}: natural logarithm of total assets of j firms audited by auditor i.

n: total number of listed firms by the auditor audited in the fiscal year.

m: number of official auditors of a particular j firm.

In most cases, two auditors are responsible for auditing an annual report (m= 2),

though this number is three in some cases. The work stress of auditors is indicative of the mean work stress bore by two or three official auditors of a particular firm (Yan and Zhi, 2016).

3.5. The interactive effect of work stress on the first audit (WS*FST)

The variable of the interactive effect of the work stress of auditors with the first audit is computed by multiplying the values of two variables of work stress of auditor and first audit (Yan and Zhi, 2016).

3.6. Control variables: in this study, several variables were controlled to maintain their effects on the relationship between independent and dependent variables.

Firm size (SIZE): natural logarithm of the book value of total assets, put in the model to control the size (Yan and Zhi, 2016).

Financial leverage (LEV): financial leverage is computed by dividing total debts by total assets (Yan and Zhi, 2016).

Operational cash flow (CF): net input and output flow of operational cash divided into the book value of total assets for homogeneity (Yan and Zhi, 2016).

Financial risk (RISK): in this paper, the financial risk of firms is concentrated through the bias of return on assets for three years (Yan and Zhi, 2016).

Loss (LOSS): a dummy variable that, if the firm is losing, it is 1, otherwise 0 (Yan and Zhi, 2016).

Market value to book value of equity (TQ): is indicative of growth opportunities, which are computed by dividing the market value of equity into the book value of equity (Yan and Zhi, 2016).

The number of board members (SPV): is a natural logarithm for the number of board members (Yan and Zhi, 2016).

Firm age (Age): The natural logarithm of the number of firm ages from establishment data (Yan and Zhi, 2016).

Auditor's reputation (BIG): a dummy variable, such that if the firm is audited by the audit organization 1, otherwise, 0 (Yan and Zhi, 2016).

Year (Year): a dummy variable put in the model to control the year's effects (Yan and Zhi, 2016).

Industry (Industry): a dummy variable used for the effects of each industry's particular characteristics in models (Yan and Zhi, 2016).

First hypothesis test model

$$|DAC|_{it}= \beta_0+ \beta_1 WS_{it}+ \beta_2 Size_{it}+ \beta_3 Debt_{it}+ \beta_4 CF_{it}+ \beta_5 Risk_{it}+ \beta_6 Loss_{it}+ \beta_7 INV_{it}+ \beta_8 REC_{it}+ \beta_9 TQ_{it}+ \beta_{10} SPV_{it}+ \beta_{11} Age_{it}+ \beta_{12} Big_{it}+ \beta_{13} Year_{it}+ \beta_{14} Industry_{it}+ \varepsilon_{it}$$

Second hypothesis test model

$$|DAC|_{it}= \beta_0+ \beta_1 WS_{it}+ \beta_2 FST_{it}+ \beta_3 WS_{it}*FST_{it}+ \beta_4 Size_{it}+ \beta_5 Debt_{it}+ \beta_6 CF_{it}+ \beta_7 Risk_{it}+ \beta_8 Loss_{it}+ \beta_9 INV_{it}+ \beta_{10} REC_{it}+ \beta_{11} TQ_{it}+ \beta_{12} SPV_{it}+ \beta_{13} Age_{it}+ \beta_{14} Big_{it}+ \beta_{13} Year_{it}+ \beta_{14} Industry_{it}+ \varepsilon_{it}$$

Third hypothesis test model

$$ICMW_{it}= \beta_0+ \beta_1 WS_{it}+ \beta_2 Size_{it}+ \beta_3 Debt_{it}+ \beta_4 CF_{it}+ \beta_5 Risk_{it}+ \beta_6 Loss_{it}+ \beta_7 INV_{it}+ \beta_8 REC_{it}+ \beta_9 TQ_{it}+ \beta_{10} SPV_{it}+ \beta_{11} Age_{it}+ \beta_{12} Big_{it}+ \beta_{13} Year_{it}+ \beta_{14} Industry_{it}+ \varepsilon_{it}$$

If the coefficients of independent variables are significant at a 5% error level in these models, the research hypotheses will be accepted.

