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

- *Introduction* Some paragraphs contain explaining the problem, literature review, object (purpose), importance and necessity of it.
- *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;
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Editor's Note

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

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Yours faithfully,

Mahdi Moradi

Editor in Chief

Content

IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

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Research Article

Evaluating the Effect of Political Uncertainty on the Cost Stickiness

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ABSTRACT

The present study's main objective is to assess the impact of political uncertainty on cost stickiness intensity. This paper attempts to compare the cost stickiness intensity in periods with high political uncertainty with other periods. The statistical population includes listed companies on the Tehran Stock Exchange during 2009-2016 that given the use of screening methods, and after omitting the remote observations, this amount reaches 131 firms. In this paper, political uncertainty and sales changes were considered independent variables to assess their impact on asymmetrical cost behavior. In this paper, the panel data approach is used to test the research hypothesis. The data analysis results of firms using the multivariate regression at the 95% confidence level demonstrate that political uncertainty has a significant effect on cost stickiness intensity. The presidential election years of 2009 and 2013 were considered as years with high political uncertainty to achieve the objectives. The study results indicate the presence of sticky behavior of sales, general, and administrative costs in the so-called years. The asymmetry in cost behaviors is stronger during election years than in the non-election years, even after controlling other firm-level and country-level determinants.

Keywords: cost stickiness, political uncertainty, presidential election

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1.Introduction

Political uncertainty has gained significant importance recently both in research and in public policy circles. Political events may create political uncertainty, and it may influence a firm's planned activities (Bloom et al., 2007; Bernanke, 1983). Political uncertainty usually rises toward the peak during the years a country deals with major political shocks, and this would shape the firm decisions. Recent studies are concentrated on national elections worldwide to figure out whether or not political uncertainty contributes to firms' decisions and results (Durnev, 2010; Julio and Yook, 2016).

In this paper, we are concerned about the impact of political uncertainty on managers' operational decisions, which causes a change in cost behaviors. More specifically, we analyze whether or not political uncertainty contributes to managerial decisions to protect the resources. The sensitivity of asymmetrical behavior of cost to activity changes, called cost stickiness, will be measured in proportion to political shocks. The primary key to understanding the cost stickiness is to realize when and where managers are more or less inclined to maintain the resources during the decrease of activities. The previous studies were mainly concentrated on the effect of influential cross-sectional factors on cost stickiness intensity, while few studies are conducted on the temporal aspects. Anderson et al. (2003) state that managers, in response to uncertainty, reduce the committed resources considerably, until when the stability of the decrease in demand is better understood. Hence, under such an argument, the cost stickiness may be inversed within a time dimension period that solved the uncertainty. Cost stickiness, however, is not compared in different periods. This paper attempts to compare the cost stickiness intensity in periods with high political uncertainty with other periods.

Despite the pivotal role of certainty in managerial decisions, there is no direct empirical evidence to figure out how such uncertainty affects the direction and magnitude of costs' asymmetrical behavior. This paper aims to fill the studies' gap on the impact of uncertainty on managerial decisions in asymmetrical behavior of costs. More specifically, this paper is concerned about the effect of political uncertainty due to holding an election in the country by comparing the election years with non-election years. Analyzing the relationship between political uncertainty and cost stickiness, which increases the understanding of management from the firm's cost structure, is a matter of the utmost importance. Since the current study only analyzes Iran's election, it is different from that of the Lee et al. (2020) and Izadpour et al. (2018) in terms of the study period and the obtained results.

In this study, we attempt to answer the question, “to what extent does the political uncertainty affect the cost stickiness? In the following, we first analytically discuss the theoretical principles and the literature of the study and formulate the study's hypotheses, then we work on the methodology of the topic. Finally, the findings of the study are presented, analyzed, and conclusions and suggestions are provided.

2. Review literature and previous researches

One of the critical issues that affect the country and, consequently, the managerial decisions is political uncertainty, which is derived from holding an election. According to Agmont (1985), political risk is defined as unpredicted changes in production factors, exchange of goods, and services related to governmental measures and reactions (Zorgui, 2011). Managers make temporary decisions due to uncertainties they face in the year of an election, or they may attempt to preserve the resources due to a decrease in demands and the chance of temporalities of these cuts to pass these periods. Being aware of cost behavior changes with the changes in activity and/or sales level is among

other important information required for managerial decision-making in planning and budgeting, pricing the products, and determining the break-even point and other managerial issues (Namazi et al., 2012). Similar to all uncertainties, political uncertainty contributes to management decisions. Consequently, the financial performance and firm behaviors, which means the number of sales or demand and consequently, firms' financial position, are influenced by any political tension, either domestically or internationally.

In this paper, two major political events, namely presidential elections of 2009 and 2013, are used as the years with high political uncertainty. One of the significant reasons for why we selected the elections as the variable of political uncertainty was that the results of elections are closely related to managerial decisions in that the subsequent changes will have extensive consequences on the regulations of industrial, monetary, commercial, and tax policies (Julio and Yook, 2016). Julio and Yook (2016) demonstrate that companies decrease their investment before national elections, and also Jens (2017) posits that companies, before the election in America, lower their investment.

The other significant factor is that elections are an ideal turning point, enabling us to analyze the management behavior in preserving unused resources during the periods the management is optimistic about temporary sales reduction. On the other hand, since cost stickiness is the result of temporary changes of costs during uncertainty periods, years of election, as the periods with high uncertainty, allow the scholars to directly observe how cost stickiness will change following the uncertainty that affects the managerial decisions (Durnev, 2010). Lee et al. (2020) carried out a study on the relationship between political uncertainty and cost stickiness and discovered that political uncertainty in the years around major political shocks, like an election, can affect costs' asymmetrical behaviors. By evaluating the real effects of political uncertainty, Durnev (2010) reports that firm investment during the election years has less sensitivity to stock price. Hence, Banker et al. (2013) provide some evidence concerning political uncertainty's economic consequences and declare that political uncertainty increases unemployment and decreases investment. According to the theoretical principles and literature review, the following hypothesis was formulated.

Research hypothesis: political uncertainty has a significant impact on cost stickiness intensity.

3. Research methodology

The present study is practical, in terms of classification based on the objective. The aim of practical studies, in terms of method and nature, is correlational. In terms of method, the study is descriptive-correlational. Those studies that measure the relationship between two or more variables are correlational. In this paper, since the goal is evaluating the relationship between independent and dependent variables, the correlational method is used. After selecting the sample and calculating the study's min variables, we tested the hypothesis using the multiple regression and R and SPSS software.

3.1. Data Collection

The statistical population of this study includes the listed companies on the Tehran Stock Exchange during 2009-2016. The samples under study were selected using the screening method by considering the following criteria:

These firms should be enlisted on the Tehran Stock Exchange before 2009 and should be active during the period of study.

They should have no change in their fiscal year.

Due to the particular nature of their activity, they should not be affiliated with investment companies, banks, credit, and other monetary institutions and financial intermediaries.

The number of sample firms will be selected regarding the desired statistical confidence interval, which will be 95%. Among the statistical population, the sample firms are also selected using a systematic method, through which it is assumed that the statistical population is consistent. Thus, a code will be given to each firm, and given the adjusted statistical population, a firm will be selected in the statistical population. Finally, the volume of the final sample is 131 firms concerning the screening elimination method.

3.2. Test Model

In this study, we are specifically concerned about the impact of political uncertainty on cost stickiness intensity in the regression model. In this paper, the cost stickiness model of Anderson et al. (2003) is used. According to Dai and Ngo (2020), we consider two determining factors in this study for the amount of cost stickiness because lack of sufficient control on these determining factors would lead to an inappropriate relationship between political uncertainty and cost stickiness. First, assets intensity, which is indicative of the adjustment costs at the firm level (Anderson et al., 2003) and second, an index for showing sales drop in the previous year, which is indicative of management expectations of future sales (namely, management optimism or pessimism) (Banker et al. 2013). Finally, the gross domestic product's growth rate will be controlled because it affects management expectations (Andrson et al., 2003).

3.3. Measuring the main variables

Dependent variable:

$\Delta lnSGA_{it}$: changes in the natural logarithm of selling, general, and administrative costs for the firm i in the year t.

$$\Delta lnSGA_{it} = \log\left(\frac{SGA_{it}}{SGA_{i,t-1}}\right)$$

Independent variables:

$\Delta lnSALE_{i,t}$: Change of natural logarithm of sales is equal to:

$$\Delta lnSALE_{i,t} = \log(\frac{SALE_{i,t}}{SALE_{i,t-1}})$$

$DEC_{i,t}$: Dummy variable equal to 1 in case $SALE_{i,t} < SALE_{i,t-1}$, otherwise, 0.

$ElectionYear_t$: Dummy variable for the presidential election years 1, otherwise, 0.

The election-year is defined as political uncertainty indices (Dai and Ngo, 2020; Yook and Julio, 2016; Lee et al., 2020).

Control variables:

$lnAINT_{i,t}$: Assets intensity which is equal to:

$$ASINT_{i,t} = \log(\frac{ASSETS_{i,t}}{REV_{i,t}})$$

$GDPGROWTH_t$: gross domestic product is the most important index of economic performance evaluation, which is of great importance, and most of the other macroeconomic indicators rely on the calculation and estimation of this variable, directly or indirectly. Based on the definition, the Rial value of all final products manufactured by local economic units within a certain period (annually or periodically) is called gross domestic product, calculated in different methods. The growth rate of gross domestic product is computed on the Central Bank's Internet website and is available for different years.

$LAGDEC_{i,t}$: Dummy variable for sales drop with a period of delay (($SALE_{i,t-1} < SALE_{i,t-2}$).

4. Research findings

To better understand the study and be familiar with the study variables before statistical data analysis, these variables must be described. As shown in Table (1), the descriptive statistics of the observed data are obtained.

Table 1: descriptive statistics of research variables

Variable	$\Delta lnSGA$	$\Delta lnSALE$	DEC	ASINT	LAGDEC	GDPGROWTH	ElectionYear
Mean	0.013	0.062	0.45	65.075	0.52	2.38	0.25
Median	0.085	0.087	0	1.48	0	3	0
Minimum	-1.185	-1.31	0	0	0	-6.8	0
Maximum	7.75	0.741	1	32218.054	1	7.5	1
Std. dev.	0.779	0.502	0.498	1027.57	0.5	4.34	0.433
Coefficient of skewness	2.38	-0.821	0.2	29.6	-0.088	-0.99	1.56
the coefficient of kurtosis	13.37	-0.028	-1.964	919.5	-1.99	-0.062	-0.664

4.1. Inferential findings

Before model estimation, the stagnation of all variables used in estimations should be examined. In this paper, the Madala Vio Test is used due to the presence of numerous cross-sections (number of firms) and a few numbers of time-series, the result of which is depicted in Table (2).

Table 2: the collective unit root test of variables

$ElectionYear$	$GDPGROWTH$	$LAGDEC$	$ASINT$	DEC	$\Delta lnSALE$	$\Delta lnSGA$	
<2×10-16	<2×10-16	<2×10-16	<2×10-16	<2×10-16	<2×10-16	<2×10-16	**P-value**

As can be seen, the p-value is less than 0.05 for all variables. Hence, we can accept the stagnation of all variables. Before testing the research hypothesis, it is necessary to fit the study's base model (Anderson et al., 2003) to determine the cost stickiness.

Model (1)

$$\Delta lnSG\&A_{i,t} = \beta_0 + \beta_1 \Delta lnSALE_{i,t} + \beta_2 DEC_{i,t} \times \Delta lnSALE_{i,t} + \varepsilon_{i,t}$$

We used the F-Limer test to select between the regression and panel models. In case the level of significance of the test is more than 0.05, the OLS regression and if the level of significance is less than 0.05, the panel model will be used.

Table 3: the results of the F-Limer test for the first model

F statistic	Degree of freedom 1	Degree of freedom 2	P-value	Result (appropriate model)
2.05	130	915	0.000	Panel model

Therefore, the panel regression model should be selected. In this regard, the diagnostic tests should be used, and the premises of this model should be examined. First, we analyze the Hausman test. The test aims to select between a model with fixed effect and random effects. In case the p-value of this test is less than 0.05, the model with fixed effects will be selected.

Table 4: the results of the tests for the first model

test	Chi-square statistic	Degree of freedom 1	P-value	Result
Hausman test	0.755	2	0.685	Random effects
Breusch-Godfrey test	4.97	8	0.76	There is no serial autocorrelation
Breusch- Pagan test	3.85	2	0.15	Variance homogeneity is set

As can be seen, the model with random effects is accepted. Breusch-Godfrey Test is used for evaluating serial autocorrelation that, in case its p-value is less than 0.05, we can say the data have serial autocorrelation. As can be seen, errors have no serial autocorrelation, but variance homogeneity is also tested. In case the p-value is less than 0.05, the variance homogeneity hypothesis is rejected. Variance homogeneity is set, then after performing this panel regression with random effects, the results would be as follows:

Table 5: results of model 1

	$\Delta lnSG\&A_{i,t} = \beta_0 + \beta_1 \Delta lnSALE_{i,t} + \beta_2 DEC_{i,t} \times \Delta lnSALE_{i,t} + \varepsilon_{i,t}$				
Coefficients	**VIF**	**Coefficients of the variable in the model**	**The standard deviation of error**	**T statistic**	**p-value**
Intercept	-	0.097	0.04	2.43	*0.015
$\Delta lnSALE$	1.64	0.071	0.01	6.91	***0.000
$DEC \times \Delta lnSALE$	1.64	-0.163	0.015	-10.38	***0.000
Coefficient of determination = 0.19				Significance test of the model: Test statistic = 16.66 p-value = 0.000	

Linearity is a condition that shows an independent variable is a linear function of other independent variables. In this paper, the tolerance statistic and the inflation factor of variance is used to evaluate the collinearity. As shown in Table 5, the variance inflation factor (VIF) is also less than 10. Hence, the presence of all variables in the model does not manipulate that. Moreover, the p-value (0.000) of the test's test and significance also confirm the appropriateness of the model. This test is performed at the5% significance level, and as can be seen, the coefficient of β1 is positive and significant and is equal to 0.0715. This coefficient shows that for 1 unit of increase in sales income, the selling, general, and administrative costs will increase by 0.0715 units. On the other hand, the coefficient of β2 is negative and significant and is equal to -0.163, which shows 1 unit of decrease in sales will lower the selling, general, and administrative costs by 0.163 units.

4.2. Research hypothesis

H: political uncertainty has a significant impact on cost stickiness intensity.

