

Namazi, Mohammad; Namazi, Navid Reza

Article

An empirical investigation of the effects of moderating and mediating variables in business research: Insights from an auditing report

Contemporary Economics

Provided in Cooperation with:

University of Finance and Management, Warsaw

Suggested Citation: Namazi, Mohammad; Namazi, Navid Reza (2017) : An empirical investigation of the effects of moderating and mediating variables in business research: Insights from an auditing report, Contemporary Economics, ISSN 2300-8814, University of Finance and Management in Warsaw, Faculty of Management and Finance, Warsaw, Vol. 11, Iss. 4, pp. 459-470,
<https://doi.org/10.5709/ce.1897-9254.256>

This Version is available at:

<https://hdl.handle.net/10419/195504>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Primary submission: 21.03.2017 | Final acceptance: 26.07.2017

An empirical investigation of the effects of moderating and mediating variables in business research: Insights from an auditing report

Mohammad Namazi¹, Navid Reza Namazi¹

ABSTRACT

This study examines the empirical impacts of moderating (MO) and mediating (ME) variables in business research, within the context of auditing reports. size, complexity of the operation, and risk of the firm were selected as the independent variable, moderating variable, and mediating variable, respectively. The selection was attempted over 15 years of research (1455 year-firm data) for the firms listed on the Tehran Stock Exchange (TSE). The following techniques were employed for testing the hypothesis: Pearson correlation, Levin, Lin, and Chu test, Hausman unit root, and multiple regression. The results revealed that there is a significant relationship between the size of the firm and the type of the auditing report. Moreover, a significant relationship between the size of the company and the type of auditing report is shown in the inventory value of the moderating variables. Furthermore, the same has been displayed in return on the assets and institutional ownership of the mediating variables. However, inventory and institutional ownership demonstrate a significant statistical relationship when moderating and mediating variables are considered simultaneously. The implication of this study is to demonstrate the moderating and mediating variables as significant impediments in the type of auditing report. This would change the design, theory, and implications of this research.

KEY WORDS:

Business research, Auditing reports, Size of the firm, Complexity of operations, Firm risk

JEL Classification: M41, M49

¹ Shiraz University, College of Economics, Management & Social Science, Department of Accounting, Iran

1. Introduction

An auditing report (AR) is the most potent information that is assimilated by the auditor. It reveals the final results of investigation of the auditor and the

auditing processes concerning various activities of the firms. Such reports are important as they are considered to be multi-faceted mechanisms for reducing conflicts of interests among various stakeholders- including managers, stockholders, creditors, government, and investors. Hence, AR particularly posits a very significant role for the firms and auditors (Paracini, Malsch, & Paillé, 2014; Diaz, 2016).

The auditing literature reveals that the complexity of the operations (CO) and risks (R) of the firms

Correspondence concerning this article should be addressed to: **Mohammad Namazi**, Iran, Shiraz, Eram Paradis, College of Economics, Management & Social Science, Department of Accounting, postcode 71946 85111. Tel: +98 71 36460520, Fax: +98 71 36460520. E-mail: mnamazi@rose.shirazu.ac.ir

are among the most influential factors, which could lead to significant uncertainty for the auditor. This could, in turn, affect the type of issuing AR (Milch & Laumann, 2016, Liu, 2015). The size (S) of the firm is also a potent variable affecting the issuance of AR and R factors (Youn, Hua, & Lee, 2015). The impact of the CO, R, and S of the firm are studied individually in the auditing literature (Cohen, Krishnamoorthy, & Wright, 2007; Bruynseels & Willekens, 2012; Sun & Cui, 2014, Rodríguez et al, 2014, Youn et al., 2015). However, simultaneous effects of the S, CO, and R factors of the firms on the type of the AR have not yet been studied. Furthermore, the simultaneous effects of various elements of the CO and R factors of the firms, as moderating (MO) and mediating (ME) variable, on the type of the AR, has not yet been explored. Hence, one major aim of this study is to respond to the following inquiries:

- 1) What is the effect of CO, as a moderating variable, on the type of the AR report, when the S is considered?
- 2) What is the effect of the R of the firm as a mediating variable on the type of the AR, when the S of the firm is considered?
- 3) What is the simultaneous effect of the S of the firm as moderating and mediating variables, on the type of AR?

The structure of the study is as follows: Section 2 provides a theoretical basis, previous studies, and related hypotheses. Sections 3 and 4 present the research methods- including significant hypotheses, models, statistical techniques employed, and the findings, respectively. Consequently, the conclusion, discussion, limitations, and suggestions are presented in Sections 5 and 6.