4. Empirical results

4.1. Descriptive statistics

The descriptive statistics reported in Table 2 indicate the descriptive parameters of each variable separately. These parameters mainly include the information related to central indexes, including minimum, maximum, mean, median, and information related to dispersion indexes, including standard deviation. The essential primary index is mean, which is indicative of the balance point and center of gravity of distribution and an appropriate index for indicating the centrality of data.

Table 2: descriptive statistics of variables

Sign	Variable	No. of observation	Mean	Std. dev.	Min.	Max.
$\lvert DAC_{it} \rvert$	Audit quality	555	0.0468	0.0443	0.00003	0.4133
WS_{it}	Work stress of auditor	555	15.4398	0.9665	9.8423	17.4722
FST_{it}	Auditor change	555	0.4018	0.4907	0.0000	1.0000
$Size_{it}$	Firm size	555	28.0730	1.3653	24.3485	32.9655
$Debt_{it}$	Financial leverage	555	0.6465	0.2273	0.0436	2.3152
CF_{it}	Operation cash to book value of total assets	555	.1140	0.1272	-0.3361	0.5684
$Risk_{it}$	Risk	555	0.0559	0.0539	0.0004	0.5838
$Loss_{it}$	Dummy variable of loss	555	0.1532	0.3605	0.0000	1.0000
LnV_{it}	Inventory to operational income	555	0.3374	0.2472	0.0000	2.8134
REC_{it}	Accounts receivable to operational income	555	0.3917	0.3727	0.0000	2.2789
TQ_{it}	Market value to book value of equity	555	2.4458	4.5697	-31.5793	63.4352
SPV_{it}	No. of board members	555	1.6149	0.0425	1.6094	1.9459
Age_{it}	Firm age	555	3.6622	0.3334	2.7726	4.2047
Big_{it}	Dummy variable of auditor reputation	555	0.2523	0.4347	0.0000	1.0000
$ICMW_{it}$	Internal control weakness	555	0.4396	0.4968	0.0000	1.0000

Resource: research findings

4.2. Combination test

To estimate the pattern, the F test should first examine the pooled or panel data. This test's null hypothesis shows the pooled data, and the first hypothesis indicates the panel data. Given the pooled test results, which are depicted in Table 3, the null hypothesis concerning the pooled data is rejected at a 99% confidence level for all three models. Hence, the panel data model should be used for the estimation of coefficients of these three models.

Table 3: The results of the pooled test

	Calculated statistic	Prob. Level
Model 1	1.58	0.0007^{***}
Model 2	1.58	0.0008^{***}
Model 3	12.68	0.0000^{***}

Note: *** is significance at 99% level

4.3. Test of determining the fixed or random effects

In the Hausman test, the model coefficients are estimated by both estimators. Then, the significance of the difference between the estimated coefficients will be examined. If such a difference is significant, the model with the fixed effect is preferred to random effects. The null and opposite hypotheses are expressed as follows:

$$H_o : \beta_{FE} = \beta_{RE}$$

$$H_1 : \beta_{FE} \neq \beta_{RE}$$

In which β_{FE} and β_{RE} are model parameters in fixed effects and random effects approach. Under the null hypothesis, both estimators of fixed and random effects are compatible, but only the estimator of random effects is efficient asymptotically. This is while under the opposite hypothesis, only the estimator of fixed effects is compatible. In case of rejection of the null hypothesis, the model with fixed effects has priority over the model with random effects, and a model with fixed effects should be used. The Hausman diagnostic test or m statistic is as follows:

$$m = \hat{q}(\hat{V}_{FE} - \hat{V}_{RE})^{-1}\hat{q}$$

Such that $\hat{V}_{FE}$ and $\hat{V}_{RE}$ represent the compatible estimators of the asymptotic covariance matrix of $\hat{\beta}_{FE}$ and $\hat{\beta}_{RE}$ $\hat{q} = \hat{\beta}_{FE} - \hat{\beta}_{RE}$, respectively. The m statistic has χ^2 distribution with K degree of freedom. K represents the matrix order $(\hat{V}_{FE} - \hat{V}_{RE})$.