The following model, which is derived from the study of Lee et al. (2020), is fitted for evaluating the research hypothesis:

Model (2)

$$\Delta lnSG\&A_{i,t} = \beta_0 + \left(\beta 1 + \beta 2\, ElectionYear_t + \beta 3\, lnAINT_{i,t} + \beta 4\, GDPGROWTH_t\right) \times \Delta lnSALE_{i,t} + (\beta 5 + \beta 6\, ElectionYear_t + \beta 7\, lnAINT_{i,t} + \beta 8\, GDPGROWTH_t + \beta 9\, LAGDEC_{i,t})\, DEC_{i,t} \times \Delta lnSALE_{i,t} + \varepsilon_{i,t}$$

In the model of Lee et al. (2020), the primary model of the study shows the total coefficients of $\Delta lnSALE_{i,t}$, which approximates the percentage of change in costs for a

1% increase (decrease) in sales (total coefficients of $\beta 1$ to $\beta 4$) and total coefficients of the variable of $DEC_{i,t} \times \Delta lnSALE_{i,t}$ (namely, total coefficients of β_5 to β_9), and the percentage change in costs for a 1% sales decrease. Hence, the total coefficients of β_5 to β_9 which are indicative of the difference in the percentage of change in costs during increase (decrease) in sales measure the percentage of cost stickiness in the years with political uncertainty.

According to Lee et al. (2020), in case of significance and negativity of coefficients, we can say that in the years of political uncertainty, the selling, general, and administrative costs are sticky.

The F-Limer test is used to select between regression and panel model. In case the test's level of test significance is more than 0.05, the OLS regression model and if the level of significance is less than the 0.05-panel model will be used.

Table 6: the results of the F-Limer test for the hypothesis model of the study

F statistic	Degree of freedom 1	Degree of freedom 2	P-value	Result (appropriate model)
2.08	130	908	0.000	Panel model

Hence, the panel regression model is selected. In this regard, the diagnostic tests should be used, and the assumptions of this type of model should be tested. Initially, we analyze the Hausman test. This test aims to select a model between fixed effects and random effects. In case the p-value of this test is less than 0.05, the model with fixed effects will be selected.

Table 7: test results concerning the hypothesis model of the study

Tests	Chi-square statistic	Degree of freedom	P-value	Result (appropriate model)
Hausman test	3.99	9	0.911	Random effects
Breusch - Godfrey test	6.4	8	0.602	There is no serial autocorrelation
Breusch-Pagan test	15.19	9	0.085	variance homogeneity is set

As can be seen, the model with random effects will be accepted. Breusch-Godfrey test is used for evaluating the serial autocorrelation that, in case the p-value is less than 0.05, we can say that data under study have serial autocorrelation. Also, errors have no serial autocorrelation, but variance homogeneity is also studied. In case the p-value is less than 0.05, the hypothesis of variance homogeneity is rejected. As can be seen, variance homogeneity is set. After performing this panel regression and panel with random effects, the following results are achieved:

As shown in the table, the maximum value of VIF is also less than 10, so it does not vitiate all variables in the model. Moreover, the p-value (0.000) of the test and the significance of models confirm this model's appropriateness. Given the presented results, we can observe that the coefficient of the independent variable of the natural logarithm of sales is positive and significant. This means that sales changes have a significant relationship with selling, general, and administrative costs changes. Besides, given the positivity of this coefficient, we can conclude that by a 1-unit increase in sales in proportion to the previous year, the selling, general, and administrative costs will increase by 0.0435 than the last period. Among the control variables of gross domestic product growth and asset intensity, none of them are significant.

Concerning the results, the t statistic (-15.9) shows that the moderator variable of $DEC \times \Delta lnSALE \times ElectionYear$ is statistically significant at 95% confidence level, because first, the absolute value of this statistic is more than 1.96, and second, the p-value (0.000) is also less than 5%. On the other hand, this variable's coefficient is

negative in the model, which indicates the presence of a cost stickiness phenomenon in the years with high political uncertainty.

Table 8: the results of the research hypothesis model

	$\Delta lnSG\&A_{i,t} = \beta_0 + (\beta 1 + \beta 2\ ElectionYear_t + \beta 3\ lnAINT_{i,t} + \beta 4\ GDPGROWTH_t) \times \Delta lnSALE_{i,t} + (\beta 5 + \beta 6\ ElectionYear_t + \beta 7\ lnAINT_{i,t} + \beta 8\ GDPGROWTH_t + \beta 9\ LAGDEC_{i,t})\ DEC_{i,t} \times \Delta lnSALE_{i,t} + \varepsilon_{i,t}$				
Coefficients	VIF	Variable coefficients in the model	Std. dev.	T statistic	p-value
Intercept					
$\Delta lnSALE$					
$\Delta lnSALE \times ElectionYear$					
$\Delta lnSALE \times lnAINT$					
$\Delta lnSALE \times GDPGROWTH$					
$DEC \times \Delta lnSALE$					
$DEC \times \Delta lnSALE \times ElectionYear$		-0.356	0.023	-15.9	***0.000
$DEC \times \Delta lnSALE \times lnAINT$		0.00054	0.0010	0.536	0.59
$DEC \times \Delta lnSALE \times GDPGROWTH$		-0.010	0.022	-0.483	0.628
$DEC \times \Delta lnSALE \times LAGDEC$	1.77	0.28	0.13	2.157	*0.031
Coefficient of determination = 0.323				Test of model significance Test statistic = 31.49 p-value = 0.000	

Moreover, the following results are derived from the study of Lee et al. (2020):

$\beta_1 + \beta_2 = 0.2285$

This equation shows that for a one-unit increase in sales in years with high political uncertainty, selling, general, and administrative costs increase by 0.2285 units.

$\beta_5 + \beta_6 + \beta_9 = -0.265$

This equation also shows that for a one-unit decrease in sales in years with high political uncertainty, selling, general, and administrative costs decrease by 0.2265 units. Further, the research hypothesis is also confirmed given the negativity and significance of β_6 coefficient. Hence, we can say that political uncertainty contributes to the intensity of cost stickiness.

5. Conclusion

In this paper, following the previous studies, the selling, general, and administrative costs were sticky during 1999-2016 (Namazi et al., 2012). Like all other uncertainties, political uncertainty contributes to management decisions and follows that, financial performance and firm behavior. This means that the generation of any type of political tension, including domestic or international, will influence the volume of sales or demand and, consequently, the firms' financial position. In this paper, a major political event, like the presidential election, is selected during 2009-2013 as the years with high political uncertainty. One of the main reasons why we select elections as the variable for political uncertainty is that the results of elections have a significant relationship with management decisions in that their subsequent changes have extensive consequences on

the industrial regulations, monetary, commercial, and tax policies (Julio and Yook, 2016). Another critical factor is that elections provide an ideal turning point for scholars and allow them to analyze the management behavior in preserving unused resources within the periods where management is optimistic about the temporary reduction of sales. The present study shows that selling, general, and administrative costs are sticky in the years with high political uncertainty. The research hypothesis is accepted. The obtained result is in line with that of Lee et al. (2020) but different from Izadpour et al. (2018). They find that cost behavior is not sticky in the years of the presidential election, but in other years cost behavior is sticky. Moreover, Rezaei et al. (2018) analyzed the impact of economic growth and economic sanctions on selling, general, and administrative costs. The election years of 2009 and 2013 were in periods with strict sanctions, and this paper also concluded that during 2006-2014, the selling, general, and administrative costs are sticky.

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Research Article

The Relationship Between the Weakness of Internal Controls and Fraudulent Financial Reporting with an Emphasis on the Adjustment Role of External Audit Quality

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ABSTRACT

Fraud in financial accounting has grown significantly in recent years. With the financial crisis emergence in recent years, fraud in financial reporting has been entered in politics. Today, legislator assemblies, accounting, and management profession have paid special attention to financial reporting due to fraud and existing ways to prevent fraudulent behavior. Therefore, in this research, we investigate the relationship between the weakness of internal controls and fraudulent financial reporting with an emphasis on the adjustment role of external audit quality. This research was conducted during 2012-2017 years for active companies operating in Tehran stock Exchange by selecting 114 companies as a statistical sample and using logistic regression tests in EViews statistical software. The results showed that, contrary to society's perception, there is no statistically significant relationship between the weakness of internal controls and fraudulent financial reporting. The results also showed that external audit quality did not have a statistically significant effect on the relationship between the weakness of internal control and fraudulent financial reporting.

Keywords: Fraudulent Financial reporting, weakness of internal controls, external audit quality.

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1. Introduction

In the last two decades and in the wake of the financial scandals of companies such as Enron and WorldCom, internal controls to increase investor confidence in the reliability of financial statements have come to the attention of legislators. The Sarbanes-Axel Act of 2002 required companies to publish internal control reports. Therefore, investors can easily find out about the quality of the company's internal control system. In our country, following article 18 of the Tehran Stock Exchange Acceptance Instructions, we have published internal control guidelines for publishers admitted to the Tehran Stock Exchange.

According to this article, management is responsible for evaluating the effectiveness of internal controls and should report on the results of internal control evaluations. The company's Independent Auditor is also required to comment on establishing and implementing appropriate and effective internal control systems by the company in the context of internal controls (Stock Exchange, 2012). Cheating is a complex, multi-dimensional phenomenon with different effects and causes that has devastating consequences for businesses and society. Increasing fraud rates lead to bankruptcy for large companies and raise concerns about the quality of financial statements. For this reason, identifying the probability of fraud in the financial statements has been the focus of investors, legislators, executives, and auditors. Fraudulent financial reporting in Iran is also of particular importance. They are increasing the number of companies listed on the stock exchange to attract securities, reduce taxes, and so on are among the reasons for the issue's importance. So far, various researchers have used empirical and analytical financial information tests to identify the likelihood of fraud. In other words, many fraud studies have used quantitative information on financial statements (Brazel et al., 2009).

2. Theoretical basics and research background overview:

In recent years, due to the financial crises created by corporations, fraud in financial reporting and accounting has grown dramatically, as fraud has become a political and economic issue, and today the legislative and accounting communities are dealing with accounting and management fraud and coping Special attention has been paid to fraudulent behavior in financial reports. Cheating has a wide range of legal implications, but it is generally a voluntary act to obtain unfair and unlawful benefits. Violation is also abuse that is a violation of laws, regulations, internal organization practices, and disregard for market expectations of ethical conduct in business. Distilling financial statements involve manipulating the constituent element by providing more than real assets, selling and profiting, or offering less debt, cost, and loss. It is said that fraud has been reported when fraudulent financial standards contain a significant distortion so that the constituent element doesn't represent reality (Spathis, 2002). For this reason, Fraud prevention is of particular interest to investors, legislators, and audit managers. Given that fraud methods are constantly evolving and new methods are being used, the methods used to detect fraud are also required to be refined. The more predictable Fraud detection in financial reporting can enhance the ability to detect and prevent fraud and support auditors in claims and reduce the heavy burden that inflicts on the entire community (Nasihabadi and Sarchami, 2017).

Over time, various comments have been made about internal controls: however, in modern discussions, the concept of internal controls is designing, implementation, and protection process by designated authorities by management to provide reasonable assurance about credibility and quality of Financial reporting: efficiency and effectiveness of operations and ultimately proper implementation of laws and regulation

(Briciu et al., 2014). Disclosure of several internal control weaknesses has different effects. First, it is possible that the company s stock traded at a lower price when disclosing several internal control weaknesses.

And this will be in the minds of investors that the quality of corporate financial information is due to internal control weakness, and this information can not reflect the company s prospects accurately. The second weakness of more internal control may exacerbate investors' risk due to low-quality information and a lack of information symmetry. Third, it is expected that in the context of ownership separation from control and representation problem resulting from it in the world, which modern work is an essential institutional management system that management is monitored and watched by it to reduce the cost of representation and interests of shareholders align with investors.

One of the most critical control mechanisms that provide effective and efficient guidance for the organization is internal controls. Internal control is a process implemented by the board of directors, management, and other institution staff. Its creation goal is to obtain reasonable assurance from operational effectiveness and efficiency objectives, reliability of financial reporting, and compliance with current laws and regulations. The existence of a system of controls protects organizations' goals and interests of all beneficiary groups. On the other hand, external directors and auditors provided integrated financial reporting and internal control to external stakeholders. These integrated reports are beneficial for investors, as effective internal controls in financial reporting have a vital role in preventing and detecting financial distortions, including fraud. So, it is expected that internal control weakness reduces the quality of financial information and provide opportunistic conditions for managers. Hence, films that have internal control weaknesses increase investment inefficiencies (Saedi and Dastgir, 2017). Besides, past internal research revealed a fundamental research gap in fraudulent financial reporting that lacks a comprehensive fraud pattern in financial statements.

Few studies have been conducted about adaptive studies, review, and introduction of existing mechanisms in other countries. It seems that fraud comprehensive pattern presentation in financial reporting is necessary for the country's cultural, economic, and legal context and can be used by researchers, auditors, inspectors, and authorities. Disclosure of internal control weak numbers will reduce managers and investors (sun, 2016). The present research tries to answer the question of the relationship between internal control weakness and fraudulent financial reporting, emphasizing the adjustment role of external audit quality?

2.1. Research background

Xi and Wang (2018) investigated critical management criteria in internal control weakness and fraud (evidence from china). In this study, Factors and initial consequence of decision-making of companies registered in China are examined on the criteria of internal control weaknesses that are observable from the 2011 annual report. We argue that non-virtuous leaders prefer not to disclose material weakness by violating material standards to justify non- disclosure of potential weakness. According to this opportunistic incentive, we realize that when companies have not unreported fraud in past years, their management probably uses revenue (rather than prepaid earning) as a benchmark for fraud. Additionally, when true criteria are defined, the importance of prepaid load based revenue is significantly and positively correlated with the incidence of company's fraud problems, which indicated that measurement of material deviation provides an opportunity to management in future mistakes.

Wang et al. (2017), study management ability, political communication, and

fraudulent reporting in china using the information of china corporations for the period 2007-2012. The results show that firstly, increasing managerial capacity can reduce fraudulent financial reporting, and secondly, corporate political relations can limit or weaken the impact of managerial ability on the likelihood of fraudulent financial statements. Finally, corporations with capable managers Faceless fines by regulatory bodies compared to those who have no such managers.

Awang et al. (2016) investigated effective behavioral factors on the tendency to fraud in financial reporting using rational action theory and found that abstract attitudes and norms have a positive relationship with a tendency to fraud in financial reporting.

Albrechet et al. (2015) investigated the effect of power on fraudulent financial reporting. They used French and Raven power rating models to show how to use power to attract other people's participation in the fraudulent financial reporting process. The results of their research show that person A calls for participation in cheating employing allure, threat, legal authority, professional skill, and justification. Tarassi et al. (2019) investigated the prediction of fraudulent financial reporting via an artificial neural network (ANN) in companies listed on the Tehran Stock Exchange in 9 years between (2006) to (2014). For this purpose, the existence of distortion in Financial reports and presenting of fraudulent financial reporting through the neural network technique was evaluated via information contained in financial statements, financial ratios, and multi-layer perception model, which include an input layer, a hidden layer from MATLAB software view and an output layer. In this regard, companies' first seven years information was used to designing and training the neural network, and 8^{th}-year data was used to validate network training, and 9^{th}-year data was used as test data and to test the designed network.