2. Theoretical background, prior studies, and hypotheses

An AR is the end result of the auditing process. Based on the agency theory (Jensen & Meckling, 1976; Namazi, 1985; 2013) it is used as a mechanism for reducing agency conflict between the managers and other stakeholders, (specifically, shareholders). The type of AR peculiarly affects the interests of the managers, stockholders, and other stakeholders by decreasing the informational asymmetry between the agent and principals. Moreover, it accurately discloses the degree of

reality of the firm with the help of the judgement of the independent auditor (Taffler, Lu, & Kausar, 2004). However, the type of auditing report, which is issued by the independent auditor, depends on various variables. The most notable variables are as follows:

Size of the Firm (S)- When the S of the firm is small, the probability of issuing a qualified or adverse/disclaimer report by the independent auditor increases. This is because small firms usually do not maintain required legal documents appropriately. They do not maintain suitable accounting systems, and lack well-informed accounting personnel. Therefore, these small firms do not maintain appropriate accounting books, records, and financial statements consistent with the prescribed accounting, tax, and commercial standards and principles. In addition, the amount of their materiality level is low, due to their small sizes. These factors would increase the risks of the firm and auditing to the extent that the auditor may issue the qualified or adverse/disclaimer report in accordance to the Auditing Standards No. 42 and 51.

Earnhart and Leonard (2013) studied the role of the organizational structure and S in the auditing process. They concluded that corporate governance and S posit a significant relationship with the issuance of AR. Tsipouridou and Spathis (2014) also, by considering the significant factors affecting the type of AR, concluded that a significant relationship is predominant between S and R with the type of AR. Recently, Wang and Dou (2015) found that S is an influential factor affecting the type of AR by investigating the relationship between S and AR. Corbella, Florio, Gotti and Mastrolia (2015), investigated the factors affecting the quality of AR, and concluded that the S of the client's company is an influential factor affecting the type of AR. Heliodoro, Carreira and Lopes (2016) also arrived at a conclusion that there is a significant relationship between S and the qualified audit opinions.

The previous studies unambiguously indicated that a significant effect exists between the S of the firm and the type of AR.

Complexity of the Operations (CO): Another potent factor which affects the AR type is the CO of the firm (Blandón & Bosch, 2013). CO could reduce the

efficiency and effectiveness of the firm's systems and would provide a basis for the emergence of the risk for auditors. System effectiveness and CO are considered as a part of the firm's risks, which ultimately affect AR type (Kardes, Cavusgil, & Cavusgil, 2013).

To study the effect of CO, Hylas and Ashton (1982) tested 281 errors, which were required to be adjusted in the financial statements, and these were reported in 158 AR. The result revealed that the most infringed and distorted errors were related to accounts receivables and inventory. Xie, Cai and Ye (2010) concluded that CO is a significant factor affecting the type of AR. Ho and Kang (2013) identified the following as the components of CO: accounts receivables, inventory, return on assets, number of departments of foreign sales, merger, consolidation activities, and the ratio of the market value to book value. Their findings showed that the designated CO variables are influential in the operations of the firms. Moreover, Davies and Mackenzie (2014) inferred that the levels and volume of the activities exhibit a significant relationship with CO. Recently, Milch and Laumann (2016) deduced that CO would affect the risk associated with the firms.

Previous studies indicated that CO exerts a significant effect on the relationship between S and AR. Hence, the first hypothesis is provided as follows:

Hypothesis 1: Complexity of the operations of the firm, as a moderating variable, will affect the relationship between the size of the firm and the type of auditing report.

Risk (R): According to the Auditing Standard No. 42, the duty of the auditor is to assess the probability and significant effects of the risk (R). The R which cannot be ordinarily identified by substantive tests must also be identified by the auditor.

The importance of the evaluation of R by the auditor has also been emphasized in other auditing standards (for instance, No. 107). The higher the degree of R, the higher will be the amount of uncertainty and going concern of the firm. Therefore, R factor can create a situation, which will result in the issuance of the non-qualified report by the auditor (Taffler et al., 2004).

The effect of the internal control and inherent risks was evaluated by Messier and Austen (2000).

They showed that the CO and R factors maintain a significant relationship with the evaluation and issuance of the type of AR. Geiger, Raghunandan and Rama (2006) also derived at the conclusion that the uncertainty factor in "going concern", which is a part of R factor, posits the most significant influence on the judgment formation of the auditor in issuing AR. The role of corporate governance on the evaluation of the auditing R and auditor's planning was also studied by Cohen et al. (2007). Their findings showed that the board of directors would have a significant relation with identifying the risk of the firm. Bruynseels and Willekens (2012) studied the type of AR in more risky American firms. They discovered that the R of the firm and going concern are extremely important in issuing the type of AR. Tspouridou and Spathis (2014) also concluded that among the financial ratios of the clients such as profitability and S, activity uncertainty, and R, exhibit a significant relationship with the type of AR. Furthermore, Sun and Cui (2014) considered corporate governance variables and found that shares of the non-executive board members, duality of director's task, and institutional shareholders are regarded as the most important factors of the firm's R. Recently, Habib and Jiang (2015) investigated the R factors of China's firms including corporate governance, independence of the board of directors, and financial reporting. The result of their study indicated that the firm's R factors are influential impediments for financial reporting. Chen, He, Ma and Derrald (2016), also by considering the paradigms of the going concern in the process of issuing AR, arrived at a conclusion that R variables are the major factors affecting the type of AR.