Table 4: The results of the Hausman test

	Calculated statistic	Prob. Level
Model 1	43.79	0.0000***
Model 2	43.39	0.0001***
Model 3	27.35	0.0069***

Note: *** is significance at 99% level

4.4. Results of model estimation

The results of the robust model estimation are reported in Table 5. In the panel data model, four classic hypotheses of econometrics comprising linearity among variables, exogeneity of descriptive variables, the variance of homogeneity, and absence of serial autocorrelation among disrupting components are discussed, and the reliable results are reported.

Given the used regressions, only the intercept of the third model is significant. The third model's intercept is equal to 2.7154, which is significant at a 99% confidence level.

According to the observed results, the audit work stress (WS) variable is negatively associated with the audit quality. The results coefficient numbers suggest that by a 1% increase in auditors' work stress, audit quality will decrease on average by 0.0065%. Meaning, as it is expected and proposed by Richard et al. (2019), Umar et al. (2017), and Forooghirad and Bazazzade (2018), intense work stress, related to tight time budget, work ambiguity, and conflict, is likely to expose additional workload to auditors, which in turn may deteriorate the quality of audit services outcome.

However, further analyses demonstrate that being the primary auditor proxied by (WS*FST) plays a moderating role in the association between audit work stress and audit quality. It means auditors experience less audit work stress under extended time

budget, appointing experienced auditors, and improved audit independency. In this regard, Dody and Tiara (2018) and Salehi, Fakhri, and Daemi Gah (2019) provide similar findings.

Table 5: The results of model estimation

Variable	Model 1	Model 2	Model 3
	Coefficient (standard error)	Coefficient (standard error)	Coefficient (standard error)
Constant	0.0361 (0.0868)	-0.0646 (0.1009)	2.7154 (0.9406)
WS_{it}	-0.0065 (0.0024)	-0.0056 (0.0031)	0.0248 (0.01667)
FST_{it}		-0.0037 (0.0028)	
$(WS*FST)_{it}$		0.0051 (0.0245)	
$Size_{it}$	-0.0030 (0.0017)	-0.0098 (0.0076)	-0.0582 (0.0297)
$Debt_{it}$	0.0259 (0.0098)	0.0353 (0.0094)	0.3726 (0.1494)
CF_{it}	0.0336 (0.0153)	0.0647 (0.083)	0.3064 (0.2133)
$Risk_{it}$	0.1876 (0.0374)	0.1093 (0.0365)	0.5274 (0.4773)
$Loss_{it}$	-0.0095 (0.0060)	-0.0103 (0.0062)	0.1386 (0.0841)
LnV_{it}	-0.0233 (0.0083)	-0.0418 (0.0098)	0.1168 (0.0837)
REC_{it}	-0.0111 (0.0055)	-0.0079 (0.0051)	-0.0529 (0.0408)
TQ_{it}	-0.0007 (0.0004)	-0.0014 (0.0007)	0.0062 (0.0028)
SPV_{it}	-0.0169 (0.0470)	0.1416 (0.0862)	-0.9765 (0.1109)
Age_{it}	0.0012 (0.0062)	0.0009 (0.0069)	0.0989 (0.1309)
Big_{it}	-0.0186 (0.0079)	-0.0115 (0.006)	-0.1745 (0.1176)
Number of obs.	555	222	333
Adj. R-squared	0.1201	0.2348	0.0783

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

The obtained results also show that the variable (WS) has a positive impact on the reported material internal control weaknesses. In this respect, the coefficient of variable provides that by a 1% increase of audit work stress, the internal control weaknesses would be increased by 0.0248%.

The coefficient of the variable of firm size is negative and significant in all three models. Thus, by a 1% increase in the variable of SIZE, audit quality at a 90% level will decrease by -0.0064%, and weakness on internal controls will reduce by -0.0582% at a 95% confidence level. Collectively, it means that more prominent clients are more likely to suffer from lower audit quality and more considerable internal control weaknesses.