Finally, according to the results, it was found that neural network technique and neural network-based modeling have 97.4% accuracy. We can design neural networks with accurate design and training that can accurately predict and discover companies' probable fraudulent financial reporting.

Karshenasan and Mamshali (2018) investigated the effect of management ability in controlling the inter-organization financial crisis and the possibility of fraudulent reporting from 2009-2013using 173 companies listed on Tehran Exchange stock as the statistical sample that selected because they have research condition. Using a multivariate regression model showed a reverse and significant relationship between management ability and severity of the inter-organization financial crisis at the 95% confidence level. The result of the first hypothesis of research states that a manager can solve an inter-organization financial crisis. The results of the second and third hypotheses showed that managers didn't conduct Fraudulent reporting to exit from financial crisis conditions and only managed profits in the framework of accounting principles.

Rahmani et al. (2017) investigated the effect of rational action theory on the inclination of fraud I financial reporting. The research method is an applied survey. The subject was also studied by a questionnaire and sampling from 107 professional accountants and relevant trends in 2016. The structural equation method by smart PLS software was used to analyze findings in two main hypotheses. The results showed a positive and significant relationship between attitude, abstract norms, and tendency to financial reporting fraud.

Based on the results, it can be seen that the theory of relational action is effective in evaluating the tendency of fraud in financial reporting. Besides, it is necessary to examine effective cases in financial reporting fraud, especially individual and psychological factors affecting it.

Sajadi and Kazemi (2016) have tried to study base – field theorizing. The statistical

research community is experts in the field of fraudulent financial statements. That snowball or chai sampling method was selected for interviews according to the research purpose. In addition to interviews, the documents on fraudulent financial reporting of companies listed to the Tehran Stock Exchange have been carefully studied and analyzed to increase research credibility and comprehensiveness. Following expert opinion acquiring and careful study of documents, pieces of evidence, and reports, the pressure factor was recognized as a fraudulent financial reporting requirement. Research results show that motivation for managers' rewards, motivation for assets abuse, political costs, tax purposes, and company by managers also affect fraudulent financial reporting. Fraud schemes in the context of public culture, the legal system, and country's accounting standard as underlying conditions and corporate governance system, internal control, and audit quality as intervening conditions. In the present study, 25 fraud schemes were identified in financial statements and their components. The consequence of fraud in financial reporting is classified and interpreted in two-level: financial statements and capital markets.

3. Research hypothesis

1) There is a relationship between the weakness of internal controls and fraudulent financial reporting.

2) Auditors' expertise in the industry affects the relationship between the weakness of internal controls and fraudulent financial reporting.

3) Size of the audit film effect the relationship between the weakness of internal controls and fraudulent financial reporting.

4) Auditor tenure period affect the relationship between the weakness of internal controls and fraudulent financial reporting.

4. Methodology of research

This research is applied research in terms of correlation and methodology of analysis, quasi-experimental, and post-event in the field of accounting research, which is carried out with real information and can be used in the process of using information. This research is also based on real stock market information, financial statements notes accompanying financial statements, and company reports. In this research, necessary data were collected from Rahavard Novin software and notes accompanying financial statements – the data were analyzed using EVIEWS software. Research statistical community are companies listed on the Tehran Stock Exchange between 2011 and 2017. The sampling method was used in this research, and all companies with the following conditions are studied and analyzed. It is worth noting that 114 companies were selected after applying the following restrictions, presented in Table 1.

Table 1: the selection of a statistical sample by applying community constraints and conditions.

Constraints	***company***	***Year-company***
Total existing companies at the end of 2017 (including stock Exchange and outsourcing)	621	4347
Removal of companies listed in Tehran Stock Exchange after 2011	(82)	(572)
Removal of companies other than the period ending March to observe their comparability	(128)	(896)
Removal of Holdings companies, banks, and investments	(117)	(819)
In the realm of research time. They have not stopped any trading symbol (more than six consecutive months) and did not change their Financial period	(26)	(182)
Remove companies whose financial information is not available.	(154)	(1087)
Number of available companies in the statistical community after imposition of limitations and conditions	798	114

5. Research Models

Considering the theoretical bases and research background, we use the following models to test the research hypothesis.

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 MB_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 ROA_{i,t} + \alpha_6 TANG_{i,t} + \varepsilon_{i,t}$$

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 SPEC_{i,t} + \alpha_3 ICW * SPEC_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 BM_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TANG_{i,t} + \varepsilon_{i,t}$$

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 BIG_{i,t} + \alpha_3 ICW * BIG_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 MB_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TANG_{i,t} + \varepsilon_{i,t}$$

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 Tenure_{i,t} + \alpha_3 ICW * Tenure_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 MB_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TANG_{i,t} + \varepsilon_{i,t}$$

Where is it: Dependent variable – fraudulent financial reporting ($FRAUD_{i,t+1}$): Dependent variable I this research is fraud in companies' financial reporting, which is described its determinants method. In this research, the dependent variable, i.e., fraudulent financial reporting (fraud), is defined as follows: Based on the access model to prediction, if the company has committed fraudulent Financial reporting that represented its financial statement in the subsequent period and this representation is due to fraudulent management incentives, fraud variable will have the value of one. Based on the access model to prediction, representation of financial statement is fraudulent when initially reported income (i.e., managed income) is higher than represented in com (ex-post income) (incremental representation) and when initial income is greater or equal to expected income, where represented income is less than expected income – the following model shows this relationship:

OIjt≥MFjt>RIjt

Where IQ is initial income, RI represents ex-post, and MF is the last income prediction by managers for the year t that was published before the financial statement of year t. Other cases were considered non – fraudulent representation. For example, if the representation doesn't lead to income change or represented income is greater than the initial income, the company doesn't commit fraudulent representation (Farajzadeh and Aghaee 2015). In this research, only the opportunistic management aspect of income –increasing was considered fraudulent financial reporting.

External variable – internal control system (ICW_{it}) significant internal control weakness is derived from the external auditor's report. Considering that in the audit report, only significant internal contrails weakness of the company is presented as a clause of the condition and it is avoided to provide all a weakness that the auditor has already considered them I management letter, all section of condition clauses relating to internal controls weakness is considered as crucial internal control weakness. The number of significant internal control weaknesses has been extracted in the audit report of companies listed on the Tehran Stock Exchange during the research period. Therefore, in this research, essential weaknesses are weaknesses that the auditor point to in her / his report and resolved during the financial year and, in some cases, don't resolve—for example, existing weaknesses in receivable accounts. Inventory, assets, taxes, or cases related to board decisions, and these weaknesses exist at the company accounts level and own company level. In this study, following Beng and Li (2011), internal control weakness is an artificial variable, and according to lee et al. study (2016), if the company has an internal control weakness, it takes one, and otherwise, O. Internal control weakness of the company has been extracted from external auditor report (Saedi and Dostghir, 2017).

Moderator variable – Audit quality (AQ):

In this research, three variables, i.e., auditor's expertise in the industry, size of the audit firm, and auditor's tenure period, are used for audit quality as follows:

Auditor's expertise in the industry ($SPEC_{i,t}$): many strategies that are currently used by audit firms to increase profitability level are auditor expertise level in the customers' industry. Auditor expertise in the industry means creating constructive ideas for helping creditors (value-added creation) and providing new perspectives and solutions for some issues faced by creditors in their industries. Auditor expertise in the industry is based on the proportion of total sales for customers that an auditor audits in the specific industry. The total sales of its industrial companies over a given year are calculated using the following relationship: (Krishnan, 2003).

$$SPEC_{i,k} = \frac{\sum_{j=1}^{m} ClientSales_{i,j,k}}{\sum_{j=1}^{n} ClientSales_{jk}}$$

Where

Client sales $_{i,j,k}$ is customer company sales j audit firm I in industry K client sales $_{jk}$ is company sales j in industry K

M is the number of audited companies by Audit firm I in industry K

N is the industry's number of existing companies (Khodadadeh Shamloo and Bodavar Nahandi, 2016).

The size of the audit firm ($BLG_{i,t}$): Bigger audit firms (that have a business brand) have a high equation, which enhances the auditor's credibility. In this research, if the audit organization and the auditory firm are selected, an audit firm takes one, and the rest of the Trusted audit institutions are considered zero (Namazi et al., 2011).

Auditor tenure period (Tenure $_{I,t}$): To measure tenure duration, we use a number of years that an auditor consistently audited a firm until t period. (Karami et al., 2011).

5.1. Control variables

Company size ($SIZE_{it}$): Research result of Feroz et al. (1991) shows that most of the companies dealing with securities and trade commission are companies that are traded outside stock and are relatively small in size. In this research, the natural logarithm of the sales rate of statistical sample companies was used as a criterion for measuring company size. Company size effect on fraud in the financial statement has been considered in researches of Pearsones (1995) and Kaminski et al. (2004), Kirkuz et al. (2007), Brazel et al. (2009), Alden et al. (2012) and Chen et al. (2014).

Market value to book ratio of shareholders equity (MBit):

It is expected that fast growth is related to fraud (Bessley, 1996; Bell et al., 1991). Most Managers of high growth companies don't commit fraud. However, in times of growth or reversal, immoral managers will be motivated to maintain surface sustained growth. In this research, market value to book ratio of shareholder's equity was used as a criterion for measuring growth. The effect of growth on fraud in financial statements has been considered in Summers and Sweeney (1998), Carcello and Nagy (2004), and Kirkuz et al. (2007) researches.

Tangible fixed assets ($TANG_{it}$): The ability to view company assets can reflect agency costs and financial distress costs and derive from fixed assets -to total assets ratio.

Profitability (ROA_{it}): It seems that profitability is one of the primary goals of companies. This goal is influenced by the maximization of the personal desirability of

managers (Gordan, 1904). Personal desirability is partially defined as job security, which is maximized by smooth or growing profit flows. As a result, it is expected that managers maintain or improve past profitability levels regardless of their previous (or past) size. If you cannot achieve this goal through real action, it will motivate you to commit fraud. In this research, profit prior to the tax of company ratio to total assets was used as profitability criteria. Profitability effect on fraud in financial statements have also been considered in Sepatis et al. (2003), Kaminski et al. (2004); Kirkuz et al. (2007), Brazel et al. (2009); Chen et al. (2014); Rezaee and Riley (2010).

Financial leverage ($LEV_{i,t}$): Higher financial leverage is typically related to the probability of more breach of debt contract and less ability to acquire additional capital through borrowing. Christy (1990) shows that there is a positive relationship between leverage and profit – increasing accounting practices. If profit-increasing accounting practices are not enough to avoid a breach of the liabilities contract's content, managers will probably be motivated to show debt lower than real debt or show assets higher than real assets. In this research, financial leverage will be calculated from the total debt – to-total assets ratio (Khajavi and Ebrahimi, 2017).

6. Research findings

6.1 Data descriptive statistics

To better understand the nature of the community that has been studied in this research and more familiarity with research variables, it is necessary to describe these data before analyzing statistical data.

Also, Data statistical description is a step toward identifying the dominant pattern and is a basis for explaining the relationships between variables used in this research. Therefore, research variables are briefly studied before testing the research hypotheses. This table contains indicators; maximum and minimum were calculated in the descriptive analysis of data.

Table 2: Descriptive statistics of quantitative research variables.

LEV	MB	ROA	SIZE	SPEC	TANG	TENURE	Research Variables
684	684	684	684	684	684	684	Number
.637	2.122	.116	13.864	.213	**..**247	2.235	Mean
.625	1.901	.096	13.702	.080	.195	2.000	Median
3.750	10.971	.674	19.367	.926	.801	6.000	Maximum
.090	-7.247	-.723	8.899	.000	.019	1.000	Minimum
.283	1.834	.166	1.481	.272	.177	1.318	Std.Dev.
3.385	.623	.177	.667	1.418	1.059	.980	Skewness
29.833	8.310	4.946	4.524	3.846	3.417	3.265	Kurtosis

The results of the research variables descriptive statistics are presented in Table 2 that indicate descriptive parameters for each variable individually. Table 2 shows the descriptive analysis of all combined data and the main variables used in this research on all companies' level. The following table presents the mean, standard deviation, median, modality, variance, skewness, maximum and minimum of independent, control, and dependent variables of research yearly from 2010 to 2017 (fraudulent financial reporting ($FRAUD_{i,t+1}$). The leading central indicator is the mean, which represents the equilibrium point and distribution gravity center and is a useful index for showing the centrality of data. For example, the mean value for the company size variable (LEV) is (0.637), which indicates that most data is focused on this point. In general, scattering parameters are a criterion for determining the degree of dispersion from each other or their dispersion relative to mean. The most crucial dispersion parameters are standard deviation. For example, the value of this parameter for the profitability variable is

(0.166), and for the variable of market value – to- book ratio of shareholders, equity is (1.834), which shows that these two variables have the lowest and highest dispersion level respectively among these two research variables.

Table 3: Descriptive statistics indices related to qualitative research variable

Size of the auditing organization			
	frequency	**percentage**	**Cumulative percentage**
Other auditing institutions	499	72.95	72.95
Auditing and beneficed	185	27.05	100
Total	684	100	

According to the above table, 185 company – year, or 27.05% of companies are audited by auditing or beneficial organization.

Table 4: Descriptive statistics indices related to qualitative research variable

fraudulent financial reporting			
	frequency	percentage	Cumulative percentage
Without fraudulent financial reporting	477	69.44	69.44
With fraudulent financial reporting	207	30.56	100
Total	684	100	

According to the above table, 207 company-year or 30.56% of companies have fraudulent financial reporting.

Table 5: Descriptive statistics indices related to qualitative research variable

Internal control weakness			
	frequency	percentage	Cumulative percentage
Without internal control weakness	321	46.93	46.93
With internal control weakness	363	53.07	100
Total	984	100	

According to the above table, 363 company-year or 53.07% of companies have internal control weaknesses. Also, considering that the combinational data method is used to test research hypotheses, the number of company–year observations is based on balanced combinational data was 684.

6-2 inferential statistics

In this section, Data analysis is carried out using inferential statistics Data analysis is carried out using a combinational data method and with a data panel approach. Data analysis is carried out using a combinational data method and a logistic regression approach in this section.

6.2.1 Normal-being test

Table 6: Jarque and Bera Normal distribution detection test

Variable name	**Jarque and Bera significance level**	**Interpretation**
Auditor expertise in the industry	0.000	Have not the normal distribution
Auditor tenure	0.000	Have not the normal distribution
Company size	0.000	Have not the normal distribution
Market to book ratio of shareholder's equity	0.000	Have not the normal distribution
Tangible fixed assets	0.000	Have not the normal distribution
Profitability	0.000	Have not normal distribution
Financial leverage	0.000	Have not the normal distribution

Considering that the significance level of the normal distribution detection test (Jarque and Bera) is less than 5%, Therefore, at the 95% confidence level, it can be said that the research variable does not have a normal distribution. Since one of the linear regression, pre-assumptions is a normal distribution of the dependent variable, and normalization of the dependent variable leads to the normalization of the model in general. Therefore, considering variables leads to the normalization of the model in general. Therefore, according to the central limit theorem, considering virtuality of the dependent variable ad impossibility of its normalization. We accept variable normalization.