The previous research indicated that the following are considered as significant R variables of the firms: quick ratio, return on assets, ratio of long-term liabilities and earnings before extraordinary items, share of non-executive board members, duality of director's task, and institutional shareholders. These R variables are considered to affect the issuance of the type of AR. Furthermore the mediating role in the relationship between S and AR is posited by the R of the firm. Thus, a firm which would experience a high R would probably not receive an unqualified AR. This is because the firm's R will eventually limit the scope of the investigation and deviate it from the accounting and auditing

standards. These factors, in effect, influence the type of AR issued by the auditor.

Hence, the following hypotheses are provided:

Hypothesis 2: The risk of the firm, as a mediating factor, affects the relationship between the size of the firm and the type of auditing report.

Hypothesis 3: The complexity of the operations and the risk of the firm posit a mediated-moderated effect on the relationship between the size of firm and the type of auditing report.

3. Research methodology

This study is a quantitative applied research that utilizes the quasi-design approach (Smith, 2014). The population of this study encompasses all listed firms in the Tehran Stock Exchange (TSE) market, Iran's largest stock exchange. It is a member of the World Federation of Exchanges and a founding member of the Federation of Euro-Asian Stock Exchanges.

The period of this study is 15 years (2001-2015). However, firms were selected on the basis of a systematic approach according to the following criteria:

- 1) The financial period of the firms is at the end of the year.
- 2) Financial institutions, banks, and holding companies are not among the firms selected.
- 3) The required financial information of the companies is the information available during the period of the study.
- 4) Firms were active during the period of the study.

Given the preceding conditions, 97 firms (1,455 year-firm) were identified for this study. The required data was obtained through the Sahra and Tadbir Pardas' software. Furthermore, the information relating to institutional ownership and market value was collected from the firm's financial statements and board of directors' reports. SPSS was employed for testing the hypotheses. Eviews, panel data, and multiple regression analysis were also employed for hypothesis testing.

3.1. Research variables and design

In this study, the type of (AR) was chosen as the dependent variable. This variable was also expended by Earnhart, and Leonard (2013) and Rodríguez,

Eldridge, Roldán, Leal-Millán and Ortega-Gutiérrez (2014). Furthermore, the (R) of the firm was extracted as the dependent variable in order to reflect the nature of the mediating variable in Hypotheses 2 and 3.

The (S) of the firm was selected as an independent variable. This variable has also been used in Earnhart, and Leonard (2013) and Rodríguez et al. (2014), among others.

The (CO) was used as the MO variable based on the present literature in order to: 1) extend the theory and design the relationship between the S of the company and the type of AR to a more realistic and complex situation, 2) determine "when" and under "what condition" the direct relationship between S and AR variables would hold significant, and 3) be consistent with the definition of the moderating variable (See, Baron & Kenny, 1986; Wilken, Jacob, Prime, 2013; Namazi & Namazi, 2016). Generally, as the CO is increased, the amount of uncertainty and disagreement of the auditor would also increase. Therefore, the type of AR could be affected. In this study, Figure 1 illustrates the schematic relation of the MO variable.

In Figure 1, three paths (A, B and C) are shown to consequently determine the effect of S, MO, and their interactions on the AR type. The significant effect of the MO variable is particularly analyzed by concentrating on path C –the interactive effect of MO and S variables.

Following Hylas and Ashton (1982), Ho and Kang (2013), Davies and Mackenzie (2014), accounts receivables, inventory, return on assets and the ratio of market value to book value were expended in order to study the effect of the MO variable. These variables were selected because they are the measures of complexity of the firm and are, in fact, effective in issuance of the AR.

Hypothesis 2 was provided in order to extend the design and theory of the relationship between S and AR. Based on the literature, the R of the firm was considered as the ME variable as it was hypothesized that the relationship between S and AR can be studied by a chain of causal relations. This relation considers R as an ME factor between S and AR. Moreover, the firm would actually maintain two roles: 1) The dependent variable with respect to S, and 2) the independent variable in regard to AR variable. In essence, the introduction of ME could explain "how" and "why" a correlation exists between S and AR (See, Baron & Kenny, 1986, Namazi & Namazi, 2016). The R of the firm has also been used by Messier and Austen

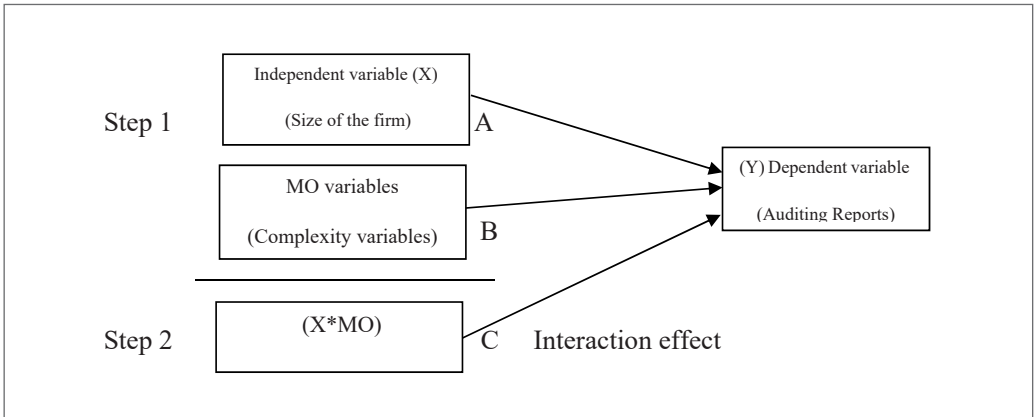


Figure 1. The effect of the moderating variable (complexity of the operations)