In contrast, the financial leverage coefficient is positive in all three models at a 99% confidence level. Hence, by a 1% increase in the Debt variable, audit quality will increase on average by 0.0306%, and weakness in internal controls will increase by 0.3726%. It means that financial leverage plays an ameliorating role in audit quality.

Operational cash to book value of total assets increases audit quality and weakness in

internal controls. CF's variable coefficient in model 1-3 is estimated as 0.0336, 0.0647, and 0.3064, respectively, which are significant at 95, 99, and 90% confidence level. On the other hand, the risk is another factor for the increase in audit quality. By a 1% increase in the variable of risk, audit quality will increase on average by 0.1484%. The risk variable's coefficient is significant in the first two models at a 99% confidence level. In contrast, the coefficient of this variable is not significant in model 3. Hence, risk has no impact on weakness in internal controls.

It is also suggested that, by a 1% increase in the number of board members, audit quality will enhance by 0.1416%, but the weakness of internal controls drops by -0.9765%. The SPV variable coefficient is significant in model 2 at a 90% level and a 99% level in model 3. The auditor's reputation's dummy variable is also a decreasing factor for audit quality and internal controls weakness. By a 1% increase in the significant variable, audit quality will decrease on average by -0.0151%, and the weakness of internal controls will also reduce by -0.1745%. The coefficient of the dummy variable of auditor's reputation in models 1-3 is significant at 99, 90, and 90%, respectively.

The age variable coefficient is not significant in all three models, so the firm age has no impact on audit quality and internal controls' weakness. Moreover, industry and year's dummy variables were also considered in the models, and their resultant coefficients are not significant.

By comparing the first two models, we can say that model 2 outperform model 1 in terms of auditor change and combined variable (WS*FST). The coefficient of determination (R^2) of the second model is 23.48%, and the descriptive power of the first model is 12.01%. The descriptive power of model 3 is also 7.83%.

5. Conclusion

This investigation's main objective is to determine the potential effect of work stress on job performers' quality in the audit job environment. To be more precise, we extend our primary objective and current literature through three sub-objectives as follows.

First of all, when the stress of auditor increases, audit quality is likely to be decreased. In general, auditors are exposed to a stressful environment that affects their performance due to their work nature. The most destructive consequences of occupational stress on auditors' performance is the inappropriate quality of their work's outcome. The presence of heavy workload, numerous deadlines, excessive time pressure, work conflict and ambiguity, and due to conflict of interest which may exist in performing audits between management and investors and other beneficiaries, auditors are dealing with many people inside or outside the organization that ask for a broad spectrum of needs and expectations. Satisfying these divergent expectations and demands from clients' side in the workplace defined by the client creates some stressful situations that, due to failure to on-time recognition, not controlling, and dealing with these occupational stresses, would lead to depreciation and lower quality of the audit. It is believed that the stress related to work or budget scheduling would interrupt the successful implementation of audit methods and influence audit quality. The stress of time scheduling or the set deadline would intensify the auditors' pressures, and the audit workload hurts the audit quality at the firm level.

Moreover, the study results suggest a positive relationship between auditor's stress and audit quality of the first audit in the Tehran Stock Exchange. In contrast to an aspect evaluating the audit risk during the first audit of a new customer, the auditor should have a comprehensive understanding of the customer's operational features, accounting policies, and industry development and acquire other related information. In this case, since the auditors may have an extended time budget for performing their original

works as well as improved independence, the audit quality is expected to be enhanced.

Finally, the obtained results demonstrate that internal controls' material weaknesses are expected to be more profound in the case of higher audit work stress. Internal control audit of financial reporting aims to decide the effectiveness of internal control of a business unit's financial reporting. However, these two audit processes are performed in an integrated manner, so auditors should plan and execute in a way that meets the objectives of both audits. It is believed that the increase of stress and creating mental tension in audit staff would lead to failure in on time recognition of audit weaknesses, and they cannot have sufficient concentration to perform the audit procedures and explore the fraud and inherent risks.