6.2.2 Static (reliability) test of research variables

According to the single –root test of Levine, Lin, and Chui test type, when the test statistic's significance level is less than 0.05, independent, dependent, and control variables of research are static during the research period. The results of the statical study of research variables using this test are presented in Table 7.

Table 7: Results of static (reliability) test (Lin and Chui)

Variable name	Amount of statistics	Significance level
Fraudulent financial reporting	-14.403	0.000
Internal control weakness	-4.371	0.000
Audit expertise in the industry	-77.981	0.000
Size of audit firm	-2.630	0.000
Auditor tenure	-18.663	0.000
Company size	-25.313	0.000
Market-to-book ratio of shareholders' equity	-19.469	0.000
Tangible fixed assets	-21.731	0.000
Profitability	-26.671	0.000
Financial leverage	-72.869	0.000

According to the above table, in all independent and control variables, the Levine, Lin, and Chui test's significance level is less than 5%, which indicates that research variables are static. As a result, studied companies have no structural changes, and these variables don't lead to false regression.

6.2.3 Testing research hypotheses:

Hypotheses 1: There is a relationship between internal controls, weakness, and fraudulent financial reporting.

Table 8: Final estimation of the relationship between internal controls and fraudulent financial reporting

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 MB_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 ROA_{i,t} + \alpha_6 TANG_{i,t} + \varepsilon_{i,t}$$

VIF	Significance level	Parenta statistics	Standard error	Coefficient	Variable name
1.081	.704	.379	.164	.062	ICW
1.037	.704	-.378	.054	-.020	SIZE
1.149	.612	.505	.046	.023	MB
1.739	.029	2.179	.392	.855	LEV
1.957	.000	3.509	.675	2.369	ROA
1.038	.668	-.428	.458	-.196	TANG
-----	.232	-1.194	.803	-.959	C
o.o18	Mc Fadden determination coefficient			17.315	Exponential ratio statistics
(0.701)5.511	Fitting goodness test (Hosmer-Lem show test)			0.008	Significance level

The equation was done using exponential ratio statistics. As shown in table LR statistics are meaningful at the level of less than 5%. This reflects the overall significance of the fitted regression model at the 95% confidence level.

The coefficient is criterion determination that describes the strength of the relationship between the independent and dependent variables. This coefficient's value determines how the independent variable explains many percent of dependent variable variations in logistic regression analysis. Mac Faden's determination coefficient has the same role as the determination coefficient. According to Mac Faden's determination coefficient of the fitted model, it can claim that model variables explain about 0.018 changes in the dependent variables. According to the results, it is observed that VIF values are less than 10. In general, results indicate non-coherence. Also, in the logistic regression model, Hosmer – LEM show tests are used for goodness of model fitting. The significance level is also used in this statistic so that if it is more significant than 0.05, Zero assumption is confirmed and indicates that the model has a good fit. Considering the results, since the Hasmer –LEM show test's significance level is more than 5%, the model has a good fit.

Hypo thesis 2: Auditor expertise in the industry affect the relationship between internal controls weakness and fraudulent financial reporting

Table 9: The interactive effect of auditor expertise in industry on the relationship between internal controls weakness and fraudulent financial reporting

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 \mathrm{SPEC}_{i,t} + \alpha_3 ICW * \mathrm{SPEC}_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 BM_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TANG_{i,t} + \varepsilon_{i,t}$$

VIF	Significance level	Parenta statistics	Standard error	Coefficient	Variable name
1.739	.521	.640	.208	.133	ICW
3.375	.141	1.471	.531	.782	SPEC
4.211	.523	-.637	.634	-.405	ICW *SPEC
1.499	.313	-1.007	.065	-.066	SIZE
1.154	.543	.607	.046	.028	MB
1.715	.035	2.099	.388	.815	LEV
1.936	.000	3.568	.672	2.399	ROA
1.044	.680	-.412	.460	-.189	TANG
-----	.607	-.513	.920	-.472	C
.021	Mc Fadden determination coefficient			19.991	Exponential ratio statistics
(0.099)13.394	Fitting goodness test (Hosmer-Lem show test)			0.010	Significance level model

The results of statistical tests of hypothesis 2 are presented in Table 9. The internal controls' weakness variable has a significant level.

More than 5% (0,521), hence at the 95% confidence level, we can comment on this variable's effect, i.e., there is no statistically meaningful relationship between internal controls weakness and fraudulent financial reporting. Auditor expertise, at the 95% confidence level, can be commented on about this variable's effect, i.e., there is no statistically meaningful relationship between auditor expertise in the industry and fraudulent financial reporting. The resultant variable from the multiplication of auditor expertise in the industry at internal control weakness is significantly higher than 5% (0.523). Hence, at the 95% confidence level, we can comment on this variable's effect, i.e., auditor expertise in industry on the relationship between internal control weakness and fraudulent financial reporting, there is no statistically meaningful effect. There is also a positive and meaningful relationship between financial leverage and profitability with fraudulent financial reporting among control variables. The significance of the

regression equation was done using exponential ratio statistics.

As shown in Table 9, LR statistics are meaningful at the level of less than 5. This reflects the overall significance of the fitted regression model at the 95% confidence level. The coefficient is criterion determination that describes the strength of the relationship between independent and dependent variables: The value of this coefficient determines how many percent of dependent variable variations are explained by the independent variable. In logistic regression analysis, Mac Faden's determination coefficient has the same role as the determination coefficient. According to Mac Faden's determination coefficient fitted model, it can be claimed that about 0.021 changes independent variables are explained by model variables. According to the results, it is observed that VIF values are less than 10. In general, results indicate non –coherence. Also, in the logistic regression model, the Hasmer – LEM show tests are used for goodness of model fitting. The significance level is also used in these statistics so that if it is more significant than 0.05, zero assumption is confirmed and indicates that the model has a good fit.

Considering the results, since the significance level of Hosmer – LEM show test is more than 5% ((0.099)13.394), so the model has a good fit

Hypothesis 3: The audit firm's size affects the relationship between internal controls weakness and fraudulent financial reporting.

Table 10: The interactive effect of audit firm size on the relationship between internal controls weakness and fraudulent financial reporting

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 BIG_{i,t} + \alpha_3 ICW * BIG_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 MB_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TANG_{i,t} + \varepsilon_{i,t}$$

VIF	Significance level	Parenta statistics	Standard error	Coefficient	Variable name
1.438	.536	.618	.189	.117	ICW
2.135	.611	.507	.258	.131	BIG
2.506	.566	-.573	.358	-.205	ICW *SPEC
1.130	.744	-.325	.057	-.018	SIZE
1.151	.608	.511	.046	.023	MB
1.754	.031	2.149	.394	.847	LEV
1.957	.000	3.480	.675	2.349	ROA
1.043	.662	-.436	.459	-.200	TANG
---	.223	-1.216	.835	-1.016	C
.019	Mc Fadden determination coefficient			17.667	Exponential ratio statistics
(0.204)10.952	Fitting goodness test (Hosmer-Lem show test)			0.023	Significance level model

The results of the statistical test of hypothesis 3 are presented in Table 10; the internal controls weakness variable has a significance level of more than 5% (0.536) and a positive coefficient of 0.117. Hence, at the 95% confidence level, we can comment on this variable's effect, i.e., there is no statistically significant relationship between internal controls weakness and fraudulent financial reporting. The size of the audit firm variable has a significant level less than 5% (0.611); hence, at the 95% confidence level, we can comment on about the effect of this variable, i.e., there is a positive and significant relationship between the size of audit film and fraudulent financial relationship between the size of audit film and fraudulent financial reporting. The resultant variable from the multiplication of audit film size at internal controls weakness has a significance level of more than 5% (0.566). Therefore, at the 95% confidence level, we can comment on the effect of this variable, i.e., the audit firm's size on the relationship between internal controls weakness and fraudulent financial reporting, there

is no statistically meaningful effect.

There is also a positive and meaningful relationship between financial leverage and profitability with fraudulent financial reporting among control variables. The significance of the regression model was done using exponential ratio statistics. As shown in table 10, LR statistics are meaningful at a level of less than 5%. This reflects the overall significance of the fitted regression model at the 95% confidence level. The coefficient is criterion determination that describes the strength of the relationship between independent and dependent variables: The value of this coefficient determines how many percent of dependent variable variations are explained by the independent variable. Ln logistic regression analysis, Mac Faden's determination coefficient have the same role as the determination coefficient.

According to Mac Faden's determination coefficient of the fitted model, it can be claimed that model variables explain about 0.019 changes in the dependent variable. According to the results, it is observed that VIF values are less than 10. In general, results indicate non – coherence. Also, in the logistic regression model, the Hasmer – LEM show test is used for goodness of model fitting. The significance level is also used in this statistic so that if it is more significant than 0.05, Zero assumption is confirmed and indicates that the model has a good fit. Considering the results, since the Hasmer-LEM show test's significance level is more than 5% ((0.204)10.952), the model has a good fit.

Hypothesis 4: Auditor tenure period affects the relationship between internal controls weakness and fraudulent financial reporting.

Table 11: The interactive effect of auditor tenure period on the relationship between internal controls weakness and fraudulent financial reporting.

$$FRAUD_{i,t+1} = \alpha_0 + \alpha_1 ICW_{i,t} + \alpha_2 Tenure_{i,t} + \alpha_3 ICW * Tenure_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 MB_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TANG_{i,t} + \varepsilon_{i,t}$$

VIF	Significance level	Parenta statistics	Standard error	Coefficient	Variable name
3.929	.543	-.608	.315	-.191	ICW
2.392	.026	-2.219	.094	-.210	$Tenure$
5.463	.396	.847	.125	.106	ICW * $Tenure$
1.491	.377	-.882	.065	-.058	SIZE
1.166	.402	.837	.046	.039	MB
1.684	.032	2.138	.389	.832	LEV
1.945	.000	3.416	.674	2.305	ROA
1.519	.057	1.897	.357	.679	TANG
---	.848	-.191	.915	-.175	C
.027	Mc Fadden determination coefficient			25.809	Exponential ratio statistics
(0.580)6.601	Fitting goodness test (Hosmer-Lem show test)			0.001	Significance level model

The results of a statistical test of hypothesis 4 are presented in Table 11; the internal controls weakness variable has a significant level of more than 5% (0.543). Hence, at the 95% confidence level, we can comment on this variable's effect, i.e., there is no statistically significant relationship between internal controls weakness and fraudulent financial reporting. The auditor tenure variable has a significant level of less than 5% (0.026) and a negative coefficient – 0.210. Hence, at the 95% confidence level, we can comment on this variable's effect, i.e., There is a negative and significant relationship between auditor tenure period and fraudulent financial reporting. The resultant variable from the multiplication of auditor tenure at internal controls weakness is significantly

higher than 5% (0.396). Therefore, at the 95% confidence level, we can comment on this variable's effect, i.e., Auditor tenure on the relationship between internal controls weakness and fraudulent financial reporting, there is no statistically meaningful effect. Among control variables, there is also a positive and meaningful relationship between financial leverage and profitability with fraudulent financial reporting, as shown in table 11. LR statistics are meaningful at the level of less than 5%. This reflects the overall significance of the fitted regression model at the 95% confidence level. The coefficient is criterion determination that describes the strength of the relationship between independent and dependent variables: The value of this coefficient determines how many percent of dependent variable variations are explained by the independent variable. In logistic regression analysis, Mac Faden's determination coefficient has the same role as the determination coefficient.

According to Mac Faden's determination coefficient of the fitted model, it can be claimed that model variables explain about 0.027 changes in the dependent variable. According to the results, it is observed that VIF values are less than 10. In general, results indicate non- coherence. Also, I logistic regression model. The Hasmer – LEM show tests are used for goodness of model fitting. The significance level is also used in these statistics. It is more significant than 0.05. The zero assumption is conferment and indicates that the model has a good fit. They are considering the results. Since the significance level of the Hasmer – LEM show test is more than 5% ((0.580)6.601), so the model has a good fit.

7. Discussion and conclusion

Today, fraud has become one of the key issues in the country's economy.

Considering membership of stoke Exchanges at the international organization of securities commissions, the need to improve quality of financial information, special attention to the attraction of foreign investors in Post-Barjam condition, increase of the number of listed company and continuation of the privatization process in-country, Fraudulent financial reporting have special importance. Despite the importance of addressing fraudulent reporting instances and information about it, the list of fraudulent companies and fraudulent cases in financial statements is not presented by any organization or institution in the country. For this goal, the relationship between internal controls weakness with fraudulent financial reporting with an emphasis on the adjustment role of independent audit quality was investigated in this research. The present study is essential because it is one of the first domestic studies that address this issue and hence can contribute to the development of accounting and auditing literature in developing countries such as Iran. To achieve this goal, a sample of 114 companies listed in Tehran Stock Exchange was considered, and two hypotheses were introduced. The test results of hypotheses are as follows:

Hypothesis 1: According to the results obtained, this hypothesis is rejected. The internal auditor's influence on reducing the amount of distortions confirms that internal auditor existence prevents mistakes caused by. Non –compliance of regulations, whether domestic (resolutions of the general assembly and board of directors)and foreign (law of commerce and so on) and this is a crucial point because in the statutes of the audit committee and internal auditor reduce non- compliance of regulations and laws risk in companies is internal auditor duty which this relationship confirmation indicate internal auditor effect on reducing distortions and violations – It was expected that when increasing employee number, the volume of proceeding increase, internal control of companies becomes more effective. As a result, the probability of fraud occurrence in companies' statements decreases. The data analysis results show no significant

relationship between the internal control variable and the probability of fraud occurring in the company's financial statements. This hypothesis is contrary to the theoretical bases of Xi and Wang's research (2018).

Hypothesis 2: The auditors' expertise effect the relationship between internal controls weakness and fraudulent financial reporting. Considering the results obtained, this hypothesis is rejected. The more audit firm gains more experience in a special industry, the more it will become interested in providing better audit services because of its positive reputation. This leads to the reduction of internal controls weakness and ultimately decreases fraudulent financial reporting. This hypothesis's results are contrary to the theoretical bases of Xi and Wang's research (2018).

Hypothesis 3: The audit firm's size affects the relationship between internal controls weakness and fraudulent financial reporting. According to the results obtained, this hypothesis is rejected. It is expected that with the increasing size of the audit firm, the quality of audit information increase, and this increase lead to the decrease of internal controls weakness and ultimately decreases fraudulent financial reporting. The results of this hypothesis are contrary to the theoretical bases of Xi and wang research.