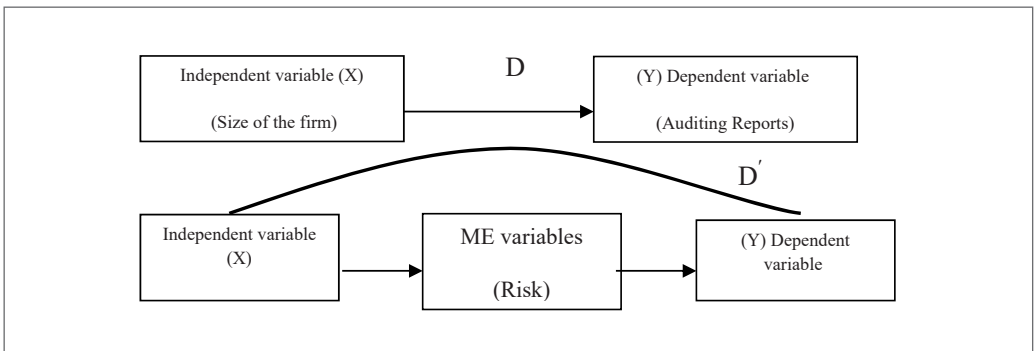


Figure 2. Path diagram of the mediating variable (risk)

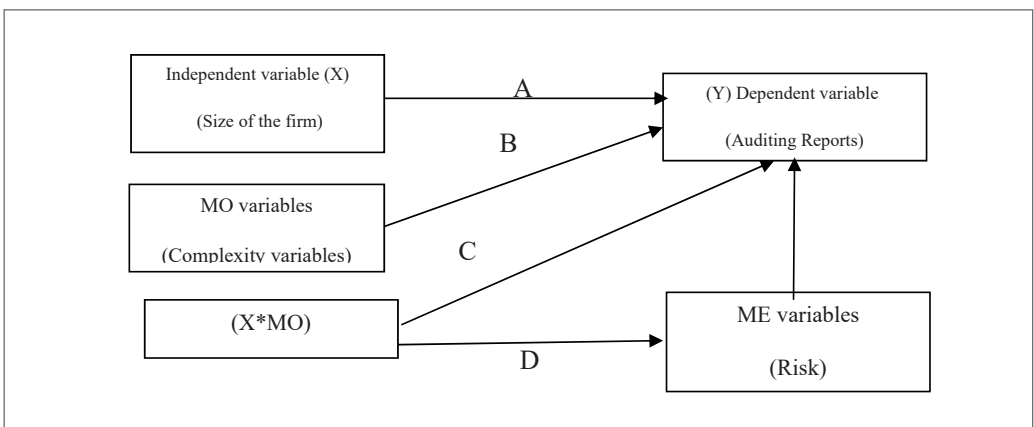


Figure 3. The simultaneous effects of the MO and ME (The mediation-moderation) effect

(2000), Cohen et al. (2007), Bruynseels and Willekens (2012) and Sun and Cui (2014) in their studies.

Figure 3 illustrates the simultaneous effects of the MO and ME (The mediation-moderation effect). It shows that the relationship between S and AR is not direct; rather it is based on the combination of the MO and ME variables. In this situation, the design and theory of the relationship between S and AR are extended to situations, in which the ME variable is affected by the determined interaction effect of the MO variable on the independent variable (S*MO). The ME variable, in turn, affects the dependent variable.

3.2. Models

The following equations were considered for each hypothesis, based on the Baron and Kenny (1986), Muller, Judd and Yzerbyt (2005) and Ro (2012).

First Hypothesis:

$$Y = \alpha_{10} + \alpha_{11} X + \alpha_{12} MO + \alpha_{13} (X*MO) + \epsilon_1 \tag{1}$$

Hence,

$$OPIN = \alpha_{10} + \alpha_{11} LNTA + \{\alpha_{12(1)} REC + \alpha_{12(2)} INV + \alpha_{12(3)} ATURN + \alpha_{12(4)} MB\} + \{\alpha_{13(1)} LNTA*REC + \alpha_{13(2)} LNTA*INV + \alpha_{13(3)} LNTA*ATURN + \alpha_{13(4)} LNTA*MB\} + \epsilon_1$$

For the second hypothesis, the following three multiple regressions were formed to reflect the nature of the mediating variables:

Second Hypothesis:

$$Y = \alpha_{20} + \alpha_{21} X + \epsilon_2 \tag{2}$$

$$ME = \alpha_{30} + \alpha_{31} X + \epsilon_3 \tag{3}$$

$$Y = \alpha_{40} + \alpha_{41} X + \alpha_{42} ME + \epsilon_4 \tag{4}$$

Hence,

$$OPIN = \alpha_{20} + \alpha_{21} LNTA + \epsilon_2$$

$$(QUICK + ROA + LEV + PROFIT/LOSS + BI + CEOCHR + INST) = \alpha_{30} + \alpha_{31} LNTA + \epsilon_3$$

$$OPIN = \alpha_{40} + \alpha_{41} LNTA + \alpha_{42} (QUICK + ROA + LEV + PROFIT/LOSS + BI + CEOCHR + INST) + \epsilon_4$$

Third Hypothesis:

$$Y = \alpha_{50} + \alpha_{51} X + \alpha_{52} MO + \alpha_{53} (X*MO) + \epsilon_5 \tag{5}$$

$$ME = \alpha_{60} + \alpha_{61} X + \alpha_{62} MO + \alpha_{63} (X*MO) + \epsilon_6 \tag{6}$$

$$Y = \alpha_{70} + \alpha_{71} X + \alpha_{72} MO + \alpha_{73} (X*MO) + \alpha_{74} ME + \alpha_{75} (ME*MO) + \epsilon_7 \tag{7}$$

Equation 5 is exactly the same as Equation 1. The right side expression of Equation 6 is exactly the same as that of the Equation 5. Hence,

$$OPIN = \alpha_{50} + \alpha_{51} LNTA + \{\alpha_{52(1)} REC + \alpha_{52(2)} INV + \alpha_{52(3)} ATURN + \alpha_{52(4)} MB\} + \{\alpha_{53(1)} LNTA*REC + \alpha_{53(2)} LNTA*INV + \alpha_{53(3)} LNTA*ATURN + \alpha_{53(4)} LNTA*MB\} + \epsilon_1$$

$$(QUICK + ROA + LEV + PROFIT/LOSS + BI + CEOCHR + INST) = \alpha_{60} + \alpha_{61} LNTA + \{\alpha_{62(1)} REC + \alpha_{62(2)} INV + \alpha_{62(3)} ATURN + \alpha_{62(4)} MB\} + \{\alpha_{63(1)} LNTA*REC + \alpha_{63(2)} LNTA*INV + \alpha_{63(3)} LNTA*ATURN + \alpha_{63(4)} LNTA*MB\} + \epsilon_1$$

$$OPIN = \alpha_{70} + \alpha_{71} LNTA + \alpha_{72} INV + \alpha_{73} ATURN + \alpha_{74} (LNTA*INV) + \alpha_{75} (LNTA*ATURN) + \alpha_{76} ROA + \alpha_{77} INST + \alpha_{78} (ROA*INV) + \alpha_{79} (ROA*ATURN) + \alpha_{80} (INST*INV) + \alpha_{81} (INST*ATURN)$$

Variables:

OPIN: This stands for the audit report. This variable was considered as a dichotomous variable. Thus, if the firm received an unqualified report, the number 1, was assigned. In other cases, 0 was assigned.

LNTA: This stands for the natural logarithm of the total assets.

REC: This refers to the percentages of the accounts receivables to total assets.

INV: This signifies the percentages of the inventory to total assets.

Table 1. Descriptive statistics of variables

Statistical indicator	Central indexes		Index of Distribution	Statistical indicator	Central indexes		Index of Distribution
	Median	Average	Standard deviation		Variable	Median	Average
OPIN	0.841242	0.789103	0.428844	LNTA	3.210170	2.162516	5.370082
ATURN	0.671690	1.000000	0.469851	ROA	0.038751	0.000000	0.193106
REC	0.039828	0.000000	0.195660	INV	0.841242	0.789103	0.428844
QUICK	0.655749	0.600000	0.176924	LEV	63.04841	73.30000	31.38912
MB	5.773185	5.683248	0.690706	LOSS	0.240614	0.237581	0.173225
BI	0.771804	0.718241	0.438342	CEOCHR	14.11531	12.57199	13.77684
INST	0.657850	0.653242	0.263460				

ATURN: This stands for asset turnover determined as total sales divided by total assets

MB: This denotes the ratio of the market value to the book value of the firm.

QUICK: Quick ratio = current assets - inventories and prepaid expenses ÷ current liabilities.

ROA: Return on assets = income before extra-ordinary item ÷ total assets.

LEV: It signifies the ratio of long-term liability = long-term liability ÷ total assets.

PROFIT/LOSS: This is the income before the extra-ordinary item. This variable was considered as dichotomous. If this item was less than 0, the number 1 was assigned; otherwise, 0 was assigned.

BI: It denotes for the percentage of board independence.

CEOCHR: This signifies the duality of the director's duty. If the CEO is also the chairman, the number 1 was considered; otherwise, 0 was considered.

INST: This stands for the number of shares held by institutional investor's ÷ total shares of the firm.

4. Hypothesis testing and findings

Table 1 shows the descriptive statistics related to the dependent, independent, moderating and mediating variables. This table indicates that 84% of the TSE companies received non-qualified reports during the period of the study. The average logarithm of the total assets of the TSE companies is equal to 3.21 million Rials. Furthermore, among the complexity variables, the market to book value ratio exhibits the highest average, median, and standard deviation. This could be associated with the inflation effect related to the sales of the companies and/ or the historical cost computation of the total assets, which is calculated in this ratio.