References

Agoglia, C.P. Brazel, J.F. Hatfield, R.C. and Jackson, S.B. (2010). How do audit working paper reviewers cope with the conflicting pressures of detecting misstatements and balancing client workloads?. *Auditing: A Journal of Practice & Theory*, 29(2), 27–43. https://doi.org/10.2308/aud.2010.29.2.27

Ahmad, Z. and Taylor, D. (2009). Commitment to independence by internal auditors: The effects of role ambiguity and role conflict. *Managerial Auditing Journal*, 24(9), 899- 925. https://doi.org/10.1108/02686900910994827

Amiruddin, A. (2019). Mediating effect of work stress on the influence of time pressure, work-family conflict, and role ambiguity on audit quality reduction behavior. *International Journal of Law and Management*, 61(2), 434-454. https://doi.org/10.1108/IJLMA-09-2017-0223

Becker, C.L. DeFond, M.L. Jiambalvo, J. and Subramanyam, K.R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, 15(1), 1-24. https://doi.org/10.1111/j.1911-3846.1998.tb00547.x

Boles, J. Johnston, M. and Joseph, J.R. (2013). Role Stress, Work-Family Conflict, and Emotional Exhaustion: Inter-Relationships and Effects on Some Work-Related Consequences. *Journal of Personal Selling & Sales Management*, 17(1), 17-28. Doi: 10.1080/08853134.1997.10754079

Campbell, M.C. Sheridan, J.B. and Campbell, K.Q. (1988). How do Accountants Cope With Stress?. *The Woman CPA*, 50(3), 4-7. https://www.quora.com/How-do-accountants-cope-with-stress

Carlo, R. and Davide. M. (2019). A study of the interactions between internal audit function and external auditors in italy. *Corporate Ownership & Control*, 16(2), 38-47. Doi: 10.22495/cocv16i2art4

Chan. L.K. Raman, L.S. and Yang, R. (2019). The SOX 404 control audit and the effectiveness of additional audit effort in lowering the risk of financial misstatements. *Review of Quantitative Finance and Accounting*, https://doi.org/10.1007/s11156-019-00814-7.

Chen, J.Ch. and Silverthorne, C. (2008). The impact of locus of control on job stress, job performance, and job satisfaction in Taiwan. *Leadership & Organization Development Journal*, 29(7), 572-582. https://doi.org/10.1108/01437730810906326

Choo, F. (1995). Auditors Judgment Performance under Stress: A Test of the Predicted Relationship by Three Theoretical Models. *Journal of Accounting, Auditing, and Finance*, 10(3), 611-641. https://doi.org/10.1177/0148558X9501000311

DeAngelo, L.E. (1981). Auditor Size and Audit Quality. *Journal of Accounting and Economics*. 3(3), 297-322. https://doi.org/10.1016/0165-4101(81)90002-1

DeZoort, F.T. and dan Lord, A.T. (1997). A Review and Synthesis of Pressure Effects in Accounting. *Journal of Accounting Literature*, 16(1), 28-86.

https://www.econbiz.de/Record/a-review-and-synthesis-of-pressure-effects-research-in-accounting-dezoort-todd/10006995271

Dody, H. and Tiara, R.S. (2018). Does Audit Quality Mediate the Effect of Auditor Tenure, Abnormal Audit Fee and Auditor's Reputation on Giving Going Concern Opinion?. *International Journal of Economics and Financial Issues*, 8(1),143-152. https://www.econjournals.com/index.php/ijefi/article/view/5971

Farrastama, D.N. Asmony, T. and Hermanto, H. (2019). Effect of emotional intelligence on counterproductive work behavior with job stress as an intervening variable. *International Journal of Social Sciences and Humanities*, 3(1), 14-25. Doi: 10.29332/ijssh.v3n1.248

Ferry, A.P. and Yuliana, R. (2019). The Effect of Role Conflict and Role Ambiguity on Auditor Independence with Spiritual Intelligence as A Moderation Variable. *Proceedings of the 2018 International Conference on Islamic Economics and Business (ICONIES 2018).* Retrieved from: https://www.atlantis-press.com/article/125920565.