Hypothesis 4: Auditor tenure period affects the relationship between internal controls weakness and fraudulent financial reporting. According to the results obtained, this hypothesis is rejected. By choosing the variable of external auditor tenure, it is expected that this factor increasing cause mastery of managers I internal control, corporate accounts as well as their more efficient monitoring of financial statements that finally lead to increase ability to rely on financial statements and decrease the likelihood of fraud occurrence in financial statements. On the other hand, the long-term relationship between client and auditor impair the auditor's independence and thus affect the quality of audit done and, therefore, negatively affect the quality of reported accounting information. This hypothesis's results are contrary to the theoretical bases of Xi and Wang's (2018) research. The following suggestions are provided to recognize the existence or absence of weakness in the internal controls system re-reviewed by auditors because the state of establishing strong or weak internal controls does not reflect the company's financial reporting environment and fraud.

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Review Article

Comments on the Context-Specific Nature of Financial Reporting Quality

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ABSTRACT

Some conceptual studies believe that the nature of financial reporting quality (FRQ) is inherently context-specific, i.e., FRQ is defined only in the context of a specific decision made by a specific decision-maker, and it alone is meaningless. This article discusses how conditioning the FRQ on a specific context is not based on a well-built concept and may lead to problematic and misleading conclusions.

Keywords: financial reporting quality; context-specific nature; comment

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1. Introduction

Providing overall high-quality financial reporting is critical because it positively influences capital providers in making resource allocation decisions that enhance the functioning of capital markets and the efficient operation of economies (Financial Accounting Standards Board (FASB) 2010; International Accounting Standards Board (IASB) 2010). Over the past two decades, this issue and other factors, such as the emphasis of supervisory agencies (e.g., the U.S. Securities and Exchange Commission) on high-quality financial reporting, and the development and implementation of the international financial reporting standards (IFRS) (DeFond 2010), has resulted in many studies of the financial reporting quality (FRQ).[1]

While FRQ studies have made significant advances, they face difficult challenges to conceptualize and measure FRQ. Particularly yet, there are broad disagreements about how to define and measure FRQ (e.g., Dichev et al. 2013; Zhang 2020). However, some conceptual studies (e.g., Francis et al. 2006; Dechow et al. 2010; Nelson and Skinner 2013; Elliott et al., 2020) dismiss the suspense file and suggest the nature of FRQ is inherently context-specific, i.e., it is defined only in the context of a specific decision made by a specific decision-maker and FRQ alone is meaningless. For example, Dechow et al. (2010) define FRQ as

… "provide(ing) more information about the features of a firm's financial performance that are relevant to *a specific decision made by a specific decision-maker*" (emphasis added).

The purpose of this paper is to discuss that conditioning the FRQ on a *specific* decision made by a *particular* decision-maker is not based on well-built concepts and may lead to problematic and misleading conclusions. For example, this paper will discuss a high-quality financial reporting set, as the studies interpret it as conditional in a specific context, even cannot contribute to making a good specific decision.

The paper is organized into five sections. Section 2 elaborates on the background for the study. Section 3 presents comments on the context-specific nature of FRQ. Section 4 presents some suggestions, and Section 5 summarizes it.

2. Background: Specific Utility and Overall Utility Perspectives of FRQ

Surveying the empirical-archival literature shows that there are various views about the concept of FRQ and how to choose FRQ measures. But it seems that each of these views can be considered closer to one of the two following perspectives:

In the first perspective, the nature of FRQ is inherently context-specific, and therefore, FRQ alone is meaningless, i.e., it is defined only in the context of a specific decision made by a specific decision-maker. Then, FRQ is conditioned to a specific decision and a particular maker of decision, and it does not mean anything by itself (see, for example, Francis et al. 2006; Dechow et al. 2010; Nelson and Skinner 2013; Czerney et al., 2019). In this perspective, the FRQ measure should be selected according to the specific context, so the FRQ measure is unique (Dechow et al. 2010). First, it should be determined what aspect should financial reporting capture and describe the specific context, then the measure related to the answer should be chosen.

1- Such studies have usually employed various terminologies, such as accounting quality, transparency, earnings quality and financial reporting quality. I choose "financial reporting quality" as the terminology because it seems more accurate than other terminologies for this paper and the general intention of such studies. Accounting has diverse formal functions, such as accounting for managements, accounting for governance and accounting for financial accountability. Based on these diverse formal functions, the concept of accounting quality may be different. Moreover, some quality measures are not merely limited to earnings; thus, earnings quality is not an inclusive terminology. In addition, transparency is generally interpreted as the openness or availability of information and therefore, similar to earnings quality, does not seem to be an inclusive term.

In a more detailed explanation, the researcher should usually answer a series of questions to select proper measure:

- Q1: which specific decision and specific decision-maker are going to be examined?
- Q2: which information /information characteristics are needed?
- Q3: which FRQ measure reflects that (those) information/ information characteristics?

The answer to the third question is the same measure that should be selected. Besides, this measure, by default, can be used in the context of the first question (Q1).

In the second perspective, FRQ is not conditioned to a specific decision or a specific decision-maker, but a substantial utility over a wide range of decisions and decision-makers (see, for example, Bhattacharya et al. 2003; Givoly et al. 2010; Boulton et al. 2011; Chen et al. 2011; Dichev et al. 2013; Hope et al. 2013; Raman et al. 2013). From this perspective, the FRQ measure should cover various dimensions of FRQ. These various dimensions are ambiguous, so several measures must be chosen to increase the probability of covering all dimensions (see, for example, Givoly et al. 2010). In a more detailed explanation, the researcher should usually answer a series of questions to select proper measure:

- Q́1: what are the different groups of decisions and decision-makers?
- Q́2: which mutual information/information characteristics are needed?
- Q́3: which FRQ measures reflect that (those) mutual information/information characteristics?

The answer to the third question is the same measure that should be selected. Besides, this measure, by default, can be used in various contexts.

Therefore, as mentioned earlier, in the first perspective, FRQ is conditioned to a specific decision or specific decision-maker, and FRQ measure should be chosen according to the specific context. In the second perspective, FRQ is conditioned to an overall utility over a wide range of decisions and decision-makers, and FRQ measure is independent of a specific context.

Note that studies related to both perspectives concentrate on a specific decision and a specific decision maker proper to their research question/subject. Yet, as previously mentioned, studies related to the first perspective choose the FRQ measure based on that specific context, and studies related to the second perspective select the FRQ measure that has substantial utility over a wide range of decisions and decision-makers.

To be more brief and clear, hereafter, the first perspective will be called "specific utility perspective," and the second one will be called "overall utility perspective."

3. Comments on the Context-Specific Nature of FRQ

This section presents some comments on the context-specific nature of FRQ. It discusses how conditioning the FRQ on a specific context is not based on a well-built concept and may lead to problematic and misleading conclusions. It discusses the comments in two outlooks, including the "concept of decision-relevance" and "problematic conclusions."

3.1. Concept of decision-relevance

As formerly mentioned, the specific utility perspective believes the context-specific nature of FRQ is based on the concept of the decision-relevance in *The Conceptual Framework For Financial Reporting* and, as a result, concludes the term FRQ alone is meaningless unless used in the context of a specific decision made by a specific decision-maker (see, for example, Francis et al. 2006; Dechow et al. 2010). This interpretation is subject to the following two comments:

- First, it seems that the concept of decision-relevance in *The Conceptual Framework For Financial Reporting* is not highlighted as much as this concept in the specific utility perspective.

To clarify, although *The Conceptual Framework For Financial Reporting* uses the character of the decision-relevance to defined and achieve the FRQ, it *also* uses other characteristics. According to the *Conceptual Framework For Financial Reporting*, FRQ is defined and achieved by adherence to information characteristics (FASB 2010; IASB 2010). Some of the characteristics are "related to overall utility over a wide range of decisions and decision-makers."

For example, while characteristics regarding relevance, including predictive value or confirmatory value, may be related to the context, the characteristics regarding reliability (or representational faithfulness), including completeness, neutrality, and free from error, are related to an overall utility over a wide range of decisions and decision-makers. To explain, unlike relevance, reliability is a basic characteristic of information, and information users are well acquainted with its *determinants*. To support this assertion, Kadous et al. (2012) provide evidence that reliability is a basic property of information that users understand well. On the other hand, relevance is related to context and requires a more difficult analysis.[1]

Therefore, if we accept that achieving various characteristics is necessary for achieving FRQ and that some of the characteristics are "related to overall utility over a wide range of decisions and decision-makers," then the overall utility perspective should be taken into consideration to achieve FRQ. So it is clear that attending to the other characteristics (and not only the decision-relevance) is necessary to conceptualize and measure FRQ. In summary, it seems a specific utility perspective overemphasizes the concept of decision-relevance.

- Second, it seems that the concept of decision-relevance in *The Conceptual Framework For Financial Reporting* is not necessarily contingent on a specific decision made by a specific decision-maker.

To clarify, according to *The Conceptual Framework For Financial Reporting*, the concept of decision-relevance of information does not necessarily indicate that information is relevant to a specific decision or a specific decision-maker, but most imply that the information is relevant to the *general process* of decision making. The concept of decision-relevance is defined independently of and without reference to specific preferences, decision models, or even the actual use of information (Williams and Ravenscroft 2014). To explain, according to *The Conceptual Framework For Financial Reporting* (FASB 2010; IASB 2010), information is decision-relevant if it has predictive value or is confirmatory. Predictive value and confirmatory relate to the general process of decision-making and can relate to different decisions (rather than necessarily a specific decision or a specific decision-maker). Several reasons generally indicate decision relevance or specifically predictive value and confirmatory most relate to the general process of decision making. For example:

- Financial information has predictive value if used as an input to *primary users' processe*s to predict future outcomes. Further, financial information has confirmatory value if it provides feedback about (confirms or changes) previous evaluations (FASB 2010; IASB 2010).
- Furthermore, financial reporting meets the *common needs* for decision-making, like information for assessing future net cash inflows' prospects for an entity that most users need (FASB 2010; IASB 2010).

1- Kadous et al. (2012) reveal that users will substitute the more accessible assessment of measurement reliability when asked to assess the relevance of information.

- Mainly financial reporting is not of any value to a specific decision or specific decision-maker; instead, its value lies in addressing the primary users as a whole (Beaver 1981).

The *general process* of decision making usually requires predicting future outcomes, getting feedback, assessing prospects for future net cash inflows, assessing the competitive opportunity, and so on. This *general process* of decision making is not usually contingent on a specific decision and decision-maker.

In summary, it seems a specific utility perspective chooses limited intuition from the concept of decision-relevance and overemphasizes the specific decision-maker's specific decision.

Therefore, it seems a specific utility perspective overemphasizes the concept of decision-relevance and chooses limited intuition from the concept. As a result, the decision-relevance concept is not a well-built concept to condition FRQ to a specific decision-maker's specific decision.

3.2. Problematic conclusions

Conditioning the FRQ on a specific decision made by a particular decision-maker may lead to some problematic conclusions. Here, this paper presents six general cases.

First, suppose there are three specific decisions that information users make: ψ_1, ψ_2, and ψ_3. Furthermore, suppose a set of financial reporting, η_1, provides information that is relevant to the three specific decisions ψ_1, ψ_2 and ψ_3 and that another set of financial reporting, η_2, provides information that is relevant to only one specific decision ψ_3. If the information of η_1 is generally greater than that of η_2 but is less than that of η_2 for ψ_3, based on specific utility perspective and ceteris paribus, it cannot be said that η_1 has a higher FRQ than η_2; it can only be said that η_2 has a higher FRQ than η_1 in the context of a specific decision ψ_3 (see, for example, Dechow et al.'s definition in the second paragraph of introduction).[1] As a result, based on a specific utility perspective, it cannot be said that η_1, which is more useful than η_2, has a higher FRQ.

Second, suppose a set of financial reporting provides more information (than others) about the features of a firm's financial performance relevant to all or most of the decisions. Based on a specific utility perspective, we have to conclude that in the context of and for each specific decision made by a particular decision-maker, naming that set of financial reporting as having higher FRQ is correct. However, in the context of and for all or most decisions (not in the context of a specific decision made by a particular maker of decision), it is not very sensible to describe the set as having higher FRQ.

Third, users' decisions involve choosing between alternatives, such as buying, selling, or holding an investment (FASB 2010; IASB 2010). To make a good specific decision, a decision-maker must assess and compare the general results of different decisions (rather than a specific decision) and then need to more information relevant to different decisions (FASB 2010; IASB 2010) or high-quality information around different decisions. For example, an investor that is going to increase investment needs to the information not only to outlook the results of buying the investment but also to outlook the results of other decisions like selling and holding the investment or even decisions beyond trading decisions like changing boards of directors. Therefore, a high-quality set of financial reporting should provide information for different decisions.

1- Suppose that a set of financial reporting η1, provides more information about the features of a firm's financial performance than another set of financial reporting, η2, so that the information of η1 is more decision-relevant than that of η2. In other words, η1 has more predictive value - it can be better used as an input to processes employed by users to predict future outcomes - and more confirmatory value - it provides better feedback about (confirms or changes) previous evaluations - than η2. Given specific utility perspective and ceteris paribus, the quality of η1 and η2 cannot be assessed because QFR is meaningless except in the context of a specific decision.

With this explained, a high-quality financial reporting collection, that specific utility perspective interprets it as conditional on a particular decision, even cannot contribute to making a good specific decision.

Moreover, a decision-maker may make several decisions such that the decision portfolio (rather than each specific decision) is good. In summary, the presence of information about the alternatives allows a good specific decision to be made. Therefore, a set of financial reporting that provides more information that is relevant to a specific decision made by a specific decision-maker cannot necessarily be of high FRQ.

Forth, financial reporting is provided for a wide range of primary users, including existing and potential investors, lenders, and other creditors (FASB 2010; IASB 2010), not for a specific decision-maker.[1] Hence, if, for example, financial reporting presents the information in a way that increases information asymmetry, such that information is achievable to only a specific decision-maker, it seems the financial reporting should not be regarded as high quality, even if additional (more) information is provided for a particular decision made by the decision-maker. Otherwise, the concept of FRQ demotes to group individualism.[2] Furthermore, such an interpretation prevents us from assessing FRQ as a general utility.

Fifth, financial reporting is provided for external users. Hence, if, for example, financial reporting provides information for managers rather the primary users, in contrast to specific utility perspective, it seems that the financial reporting should not be regarded as high quality since it is far from its primary function (For example, see paragraph BC1.23 in *The Conceptual Framework For Financial Reporting* about the conflicts between regulators and main users). There are similar explanations for main decisions (decisions about providing resources to the entity) versus all specific decisions.

Sixth, practically, should such statements as “the information based on U.S. GAAP or IFRS are high quality” be necessary considered meaningless due to not being conditional on a specific decision? Is overall FRQ necessarily meaningless? Can specific utility necessary lead to overall usefulness? Affirmative answers to these questions seem to be relatively difficult.