4.1. Assumption analysis

In this study, Jarque-Bera test was first employed in order to examine the normality of the data. However, Levin, Lin and Chu test was conducted in order to perform the reliability and stationary position of the research variables. The result revealed that the data for each test was normal (p-value = 0.00) and reliable (p-value = 0.00) at a significance level of 5%. As per the result, Hausman test was extricated to investigate the collinearity of the equations of the models. The results revealed that the model could be estimated based on the fixed approach. (The statistical print-out will not be presented here because of space limitation). After appropriate estimation, Pearson correlation method was carried out in order to

Table 2. The result of Pearson correlation

		Correlations											
		LNTA	ATURN	ROA	REC	INV	QUICK	LEV	MB	LOSS	BI	CEOCHR	INST
OPIN	Pearson Correlation	-.085*	-.071*	-.141*	-.030	.072*	-.037	.019	-.025	.047	.045	.023	-.215*
	Sig. (2-tailed)	.001	.007	.000	.252	.006	.166	.460	.376	.076	.124	.409	.000

* Significant

Table 3. First regression results of model 1-Hypothesis 1

Kind of variable	Variables	Coefficient	Standard deviation	T statistic	Sig	(R ²)	(Adjusted R ²)
Independent variable	LNTA	-0.050	0.019	-2.552	0.010*		
MO variables	INV	0.265	0.102	2.595	0.009*	0.018	0.016
	ATURN	-0.108	0.028	-3.757	0.000*		
	C	1.004	0.128	7.806	0.000*		

* Significant

examine the association relationships. In all of the analysis, the significance level was set at 5%. Table 2 shows the result of the Pearson correlation.

Consequently, for testing the hypothesis of the study, only the significant correlation coefficients were entered into the model.

4.2. Results of the hypotheses

Hierarchical multiple regression analysis was performed for the first hypothesis.

Table 3 shows that the relationship between AR and S (P=0.01), and MO variables for INV (P= 0.009), and ATURN (P=0.000) are significant, and the amount of R² is 0.018.

Table 4 shows that only INV (P=0.000) and LNTA*INV (P=0.002) are significant among the MO variables. This will unambiguously show the significance of the INV among the MO variables. Hence, H1 is confirmed and the R² of the model changes to 0.026.

In pursuing the second hypothesis, the statistical relationship between significant designated variables was tested through multiple regressions analysis based on the Equations 2 and 4, and MANOVA for Equations

3. The results of Equation 2, revealed that the relationship between S (P = 0.005) and AR is significant. The result for MANOVA, using Wilk's Lambda, was also significant (P = 0.000). The regression analysis of the model 3, showed that both ROA (P = 0.000) and INST (P = 0.000) as ME variables, are significant. Moreover, the R² of the model is increased to 0.056 (see table 5). Since the absolute coefficient of LNTA in model 4 ($\alpha_{11} = 0.012$) is smaller than its coefficient in model 2 ($\alpha_{21} = 0.050$), the mediation relationship exists. Hence, H2 was supported.

For the third hypothesis, Equation 5 is used to assess moderation of the overall treatment effect of Equation 1. Equation 6 allows the treatment effect on the mediator in Equation 3 to be moderated. Equation 7 is a moderated version of Equation 4, in which both mediator and the residual effect are controlled and allowed to be moderated.

In the third hypothesis, the simultaneous effect of the S and CO (INV and ATURN) and ME (ROA and INST) was considered. The result (of Equation 7) is shown in Table 6. Table 6 shows that the relationship between LNTA and AR is significant (P =.003). INV

Table 4. Second regression results of model 1-Hypothesis 1

Kind of variable	Variables	Coefficient	Standard deviation	T statistic	Sig	(R ²)	(Adjusted R ²)
Independent variable	LNTA	0.081	0.052	1.544	0.122		
MO variables	INV	2.886	0.849	3.399	0.000*	0.026	0.022
	ATURN	0.113	0.282	0.400	0.688		
Interaction effect	LNTA*INV	-0.471	0.152	-3.088	0.002*		
	LNTA*ATURN	-0.036	0.311	0.778	0.436		
	C	0.242	0.311	0.778	0.436		

* Significant

Table 5. Regression results of model 4-Hypothesis 2

Kind of variable	Variables	Coefficient	Standard deviation	T statistic	Sig	(R ²)	(Adjusted R ²)
Independent variable	LNTA	-0.012	0.019	-0.653	0.513		
ME variable	ROA	-0.003	0.000	-4.030	0.000*	0.056	0.054
	INST	-0.002	0.000	-6.588	0.000*		
	C	0.948	0.107	8.845	0.000*		