Forooghirad, R. and Bazazzade, H. (2018). The effect of auditors' work stress on the audit quality. *Auditing Knowledge*, 19(74), 151-174. (In Persian).

Francis, J. LaFond, R. Olsson, P. and Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics*, 3, 295- 327. https://doi.org/10.1016/j.jacceco.2004.06.003.

Gary, S. and Ramanauskas-Marconi, H. (1989). *Behavioral Accounting*. South-Western Publishing Company, ISBN: 0538016507, 9780538016506.

Goolsby, J.R. (1992). A Theory of Role Stress in Boundary Spanning Positions of Marketing Organizations. *Journal of the Academy of Marketing Science*, 20(2),155-164. https://link.springer.com/article/10.1007/BF02723455

Javady, M. Asadollahi, A. and Tarokh, E. (2012). The examination of the relationship between role stress with customer orientation and job performance of retail salespeople. *American Journal of Scientific Research*, 6(13), 1-18. https://www.sid.ir/en/journal/ViewPaper.aspx?id=291771

Jeffrey, H.G. and Parasuraman, S. (1987). A Work-Nonwork Interactive Perspective of Stress and Its Consequences. *Journal of Organizational Behavior Management*, 8(2), 37-60. Doi: 10.1300/J075v08n02_04

Karatepe, O.M. and Tekinkus, M. (2006). The effects of work-family conflict, emotional exhaustion, and intrinsic motivation on job outcomes of front-line employees. *International Journal of Bank Marketing*, 24(3), 173 – 193. Doi: 10.1108/02652320610659021

Kinnunen, U. Feldt, T. Geurts, S. and Pulkkinen, L. (2006). Types of work-family interface: Well-being correlates of negative and positive spillover between work and family. *Scandinavian Journal of Psychology*, 47(2), 149-162. Doi: 10.1111/j.1467-9450.2006.00502.x

Kwon, S.Y. and Lim, Y. and Simnett, R. (2014). The Effect of Mandatory Audit Firm Rotation on Audit Quality and Audit Fees: Empirical Evidence from the Korean Audit Market. *Auditing: A Journal of Practice & Theory*, Forthcoming. Available at SSRN: https://ssrn.com/abstract=1764343.

Larson, L. Meier, H. and Poznanski, P. (2004). Concepts and Consequences of Internal Auditor Job Stress. *International Journal of Accounting and Finance*, 12(6), 35-46.

Lo, M. and Ramayah, T. (2011). Mentoring and job satisfaction in Malaysian SMEs. *Journal of Management Development*, 30(4), 427-440. Doi: 10.1108/02621711111126891

Lo'pez, D.M. and Peters, G.F. (2012). The effect of workload compression on audit

quality. *Auditing: A Journal of Practice & Theory*, 31(4), 139–165. https://doi.org/10.2308/ajpt-10305

Maria, I.K. and Augustinos, I.D. (2018). Impact of auditor tenure on audit quality: European evidence. *Investment Management and Financial Innovations*, 15(1), 374-386. Doi: 10.21511/imfi.15(1).2018.31

Mcclenahan, C.A. Giles, M.L. and Mallett, J. (2007). The importance of context specificity in work stress research: a test of the demand–control–support model in academics. *An International Journal of Work, Health & Organisations*, 21(1), 85–95. https://doi.org/10.1080/02678370701264552

Narayanaswamy, R. and Raghunandan, K. (2019). The Effect of Mandatory Audit Firm Rotation on Audit Quality, Audit Fees, and Audit Market Concentration: Evidence from India. *IIM Bangalore Research Paper*, 582. http://dx.doi.org/10.2139/ssrn.3360256.