4. general comment on overall utility perspective and future directions

This paper puts some comments on the context-specific nature of FRQ in the specific utility perspectives. In summary, the comments imply that specific usefulness per se is not necessarily evidence of FRQ. Then, what is FRQ?

It seems that interpreting quality as fitness for purpose (e.g., Ball and Urwin, 1985; Harvey and Green 1993; Klobas 1995; Woodhouse 2012; Peyravan 2020), a set of financial reporting can describe higher quality if that set better fits the purpose of financial reporting. The purpose of financial reporting is overall usefulness. So, a set of financial reporting can describe higher quality if that set better fits the overall usefulness. With this interpretation, high-quality financial reporting may have varying degrees of specific usefulness for different primary users (i.e., it may be useful for a particular decision and specific decision-maker and simultaneity not be useful for another), but it should generally meet more of the common needs of more of the

1- Although, other users, such as regulators and members of the public other than investors, lenders and other creditors, may also find financial reporting useful, but financial reporting is not primarily directed to these other groups (FASB 2010; IASB 2010).

2- See study of Williams and Ravenscroft (2014). They conclude that the current concept of decision usefulness is incoherent because policy makers and scholars have not seriously dealt with deeply-flawed ontological assumptions inherent in its definition and justification.

primary users (FASB 2010; IASB 2010; Isidro and Nanda, 2020).[1] Therefore, financial reporting should not be considered high quality just because of its usefulness for a specific decision made by a specific decision-maker. Similarly, a measure should not be deemed an FRQ measure just because of its usefulness for a specific decision made by a specific decision-maker. Stated differently, a measure that is useful in one decision is not necessarily an FRQ measure.

Taken together, it seems that researchers should distinguish the specific and overall usefulness and focus more on looking for general usefulness measures. This moving from a focus on particular usefulness to a focus on the primary users as a whole cannot be ignored.[2]

The interpretation above is relatively closer to the impressions of overall utility perspective (see, Dichev et al. 2013) since it implies that the same core concept of FRQ has substantial utility over a wide range of settings and the influence of a specific context is limited. However, the overall utility perspective faces some critical challenges and needs some improvements (see Dechow et al. 2010; Nelson and Skiner 2013).

Particularly, according to the conceptual and theoretical literature, the attention to "the impact of FRQ measures on dependent variables *in trade-off/interaction and combination with other FRQ measures*" (hereafter, "collective role of FRQ measures") is often necessary.[3] It seems the overall utility perspective suffers from neglecting the collective role of FRQ measures when it chooses the FRQ measures. As a result of neglecting the collective roles of QFR measures, the overall utility perspective cannot achieve an appropriate trade-off/interaction-based combination of QFR to measure overall QFR (overall utility).[4]

To clarify, in the overall utility perspective, the concept of FRQ as an overall utility and its dimensions are ambiguous (see questions Q´1 to Q´3 in section 2). Therefore, the perspective to escape the ambiguity and reduce the effect of applying a specific QFR measure on research results usually chooses *several* common measures.[5] The challenge here is that these several common measures are taken from the current studies that neglect the collective role of FRQ measures. The current studies usually concentrate on individual relationships (i.e., single-expected relationship) between QFR and other variables. Therefore, they do not analyze and investigate the relationship between a trade-off/interaction-based combination of QFR measures and the other variables. Currently, numerous empirical research assumes that the collective and individual role of FRQ measures are the same. This assumption results from the difficulty in the empirical investigation of the trade-off/interaction of QFR measures (e.g., Defond 2010).[6]

1- Specific usefulness is good for a specific decision or decision maker, but QFR is good for most of those for whom financial reporting is prepared.

2- Note the results of studies on specific usefulness may help the studies on overall usefulness to find overall usefulness measures. For example, the studies on overall usefulness may employ Meta-Analysis through the results of studies on specific usefulness.

3- According to theoretical discussions supporting *The Conceptual Framework For Financial Reporting*, higher quality or overall usefulness are obtained by achieving a collection of characteristics (IASB 2008). Therefore, it is expected that higher quality be a product composed of various characteristics package and not just one characteristic. In other hand, a balancing or trade-off, between the characteristics is often necessary. Therefore, it is expected that higher quality be a product of proper trade-off/interaction or combination, not just plain aggregation of measures.

4- Currently the empirical studies that tend to measure the overall QFR, usually choose perfectly different QFR measures. This causes that specific utility perspective conclude there are some research opportunities that researchers choose their favorable measures (e.g., see Dechow et al. 2010).

5- For example, some researches' (e.g., Boulton et al. 2011; Chen et al. 2011; Hope et al. 2013) reasons for using multiple measures are to cover all of the dimensions of FRQ and mitigate the probability of measuring something other than quality.

6- Note overall utility perspective studies apply the FRQ measures separately (see, for example, Koh et al. 2013; Kim and Zhang 2014) or aggregate form (see, for example, Bhattacharya et al. 2003; Bharath et al. 2008; Beatty et al.

In contrast to the assumption above, the decision tree methodology can empirically determine the trade-off of measures style and the importance of every measure that can help researchers that finally select the best combinations of measures to measure overall FRQ better. For more explanations, conventional statistical methods such as Regression or Factor Analysis are generally faced with limitations in showing the accurate manner of trade-off/interaction and combination of independent variables for affecting the dependent variables. Though, the decision tree method can show the accurate manner of trade-off and a combination of independent variables for affecting the dependent variables. Besides, this method is considered as a data (knowledge) mining method or unknown knowledge discovering process (Hastie et al., 2013; Provost and Fawcett, 2013) and provides the tools to conduct induction through classification (For more details, refer to Appendix A).

So, future studies can employ the decision tree methodology to determine which trade-off/interaction-based combination of FRQ measures could influence different dependent variables.[1] This approach probably helps to find a trade-off/interaction-based combination of FRQ measures that measure overall utility.

5. Summary

The specific utility perspective of FRQ believes the nature of FRQ is inherently context-specific. This article discusses how conditioning the FRQ of a particular context is not based on a well-built concept and may lead to problematic and misleading conclusions. In contrast, the overall utility perspective believes the nature of FRQ is conditional on the overall utility. Then it seems overall utility perspective better fits with the purpose of financial reporting. However, it needs some improvements.

As a general conclusion, it seems to condition the FRQ on a specific context cannot be a solution to dismiss the suspense file of conceptualizing and measuring overall quality. Instead, it seems moving from a focus on specific usefulness to a focus on overall usefulness is necessary.

(2010). It is clear that aggregation either by quantiles or by principal components analysis does not provide an assessment of collective role of FRQ measures, because aggregation of FRQ measures by quantiles is done with respect to the "single-expected relationship" between a measure and dependent variable. Moreover, aggregation of variables by principal components analysis is done according to changes in measures "with respect to each other not dependent variable". while the assessment of collective role of measures requires simultaneous capture of "empirical relationship of measures with each other" and "empirical relationship of measures with dependent variable".

1- Dichev et al. (2013) report that there is little guidance in the literature on (1) the relative importance of measures, (2) whether there are specific contexts in which one measure is more important than the other and (3) what trade-offs should weigh when deciding to choose one measure over the other. The suggested decision tree analysis methodology could relatively respond three cases.

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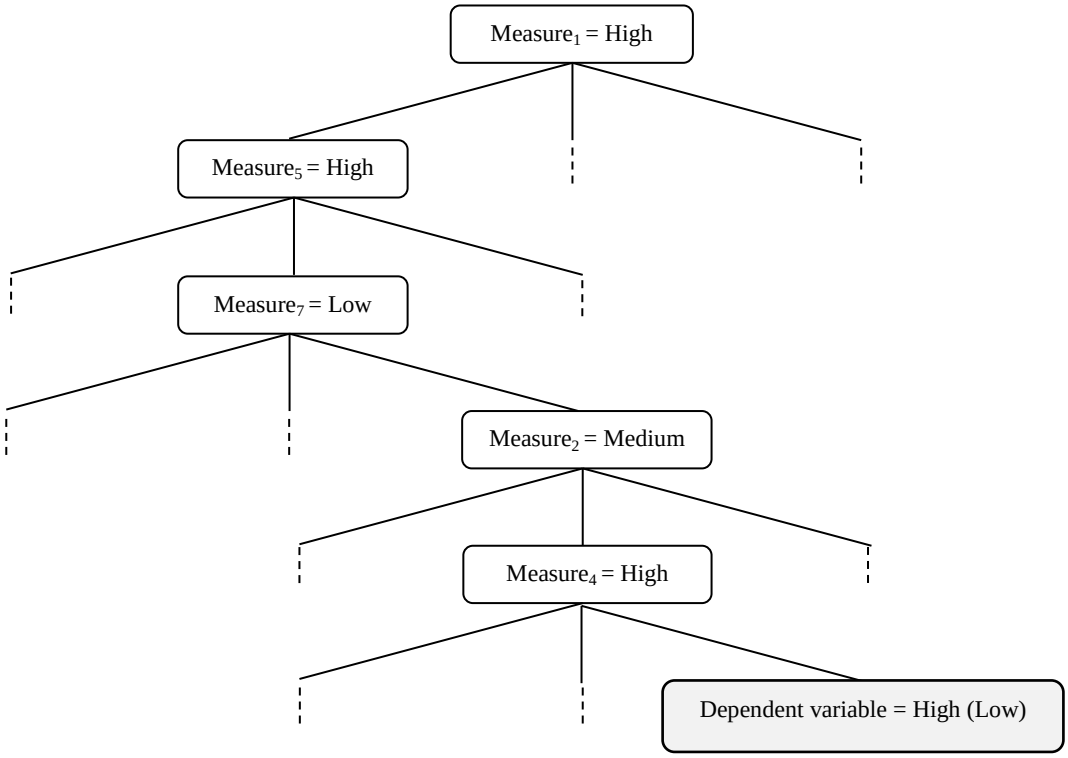
APPENDIX A

A Simple Example of Decision Tree: Fuzzy Version



Interpretation (Fuzzy Rule):
If $Measure_1$ = High and $Measure_5$ = High and $Measure_7$ = Low and $Measure_2$ = Medium and $Measure_4$ = High **then** Information = High or Uncertainty = Low with truth level of X%.
or (equivalently)
For a company with high $Measure_1$, high $Measure_5$, low $Measure_7$, medium $Measure_2$, high $Measure_4$, then a high level of information or low level of uncertainty is expected with a true level of X%.

General Explanations of Decision Tree Analysis Methodology:
Decision tree analysis creates a tree-based classification model. It breaks up a collection of heterogeneous records into smaller groups of homogeneous records using directed knowledge discovery. In brief, it classifies cases (different characteristics) into groups and predicts the values of a dependent variable (more information or less uncertainty). The procedure provides validation tools for exploratory and confirmatory classification analysis. Decision tree learning is commonly used in data mining. The goal is to create a model that predicts a target variable's value based on a trade-off of several input variables. The structure of a decision tree commences with a root node, from which all branches originate. A branch takes the form of a series of nodes, where decisions on condition attribute values are made at each node, enabling progression through (down) the tree. A progression stops at a leaf node, where a decision classification is given based on the rule associated with the full branch from the root node to the individual leaf node (Beynon et al. 2004). The method uses recursive partitioning to split the training records into segments by minimizing the impurity at each step, where a node is considered “pure” if 100% of cases in the node fall in a specific category of the target field.

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Research Article

The Genesis for the Increase of Non-Performing Assets in National and Private Banks in Iran

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ABSTRACT

The proper and rapid current of the resources and their expenditure in any dynamic economy, especially the banks, presents the ideal use of administrative methods. Therefore, collecting debts in a certain period shows the proper benefits of resources to create the required facilities for developing economic activities and supplying resources needed for different production, commercial, services, and bank sections.

Banks with less non-performing assets. Invest their released resources in new businesses or accept more commitment for payment, which increases the bank's capacity to make plans for consuming the resources, accept commitments, and make income. On the other side, an increase in non-flow assets may cause severe bank management problems not only because of a reduction in assets quality but also because the reduction in bank interests may lead to dangerous interbank problems and difficulties for supplying the investment. As a result, recognizing the effective factors on creating non-performing assets and making the right decision to prevent such assets' rise could decrease the banks' risk in granting loans and increase profitability. According to Garret Ranking Technique, the present study discusses the genesis of non-performing assets in private and national banks and classifies them.

Keywords: non-flow assets, Garret Ranking, the national bank, Private Banks

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1.Introduction

As institutes of finance and service, banks own a crucial role to flow money and wealth in a society and have a unique position in the economy of a country. (Singh Asha 2013) Banks must attract their capital first and offer facilities to other productive and industrial enterprises to improve them to play their role in the national economy very well. As banks have many branches all over the country, They can collect savings easily and grant them to producers, farmers, and people in the business. Therefore, they play an essential role in economic growth and development (Gerlach et al. 2005). That's why it's being said that however it seems, production factors such as capital, work, and technology play the main role in economic activities, the various bank gives a special position to the banks' facilities in terms of attracting savings and granting loans and credits in such a way that some economists believe lack of efficient monetary and financial institutes is one reason that underdeveloped countries have not developed yet.

Even though the central bank, with the assistance of other banks, has done a lot during the previous years, an increase in non-performing assets has not been solved yet. This bank issue is considered to be a severe problem for the economy and banks.

An increase in non-performing assets can have an abnormal affect and endanger bank network performance and national economy indexes, Bhatia (2007). Accumulation of non-performing assets of a bank or institute makes the performance indexes inefficient. Profitability decrease, increase in financial leverages, and even moving toward bankruptcy are several consequences of growing non-performing assets in banks and institutes.

2.Background

Non-performing assets are considered one of the bank crises, which sends a section of bank resources out of the operational cycle temporarily or permanently so that banks encounter various difficulties. In terms of pathology, unpunctual refunds, and an increase in non-performing assets are considered as a combination of external and internal factors. Some research has tried to discuss the genesis why non-performing assets increase in banks that are mentioned in the following.

Ravi Kumar, Subba Rao, and Kusuma (2018) examined the causes for an increase of Npas in Indian banks. In this study, twelve causes are ineffective recovery tribunal, willful defaults, natural calamities, industrial sickness, lack of demand, and change. Policies, defective lending process, inappropriate technology, improper SWOT analysis, poor credit appraisal system, managerial deficiencies, absence of regular industrial visit, after ranking technique, the result that ineffective recovery tribunal got the 1st rank, followed by industrial sickness, change in policies, poor credit appraisal system, defective lending process, lack of demand, inappropriate technology, managerial deficiencies, improper SWOT analysis, natural calamities and absence of regular industrial visit 2nd, 3rd, 4th, 5th, 6th, 7^{th}, 8^{th}, 9^{th},10^{th},11^{th} and12^{th} ranks respectively.