* Significant

Table 6. Regression results of model 7

Kind of variable	Variables	Coefficient	Standard deviation	T statistic	Sig	(R ²)	(Adjusted R ²)
Independent variable	LNTA	0.155	0.053	2.923	0.003*		
MO variable	INV	2.864	0.855	3.346	0.000*	0.083	0.076
	ATURN	0.107	0.288	0.372	0.709		
X*MO	LNTA*INV	-0.578	0.159	-3.618	0.000*		
	LNTA*ATURN	-0.043	0.049	-0.877	0.380		
ME variable	ROA	-0.000	0.001	-0.235	0.813		
	INST	-0.006	0.001	-5.957	0.000*		
ME*MO	ROA*INV	0.008	0.006	1.207	0.227		
	ROA*ATURN	-0.005	0.002	-2.745	0.006*		
	INST*INV	0.009	0.003	3.217	0.001*		
	INST*ATURN	0.002	0.000	2.308	0.021*		
	C	0.212	0.310	0.685	0.493		

* Significant

is the only significant MO variable, and $LNTA*INV$ is also significant ($0 = .000$). $INST$ is the only significant ME variable. The interaction effects of $ROA*ATURN$, $INST*INV$, and $INST*ATURN$ are also significant. Furthermore, in comparison with prior moderating and mediating models, the power of the model has increased to 0.083. This shows an improvement.

5. Conclusion and discussion

The result of this study indicated that there is a negative significant relationship between the size (S) of the firm and type of the auditing report (AR) on the Tehran Stock Exchange. This finding is consistent with other studies by Earnhart and Leonard (2013), Tsipouridou and Spathis (2014), Rodríguez et al. (2014), Wang and Dou (2015), and Heliodoro et al. (2016).

The result of the correlation coefficient demonstrated that among various MO variables, only $ATURN$ and INV , and among ME factors, ROA and $INST$, are significant. In the first hypothesis, when significant MO variables are entered into the model, INV and $LNTA*INV$ are the only variables which, along with the size of the firm, exhibit a significant relationship with the type of the AR. In this case, the power of the model increases to 2.6%. In the second hypothesis, the findings revealed that both ROA and $INST$ are the only significant variables among various ME variables representing the risk of the firm. Moreover, the power of the model is increased to 5.6%. This shows mediation has a more potent effect than moderation. When MO variables ($ATURN$ and INV) are simultaneously used with the ME variables (ROA and $INST$), variables S , $LNTA$, INV , $LNTA*INV$, $INST$, $ROA*ATURN$, $INST*INV$ and $INST*ATURN$ were significant. The power of the model also increased to 8.3%. Therefore, the model is improved when the simultaneously combined effects of the MO and ME are considered.

The result of this study cannot be compared totally with prior studies as there is no counterpart research conducted in this domain. However, it is consistent with Blandón and Bosch (2013), Ho and Kang (2013), Davies and Mackenzie (2014), and Milch and Laumann (2016) regarding the complexity issue, and Cohen et al. (2007), Tsipouridou and Spathis (2014), Habib and Jiang (2015) and Chen et al. (2016) with respect to risk.

The significance of this study is that, for the first time, it is attempted to extend the relationship between the size of the firm and the type of the AR. This has been achieved by introducing profound MO and ME variables in the TSE. The study contributed to the current knowledge through the introduction of a more accurate and complete research design. This design is of the MO and ME variables in this domain. Furthermore, the study enhanced the theory of the relationships between the size and the type of the AR. It showed “when” and under “what condition” the MO variables affect the relationship between the size of the firm and the type of the AR. Furthermore, this demonstrates “how” and “why” this relationship would be affected by ME variables.

However, the result of this study is limited due to the non-availability of data of some firms in selected years of the study. The inherent limitations of statistical methods applied in this study can be considered as other limitations. Despite these limitations, it is believed the internal and external validity of the research is intact.

6. Suggestions

Based on the findings of the research, the following suggestions are made:

1. This study did not consider the effect of other factors such as cultures, economics, power, and psychology of the auditors, on issuing ARs. Hence, these can be investigated by future researchers.
2. Auditing researchers, stock markets, and financial analysts, should pay attention to the simultaneous effects of the S, CO, and R. The role of inventories, return on assets, and institutional ownership, and their combined effects on the type of AR, are particularly important.
3. Business researchers should consider the role of other moderating and mediating factors in order to determine other significant variables affecting the relationships between S and AR. They could also apply other statistical and mathematical techniques such as SEM in this analysis.

References

- Baron, R. M., & Kenny, D. A. (1986). The moderator mediator variable distinction in social psychological research: conceptual, strategic, and statistical

- considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182.
- Blandón, J. G., & Bosch, M. A. (2013). Audit firm tenure and qualified opinions: New evidence from Spain. *Spanish Accounting Review*, 16, 118–125.
- Bruynseels, L., & Willekens, M. (2012). The effect of strategic and operating turnaround initiatives on audit reporting for distressed companies. *Accounting, Organizations and Society*, 37, 223–241.
- Cohen, J., Krishnamoorthy, G., & Wright, A. (2007). The impact of roles of the board on auditors risk assessments and program planning decisions. *Auditing. A Journal of Practice & Theory*, 26(1), 91–112.
- Chen, P. F., He, S., Ma, Z., & Derrald, S. (2016). The information role of audit opinions in debt contracting. *Journal of Accounting and Economics*, 61(1), 121–144.
- Corbella, S., Florio, C., Gotti, G., & Mastrolia, S. A. (2015). Audit firm rotation, audit fees and audit quality: The experience of Italian public companies. *Journal of International Accounting, Auditing and Taxation*, 25, 46–66.
- Davies, A., & Mackenzie, I. (2014). Project complexity and systems integration: constructing the London 2012, olympics and paralympics games. *International Journal of Project Management*, 32(5), 773–790.
- Diaz, M. C. (2016). Assembling the opinion: An active learning exercise for audit students. *Journal of Accounting Education*, 34, 30–40.
- Earnhart, D., & Leonard, M. (2013). Determinants of environmental audit frequency: The role of firm organizational structure. *Journal of Environmental Management*, 128, 497–513.
- Geiger, M. A., Raghunandan, K., & Rama, D. V. (2006). Auditor decision-making in different litigation environments: The private securities litigation reform act, audit reports and audit firm size. *Journal of Accounting and Public Policy*, 25(3), 332–353.
- Habib, A., & Jiang, H. (2015). Corporate governance and financial reporting quality in China: A survey of recent evidence. *Journal of International Accounting, Auditing and Taxation*, 24, 29–45.
- Heliodoro, P. A., Carreira, F. A., & Lopes, M. M. (2016). The change of auditor: The Portuguese case. *Spanish Accounting Review*, 19(2), 181–186.
- Ho, J. L. Y., & Kang, F. (2013). Auditor choice and audit fees in family firms: Evidence from the S&P 1500. *Auditing. A Journal of Practice & Theory*, 32(4), 71–93.
- Hylas, R., Ashton, R. H. (1982). Audit detection of financial statement errors. *The Accounting Review*, 57, 751–765.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Kardes, I. O. A., Cavusgil, S. T., & Cavusgil, E. (2013). Managing global megaprojects: Complexity and risk management. *International Business Review*, 22(6), 905–917.
- Liu, S. (2015). Effects of control on the performance of information systems projects: The moderating role of complexity risk. *Journal of Operations Management*, 36, 46–62.
- Messier, W. F., & Austen, L. L. (2000). Inherent risk and control risk assessments: Evidence on the effect of pervasive and specific risk factors. *Auditing. A Journal of Practice & Theory*, 19(2), 119–131.
- Milch, V., & Laumann, K. (2016). Interorganizational complexity and organizational accident risk: A literature review. *Safety Science*, 82, 9–17.
- Muller, D., Judd, C. M., & Yzerbyt, V. Y., (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology*, 89(6), 852–863.
- Namazi, M. (1985). Theoretical developments of principal-agent employment contract in accounting: The state of the Art. *Journal of Accounting Literature*, 4, 113–163.
- Namazi, M. (2013). Role of the agency theory in implementing management's control. *Journal of Accounting and Taxation*, 5(2), 38–47.
- Namazi, M., & Namazi, N. R. (2016). Conceptual analysis of moderator and mediator variables in business research. *Procedia Economics and Finance*, 36, 6540–554.
- Paracini, H., Malsch, B., & Paillé, A. M. (2014). Fear and risk in the audit process. *Accounting, Organizations and Society*, 39(4), 264–288.
- Ro, H. (2012). Moderator and mediator effects in hospitality research. *International Journal of Hospitality Management*, 31(3), 952–961.

- Rodríguez, A. L., Eldridge, S., Roldán, J. L., Leal-Milán, A. G., & Ortega-Gutiérrez, J. (2014). Organizational unlearning, innovation outcomes, and performance: The moderating effect of firm size. *Journal of Business Research*, 68(4), 803-809.
- Smith, M. (2014). *Research Methods in Accounting* (3rd ed.). London, UK: Sage Publishing.
- Sun, W., & Cui, K. (2014). Linking corporate social responsibility to firm default risk. *European Management Journal*, 32(2), 275–287.
- Taffler, R. J., Lu, J., & Kausar, A. (2004). In denial? Stock market underreaction to going-concern audit report disclosures. *Journal of Accounting and Economics*, 38(1), 263-296.
- Tsipouridou, M., & Spathis, C. (2014). Audit opinion and earnings management: Evidence from Greece. *Accounting Forum*, 38(1), 38– 54.
- Wang, C., & Dou, H. (2015). Does the transformation of accounting firms' organizational form improve audit quality? Evidence from China. *China Journal of Accounting Research*, 8, 279–293.
- Wilken, R., Jacob, F., & Prime, N. (2013). The ambiguous role of cultural moderators in intercultural business negotiations. *International Business Review*, 22(4), 736-753.
- Xie, Z., Cai, C., & Ye, J. (2010). Abnormal audit fees and audit opinion – further evidence from China's capital market. *China Journal of Accounting Research*, 3, 51-70.
- Youn, H., Hua, N., & Lee, S. (2015). Does size matter? Corporate social responsibility and firm performance in the restaurant industry. *International Journal of Hospitality Management*, 51, 127–134.

Acknowledgements

The authors are grateful to Professor Andrea Rey, as well as the two anonymous referees for their valuable comments.