Noor, N.M. (2003). Work and family-related variables, work-family conflict, and women's well-being: Some observations. *Community, Work & Family*, 6(3), 297-319. https://doi.org/10.1080/1366880032000143474

Otley, D.T. and Pierce, B.J. (1996). Audit Time Budget Pressure: Consequences and Antecedents. *Accounting, Auditing and Accountability Journal*, 9(1), 31-58. https://doi.org/10.1108/09513579610109969

Posig, M. and Kickul, J. (2004). Work-role expectations and work-family conflict: Gender differences in emotional exhaustion. *Women in Management Review*, 19(7), 373-386. https://doi.org/10.1108/09649420410563430

Putra, I.G. and Sudana, I.G. (2019). Effect of auditor's role conflict on auditor's stress with core self-evaluations as moderators. *International Research Journal of Management, IT & Social Sciences*, 6(4),147-155. Doi: 10.21744/irjmis.v6n4.669

Richard, W. Suwandi, N. and Lukman, L. (2019). JOB BURNOUT DAN REDUCED AUDIT QUALITY PRACTICES. *Jurnal Sistem Informasi, Manajemen dan Akuntansi (SiMAk)*, 17(1), 42-83. https://doi.org/10.35129/simak.v17i01.71

Robbins, S.P. and Judge, T.A. (2008). *Essentials of organizational behavior* (9th ed.). New Delhi: Pearson-Prentice Hall.

Rodriguez-Escudero, A.I. Carbonell, P. and Munuera-Aleman, J.L. (2010). Positive and negative effects of team stressors on job satisfaction and new product performance. *Journal of Product Innovation Management*, 27(6), 856-868. https://doi.org/10.1111/j.1540-5885.2010.00756.x

Sajadi, S.H. Farazman, H. and Ghorbani, H. (2012). The effect of audit appointment continuity and audit quality. *Journal of accounting advances*, 4(1), 81-109. (In Persian)

Salehi, M. Fakhri Mahmoudi, M. and Daemi Gah, A. (2019). A meta-analysis approach for determinants of effective factors on audit quality. *Journal of Accounting in Emerging Economies*, 9(4), 287-312. Doi: 10.1108/JAEE-03-2018-0025

Shofiatul, B.J. Baridwan, Z. and Hariadi, B. (2016). Determinant of Auditors 'Turnover Intention from Public Accounting Firm. *Imperial Journal of Interdisciplinary Research*, 2(2), 537-547. http://www.onlinejournal.in/IJIRV2I2/076.pdf

Umar, M. Sitorus, Sh.M. Surya, R.L. Shauki, E.R. and Diyanti, V. (2017). Pressure, Dysfunctional Behavior, Fraud Detection, and Role of Information Technology in the Audit Process. *Australasian Accounting, Business and Finance Journal*, 11(4), 102-115. https://ro.uow.edu.au/aabfj/vol11/iss4/8/

Utami, I. and Nahartyo, E. (2013). The Effect of Type a Personality on Auditor Burnout: Evidence from Indonesia. *Global Journal of Business Research,* 5(2), 89-102. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2323678

Venkatesh, V. and Sykes, T.A. and Chan, F.K.Y. and Thong, J.Y.L. and Hu, P.J.H.

(2019). Children's Internet Addiction, Family-to-Work Conflict, and Job Outcomes: A Study of Parent-Child Dyads. *MIS Quarterly*, 43(3), 903-927. Doi: 10.25300/MISQ/2019/12338

Yan, H. and Xie, S. (2016). How does auditors' work stress affect audit quality? Empirical evidence from the Chinese stock market. *China Journal of Accounting Research*, 9(4), 305-319. https://doi.org/10.1016/j.cjar.2016.09.001

Zhao, X. and Namasivayam, K. (2012). The relationship of chronic regulatory focus to work-family conflict and job satisfaction. *International Journal of Hospitality Management*, 31(2), 458-467. https://doi.org/10.1016/j.ijhm.2011.07.004

ISSN-Print: 2588-6142

Ferdowsi University of Mashhad Press (FUMP)

IJAAF

IRANIAN JOURNAL OF
ACCOUNTING, AUDITING and FINANNCE
Volume 4, Issue 1, Winter 2020

IJAAF

IRANIAN JOURNAL OF
ACCOUNTING, AUDITING and FINANNCE
Volume 4, Issue 1, Winter 2020