Bhatia (2007), in his research paper entitled, "Non-performing assets of Indian public, private and foreign sector banks: An empirical assessment", explored the application of an empirical approach to the analysis of NPAs. The NPAs are considered as an important parameter to judge the performance and financial health of banks. The level of NPAs is one of the drivers of financial stability and growth of the banking sector. This paper attempts to find out the fundamental factors which impact the level of NPAs of banks in India. A framework consisting of two types of elements, viz., macroeconomic and bank-specific parameters, is developed, and the behavior of NPAs of the three categories of banks has been analyzed (Veerachamy, 2006). The bank faces various difficulties in a good performance concerning the priority sector. The researcher in his study deals with understanding primary cooperative agricultural and rural

development in the Dindigul District in Tamil Nadu. The author analyzed and examined through his analysis the impact of overdue of the banks. The study revealed the external factor and internal factor as to the borrower's cause, not making the due and account becoming NPA. Socio-economic institutional, psychological, and political factors. The default in payment of credit is correlated with literacy and illiteracy of a borrower.

Uday (2005). The growing NPA and its implications on the banking system need no emphasis. While there have been several schemes in the past to facilitate the recovery from NPAs, the success of such efforts in terms of NPA reduction has been far from satisfactory. SARFAESI Act much helps the bank in its effort to reduce recovers money from NPAs attempts to provide a glimpse of the Act against this backdrop. The author has cited certain limitations on the Act and emphasized the Supreme Court landmark Judgement in 2004.

Pasadilla (2005), the Philippines has the highest number of Non-Performing Loans in Asia. As a result, the national provided a legal framework through which banks can transfer NPA to a separate entity called Special Purpose Vehicles (SPV), which privately owned Asset Management Companies are. The research paper discussed the problems and rehabilitation procedures, legal bankruptcy reforms, and effectiveness. The author also suggested that banks are trapped between the debtor and Central Bank of the Philippines.

Henry James (2007) deals with the problems on rising volume of overdue of the loan of the banking system both credit cooperative credit societies and commercial banks and other regulating agencies like RBI, NABARD and other policymakers at the national level. It also gave a solution that high overdue payment leads to the bank in inconvenient position at the time of availing refinance facilities from the external sources. The author in his research has preferred drought-prone areas since the trend recovery of loan has been worsening. The demand for recovery was higher than the actual recovery.

Kamal Das (2008), the last two decades, there has been a crisis due to NPA's volume and growth that holds the prime resources resulting in severe strains on the normal resource allocation process essential for development. The author conducted a study on the factors associated with NPA. The study attributes the macroeconomic factor, such as increasing interest, economic slowdown, and currency devaluation. The study's observation led to the systematic framework with a clear objective, flexibility, and adequate financial support that was required to resolve the distressed situation and for the strategy to succeed, adequate legal provisions.

Dutta (2014) studied NPA's growth in the public and private sector banks in India and analyzed sector-wise non-performing assets of the commercial banks. For the purpose of the study, data has been collected from secondary sources such as the report on Trend and progress of banking in India, Report on Currency and Finance (RBI) economic Surveys of India

Kamal Das (2010) analyzes the parameters which are actually the genesis of NPAs, and those are a market failure, willful defaults, poor follow-up and supervision, non-cooperation from banks, poor Legal framework, lack of entrepreneurial skills, and diversion of funds.

Ahmad, and Jegadeesh warren (2013) The current paper is written on the NPA and causes for NPA. Secondary data was collected for five years and analyzed by mean, CAGR, ANOVA, and ranking banks. The banks were ranked as per their performance in managing the NPA "s. The efficiency in managing the NPA by the nationalized banks was tested. Ranjan and Dhal (2013) explore an empirical approach to analyzing the Indian commercial banks' non-performing loans by regression analysis. The empirical analysis evaluates how the NPLs are influenced by three major sets of economic and

financial factors, i.e., terms of credit, bank size induced risk preferences, and macroeconomic shocks.

Joseph and Prakash (2014) deals with NPA trends in the banking industry, the internal, external, and other factors that mainly contribute to NPA rising in the banking industry and provides some suggestions for overcoming the burden of NPA.

Arora and Ostwal (2014) analyze the classification and comparison of loan assets of public and private sector banks. The study concluded that NPAs are still a threat for the banks and financial institutions and public sector banks have a higher level of NPAs in comparison to Private sector banks

Satpal (2014) attempts to determine NPA's actual definition and the factors contributing to the formation of NPAs, reasons for high NPAs, and their impact on Indian banking operations.

3. Data and Measures

An increase in the banks' non-performing assets has been one of the most important challenges in the money market in the past years, and there has been no certain solution for that.

Although monetary politicians have tried solutions such as founding a council to organize non-performing assets in central banks and another council for non-performing assets in other banks, the research indicates that this solution has not paved the way to organize assets.

On the other hand, an increase in non-performing assets in the banking system may weaken the capability of providing services and facilities and, finally, financial imbalance in the future. To say more precisely, an increase in these assets in terms of bank performance may lead to a decrease in service to clients, work efficiency, profitability, an increase in operational costs, etc. In the master section of the economy, it can cause slow cash flow and cash flow variance. There will be no specification and optimization of resources on the production network and country industry inappropriate time. It can also result in unemployment, economic downturn, and instability. Therefore, in this study, we have tried to discuss the genesis for increasing non-performing assets in Iran's national and private banks and their ranking.

3.1. Purpose of the study

Identify the genesis of increase in non-performing assets in national and private banks of Iran

The ranking genesis of increase in non-performing assets to control them effectively by private and national banks

3.2. Data Resources and Methodology

The present study is based on two types of data; primary data and secondary data. The primary data was collected according to the study's subject and through the investigation of respondents' characteristics. 800 people were selected from different classes of employees in the staff department and branches of 5 national banks and 5 private banks. The secondary data is adapted from different articles, magazines, newspapers, and websites.

Validity means a measuring instrument should be able to measure the aimed features or characteristics. The validity is important because inappropriate and inadequate measurement can invalidate any research.

The research variables are extracted from the following studies; Ravi Kumar, Subba Rao, and Kusuma (2018) Dutta (2014) to investigate the questionnaire's validity in this study. When the questionnaire was prepared, it was presented to some experts of the

statistical population, supervisors, and advisors working in the field of banking and finance to be revised, and after being confirmed, it was distributed between the samples.

Reliability means that under similar circumstances, the measuring instruments achieve consistent results. In other words, if a group of people is given measuring instruments for a few times at short intervals, the achieved results are similar. An index called reliability coefficient is used to measure the reliability. The reliability coefficient ranges from 0 to 1.

0 represents the lack of reliability, and 1 represents the maximum reliability. Many methods are used to measure the reliability coefficient of instruments. To measure the reliability of the designed questionnaire in this study, Cronbach's alpha coefficient has been used according to the following equation.

$$\alpha = \frac{K}{K-1}\left(1-\frac{\sum_{i=1}^{k} S_1^2}{S_{SUM}^2}\right) \qquad (1)$$

In this equation:

α: reliability coefficient of the questionnaire

K: the number of questions in the questionnaire

$S_{i:}$ answers to the i question

$S^{2:}$ all answers variance

SPSS software has been used to calculate the Cronbach's alpha coefficient, and the result was 0.92 for this questionnaire. It shows that the questionnaire is of high validity.

4. Research methodology

As the present study is looking for the genesis of an increase in non-performing assets in Iran's private and national banks, it is considered an exploratory study. The study has been done in December 2018 and January 2019. The questionnaire and proper sampling have been used to collect data from employees in private and national banks.

The collected data was inserted in the table and was analyzed by statistical instruments such as addition, percentage. Then, Garret Ranking Technique was used for ranking the data, and MS Excel was used to extract results and findings.

The main reasons for the increase in bank non-performing assets have been a challenge in the country banking system.

This challenge is serious in national banks in comparison with private banks.

1) Poor monetary and credit supervisor

The aim of supervision and inspection is clarification and recognition of strong and weak points and suggesting to adjust the operational methods and solutions. But the central bank of Iran is not capable of controlling unauthorized banks and institutes and cannot follow acts such as specifying the interest rate.

2) Poor plans for financial and technical evaluation

Sometimes banks offer facilities for the projects without investigating that project technically or financially. The technical analyses of a project may be suitable, but it's not been investigated financially, and the project owners imagine they would be able to achieve the desired resources from selling productions and providing services and repay the facilities.

3) Corrupted networks of employees in banks

Economic and financial corruption is a severe problem seen in different organizations and companies, and banks are not assumed to be an exception when they grant facilities.

Ignoring morality and being interested in materials have raised corruption in banks. As a result, this is a reason that banks grant facilities to those whose project is not justified, and they aren't interested in repaying the facilities because insufficient collateral has been offered for the facility.

4) Poor Infrastructure

Lack of deterrent instruments in case customers does not repay facilities and lack of an information bank by which the country's economic system can validate business brokers according to real, pure, and accessible information without any bribery or information leakage.

5) Improper SWOT analysis

These analyses are used for identifying internal weaknesses and strengths and external opportunities and threats that a company, a firm, or an organization encounters. If these analyses are not done carefully by bank experts when they investigate the projects applying for facilities, projects without an economic and financial plan will be accepted, and finally, the non-performing assets will increase in the bank.

6) Inadequate collateral or collateral with suspicious liquidity

Lack of standards to control the collateral has motivated asking for bribery and inappropriate evaluation or using institutes other than banks to do so, and this can raise the volume of overdue of the loan and non-performing assets.

7) Legal actions are time-consuming on collateral

The legal process to issue the order for collecting outstanding liabilities is too slow at the judicial system, and debtors ignore it because they are confident that it would last long for the bank to manage its debts.

8) Lack of appropriate mechanism to control and collect debts

In the internal bank control systems, administrative sections play a crucial role in guaranteeing activity profitability, applicants' authorization, type of collateral, continuous visit on applicant activities of using the fund, and following the process to collect debts.

9) Considering no professional criteria to choose senior managers

One serious challenge in developing countries is choosing managers and the criteria they use. Ignoring the candidate's expertise, experience, efficiency, interests, and talents when appointing them in charge of an organizational responsibility may lead to inappropriate decisions, useless actions, and dependencies on other organizations.

10) Economic sanctions and intensified bank sanctions

During the past few years, some faithful bank customers have been unable to repay the facilities because of financial transaction sanctions.

11) Currency fluctuation in the previous years

Some firms have no problems in terms of economy and profession, and they have been able to reach their goal, but the rule changes and currency fluctuation have made them unable to repay their facilities.

12) Extreme Smuggling of Goods to Country

Unfortunately, smuggling, the drastic catastrophe, although required to fight against, has been getting expansive increasingly because of unqualified management. Statistics show

that the growth in smuggling has disabled the local production and has destroyed the developing structures.

13) The significant difference between the bank interest rate and market interest rate

After the Islamic revolution of Iran, the interest rates for short-term and long-term savings accounts have been different from market interest rates because of gross national production. These results show that the Iranian economy is not stable. It means that during the last year, interest rate change and its relation with inflation and economic growth have been allocated not professionally or on purpose, and this can demotivate debtors to repay the facilities to the bank. Moreover, due to high inflation and negative real interest rate in Iran, time is passing in debtors' favor, and the bank credit value has been decreasing. Because the best policy to get wealthy in inflation is to be in debt.

14) Bank Council Dependence

Sometimes high facilities are paid according to people's relations or unique advice and without any plans. Even when the program or project is not justified, no bank cares for the advice given to repay the facilities.

15) Intentional Default or Dishonest Declaration of Bankruptcy

In some cases, debtors threaten the bank, and they would declare bankruptcy if the bank starts the legal process of collecting debts. Bank will have to accept the conditions to prevent this challenge.

16) Problems due to legislation

Allocating the interest rate is dependent on the permission of unauthorized people and granting the facilities are dependent on relations, problems arising from article 36 of documents and properties registration law and the Act controlling that, granting high facilities to the national companies and organizations, giving away the payment penalties, renewed overdue of the loan, allocating maximum credits and making various rules about the interest rate and facilities has caused many problems in the monetary system of the Iranian economy.

5. Findings

The data were collected by using a questionnaire named an increase of non-performing assets in private and national banks of Iran. It was distributed among employees in the staff department and branches of five national banks and five private banks. When the questionnaires were collected, data were summarized and classified in the table (1). Finally, the genesis of non-flow assets in private and national banks was ranked according to Garret Ranking Technique.

5.1 Ranking the genesis of non-flow assets in private and national banks

16 genesis has been considered as the genesis of non-performing assets in private and national banks, and the ranks given by respondents are shown in tables 2and 3.

1)Poor monetary and credit supervision; 2) inadequate plans of financial and technical evaluation; 3) corrupted networks of employees in banks; 4)Poor Infrastructure; 5)Improper analyses of SWOT; 6)Inadequate collateral or collateral with suspicious liquidity;7)Legal actions are time-consuming on collateral; 8) Lack of appropriate mechanism to control and collect debts; 9)Considering no professional criteria to choose senior managers; 10)Economic sanctions and intensified bank sanctions; 11)Currency fluctuation during the previous years; 12)Extreme Smuggling of Goods to Iran; 13)The

great difference between the bank interest rate and market interest rate;14)Bank Council Dependence; 15)Intentional default or dishonest declaration of bankruptcy; 16)Problems due to legislation.

Table 1. Demographic Profile of the Respondents

Type of bank		**National Banks**		**Private banks**	
Demographic Factor		**No. of Respondents**	**Percentage**	**No. of Respondents**	**Percentage**
Gender	Male	165	41%	190	48%
	Female	235	59%	210	53%
	Total	400	100%	400	100%
Age in Years	Less than 25 Years	35	9%	43	11%
	Between 25 to 30 years	80	20%	77	19%
	Between 30 to 40 Years	240	60%	205	51%
	More than 40	45	11%	75	19%
	Total	400	100%	400	100%
Category	Queue personnel	270	68%	290	73%
	Staff personnel	130	33%	110	28%
	Total	400	100%	400	100%

Table 2. Preference and ranking of respondents on Causes for an increase of NPAs in Iranian national banks.

S.No	**Causes for an increase of NPAs in Iranian national banks**	**Rank has given by the respondents**															
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th**	**13th**	**14th**	**15th**	**16th**
1	F1	33	40	52	60	10	23	20	23	15	9	35	0	15	44	18	3
2	F2	10	61	48	56	25	19	28	21	0	12	17	22	8	14	27	32
3	F3	65	48	60	32	25	27	0	23	18	7	19	24	0	30	10	12
4	F4	3	14	12	20	40	38	38	12	29	24	30	26	30	0	49	35
5	F5	29	32	24	28	40	29	28	22	33	16	26	0	35	32	26	0
6	F6	92	70	78	48	20	0	15	5	0	10	6	0	22	23	7	4
7	F7	60	80	65	52	5	14	17	11	15	0	19	5	30	18	7	2
8	F8	15	36	36	0	42	42	25	26	15	28	31	18	12	39	0	35
9	F9	50	65	72	44	23	0	20	14	0	25	20	33	9	21	3	1
10	F10	86	71	42	40	29	18	22	0	14	13	14	0	10	28	6	7
11	F11	50	62	68	55	22	12	11	0	21	5	9	18	0	20	35	12
12	F12	15	19	30	52	0	30	18	18	9	28	25	30	10	55	22	39
13	F13	51	76	29	32	48	0	19	19	34	14	0	25	16	0	24	13
14	F14	85	97	80	44	24	9	3	0	8	12	8	9	0	7	12	2
15	F15	2	12	13	0	20	24	68	55	35	10	16	0	24	46	35	40
16	F16	32	45	35	0	65	35	49	18	51	12	18	12	1	0	10	17

As you can see in table2, 92 respondents out of 400 in national banks mentioned Inadequate collateral or collateral with suspicious liquidity as the first reason, 82 mentioned Economic sanctions and intensified bank sanctions, and 85 mentioned Bank Council dependence the first rank in raising non-performing assets national banks.
As you can see in table3, 105 respondents out of 400 in private banks mentioned corrupted networks of employees in banks as the first reason, and 95 respondents mentioned Inadequate collateral or collateral with suspicious liquidity as the first rank in raising non-performing assets of national banks.

Table 3. Preference and ranking of respondents on Causes for an increase of NPAs in Iranian national banks.

S.No	Causes for an increase of NPAs in Iranian Private banks	Rank has given by the respondents															
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
1	F1	93	70	82	42	28	13	10	9	0	15	0	12	10	4	8	4
2	F2	46	39	35	43	28	7	32	22	8	0	12	8	26	35	30	29
3	F3	105	80	86	28	22	7	12	5	20	0	15	10	5	0	2	3
4	F4	15	10	29	45	0	34	0	14	12	13	25	22	26	35	52	68
5	F5	39	42	38	29	32	22	0	18	8	0	20	16	14	28	45	49
6	F6	95	75	90	35	13	25	13	10	0	11	8	4	10	0	5	6
7	F7	68	79	65	40	25	20	0	8	10	13	16	6	18	8	12	12
8	F8	38	18	45	30	18	22	0	21	12	18	0	8	23	30	62	55
9	F9	78	92	73	60	10	13	0	8	7	9	0	10	9	14	12	5
10	F10	69	73	65	32	9	12	25	0	24	10	21	21	10	19	8	2
11	F11	40	55	35	56	20	32	0	37	21	12	14	10	35	8	15	10
12	F12	34	8	38	40	22	20	18	14	9	12	18	18	29	22	25	73
13	F13	65	77	49	32	14	16	9	30	0	12	12	24	0	18	12	30
14	F14	70	65	80	15	24	42	0	0	25	0	12	15	21	10	9	12
15	F15	9	12	28	24	0	12	18	21	0	35	9	10	35	40	72	75
16	F16	48	32	20	60	25	52	0	15	18	22	12	21	15	21	17	22

5.2. The Percent Position and Garret Value

The Garret ranks were calculated by using the appropriate Garret Ranking formula. Based on the Garret ranks, the garret value was calculated. The Garret tables and scores of each cause for raise of NPAs in 2 and 3 tables, and multiplied to records scores in table 4, finally by adding each row, the total Garret score were obtained.

Percent position = $\frac{100(\text{Rij}-0.5)}{\text{Nj}}$

Rij = Rank given for the ith variable by the jth respondent

Nj = number of variables ranked by the jth respondent.

The result is provided in the following table.

Table 4. Percent Position and Garrett Value.

S.NO	100 (Rij – 0.5)/ Nj	Calculated Value	Garrett Score
1	100 (1-0.5)16	3.13	86
2	100 (2-0.5)16	9.38	76
3	100 (3-0.5)16	15.63	70
4	100 (4-0.5)16	21.88	65
5	100 (5-0.5)16	28.13	61
6	100 (6-0.5)16	34.38	58
7	100 (7-0.5)16	40.63	55
8	100 (8-0.5)16	46.88	51
9	100 (9-0.5)16	53.13	48
10	100 (10-0.5)16	59.38	45
11	100 (11-0.5)16	65.63	42
12	100 (12-0.5)16	71.88	39
13	100 (13-0.5)16	78.13	34
14	100 (14-0.5)16	84.38	30
15	100 (15-0.5)16	90.63	24
16	100 (16-0.5)16	96.88	14

6. Calculation of Garrett Value and Ranking

The calculation of Garrett value and ranking of the causes for raise of NPAs by the respondents' national and private banks in Iran.

Table5. Calculation of Garrett Value and Ranking in national banks.

S.No	Causes for the increase of NPAs in Iranian national banks	Rank has given by the respondents																Total	%	Rank
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
1	F1	2838	3040	3640	3900	610	1334	1100	1173	720	405	1470	0	510	1320	432	42	22534	56.34	10
2	F2	860	4636	3360	3640	1525	1102	1540	1071	0	540	714	858	272	420	648	448	21634	54.09	11
3	F3	5590	3648	4200	2080	1525	1566	0	1173	864	315	798	936	0	900	240	168	24003	60.01	6
4	F4	258	1064	840	1300	2440	2204	2090	612	1392	1080	1260	1014	1020	0	1176	490	18240	45.60	15
5	F5	2494	2432	1680	1820	2440	1682	1540	1122	1584	720	1092	0	1190	960	624	0	21380	53.45	12
6	F6	7912	5320	5460	3120	1220	0	825	255	0	450	252	0	748	690	168	56	26476	66.19	2
7	F7	5160	6080	4550	3380	305	812	935	561	720	0	798	195	1020	540	168	28	25252	63.13	4
8	F8	1290	2736	2520	0	2562	2436	1375	1326	720	1260	1302	702	408	1170	0	490	20297	50.74	13
9	F9	4300	4940	5040	2860	1403	0	1100	714	0	1125	840	1287	306	630	72	14	24631	61.58	5
10	F10	7396	5396	2940	2600	1769	1044	1210	0	672	585	588	0	340	840	144	98	25622	64.06	3
11	F11	4300	4712	4760	3575	1342	696	605	0	1008	225	378	702	0	600	840	168	23911	59.78	7
12	F12	1290	1444	2100	3380	0	1740	990	918	432	1260	1050	1170	340	1650	528	546	18838	47.10	14
13	F13	4386	5776	2030	2080	2928	0	1045	969	1632	630	0	975	544	0	576	182	23753	59.38	8
14	F14	7310	7372	5600	2860	1464	522	165	0	384	540	336	351	0	210	288	28	27430	68.58	1
15	F15	172	912	910	0	1220	1392	3740	2805	1680	450	672	0	816	1380	840	560	17549	43.87	16
16	F16	2752	3420	2450	0	3965	2030	2695	918	2448	540	756	468	34	0	240	238	22954	57.39	8

Table 6. Calculation of Garrett value and ranking in private banks.

S.No	Causes for increase of NPAs in Iranian Private Banks	Rank has given by the respondents																Total	%	Rank
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
1	F1	7998	5320	5740	2730	1708	754	550	459	0	675	0	468	340	120	192	56	27110	67.78	3
2	F2	3956	2964	2450	2795	1708	406	1760	1122	384	0	504	312	884	1050	720	406	21421	53.55	11
3	F3	9030	6080	6020	1820	1342	406	660	255	960	0	630	390	170	0	48	42	27853	69.63	1
4	F4	1290	760	2030	2925	0	1972	0	714	576	585	1050	858	884	1050	1248	952	16894	42.24	15
5	F5	3354	3192	2660	1885	1952	1276	0	918	384	0	840	624	476	840	1080	686	20167	50.42	12
6	F6	8170	5700	6300	2275	793	1450	715	510	0	495	336	156	340	0	120	84	27444	68.61	2
7	F7	5848	6004	4550	2600	1525	1160	0	408	480	585	672	234	612	240	288	168	25374	63.44	5
8	F8	3268	1368	3150	1950	1098	1276	0	1071	576	810	0	312	782	900	1488	770	18819	47.05	13
9	F9	6708	6992	5110	3900	610	754	0	408	336	405	0	390	306	420	288	70	26697	66.74	4
10	F10	5934	5548	4550	2080	549	696	1375	0	1152	450	882	819	340	570	192	28	25165	62.91	6
11	F11	3440	4180	2450	3640	1220	1856	0	1887	1008	540	588	390	1190	240	360	140	23129	57.82	9
12	F12	2924	608	2660	2600	1342	1160	990	714	432	540	756	702	986	660	600	1022	18696	46.74	14
13	F13	5590	5852	3430	2080	854	928	495	1530	0	540	504	936	0	540	288	420	23987	59.97	8
14	F14	6020	4940	5600	975	1464	2436	0	0	1200	0	504	585	714	300	216	168	25122	62.81	7
15	F15	774	912	1960	1560	0	696	990	1071	0	1575	378	390	1190	1200	1728	1050	15474	38.69	16
16	F16	4128	2432	1400	3900	1525	3016	0	765	864	990	504	819	510	630	408	308	22199	55.50	10

As you can see in Table 5, the Bank Council's dependence against organizations is ranked. First, Inadequate collateral or collateral with suspicious liquidity is ranked as the second reason, and the rest are ranked respectively in raising non-performing assets of national banks by the respondents.

As you can see in table 6, corrupted networks of employees in private banks are ranked. First, Inadequate collateral or collateral with suspicious liquidity is ranked the second in raising non-performing assets of private banks, and the rest of the items are ranked respectively.

Respondents Preference of Causes for the increase of NPAs using Garrett value shown in figure 1.

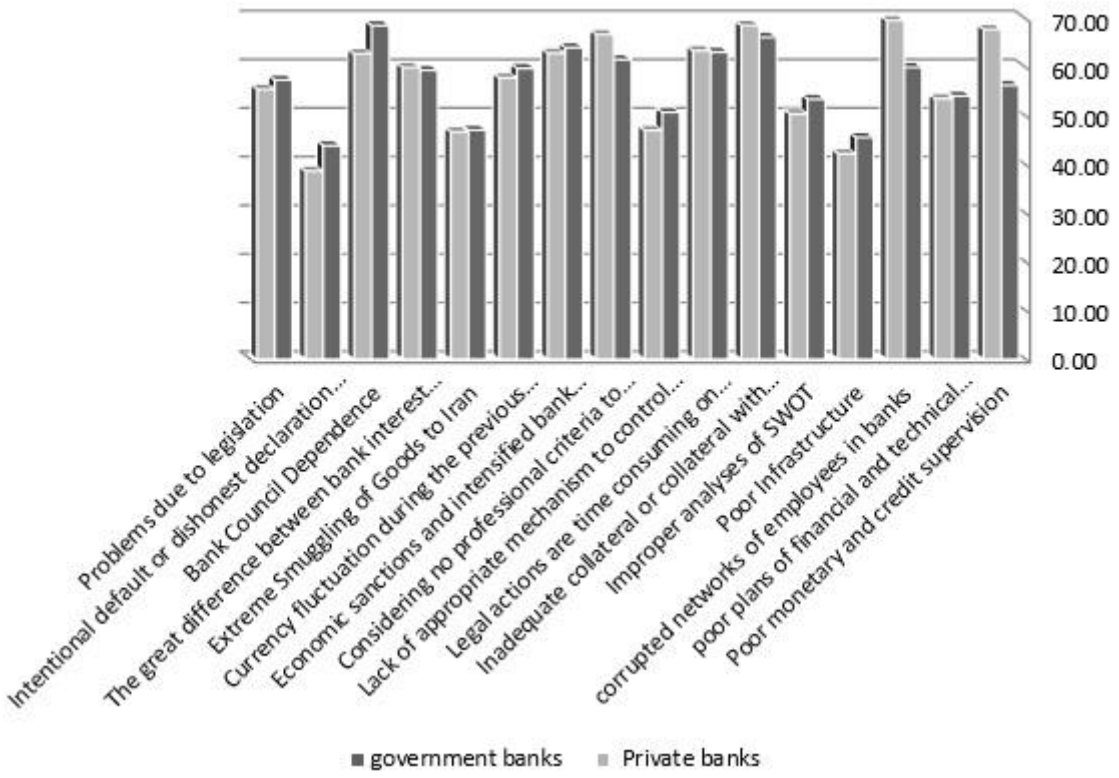

Figure1. Respondents Preference of Causes for the increase of NPAs using Garrett Value

7. Conclusion

The problem of increase in non-performing assets has been increasing continuously, and considering the expansive role of banks in different sections of the economy and because the Iranian economy is the bank- centered, the increase in non-performing assets will happen in the whole economy (Singh Asha, 2013)

The future of the banking system and their bankruptcy in Iran is seriously affected by non-performing assets, and the banking system cannot solve this problem by itself because of external factors, lack of internal motivation, and the oppression of the economic atmosphere.

According to Tables 5 and 6, the critical genesis for non-performing assets in national banks include inefficient management charged by unauthorized people and collateral evaluation. The first ranked reason for private banks is corrupted networks of employees in banks, which is a result of poor management. However, the indices' priority in research is not consistent with Ravi Kumar, Subba Rao, and Kusuma (2018). Therefore, considering these geneses and their ranks in tables 5 and 6, practical solutions are suggested which are as follows: less direct and indirect interference of national and members of parliament in granting bank facilities, appointing experts to

evaluate the collateral, selecting dependent and qualified managers, more cooperation and communication with the inferior organizations such as the cooperation of judiciary with banks on collecting debts, publishing bank debtors blacklist, exact validation, creating information bank, official conflict with the offenders, strengthening the central bank and finally outsourcing the credits to get rid of non-performing assets.

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Research Article

The Relationship between Predictive Earnings Management and Opportunistic Earnings Management with Bonus and Stock Return in Iran

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ABSTRACT

The present study aims to investigate the relationship between earnings management and a bonus of CEOs. Because earnings management does not have only opportunistic effects, but signaling effects, this study focuses on information disclosure quality to examine earnings management incentives. If firms are classified into two groups of firms with predictive and opportunistic earnings management, it can be assumed that incentives and managers' operation in these two groups differ.

The research's target population consists of listed companies on the Tehran Stock Exchange, among which 91 companies selected over a period from 2009 to 2016. The panel data technique has been applied to estimate the research model.

The study's findings show that CEO's reward has an insignificant positive relationship with predictive earnings management and an insignificant negative relationship with opportunistic earnings management. It shows that firms are bereft of appropriate plans for the CEO's rewards. Furthermore, the relationship between predictive earnings management, opportunistic earnings management, and the stock return has been investigated. The achieved findings indicate that stock return is influenced by disclosure quality. In other words, the stock return has a positive relationship with predictive earnings management and a negative relationship with opportunistic earnings management.

Keywords: predictive earnings management; opportunistic earnings management; accruals quality; disclosure quality; rewards paid to the board of directors; stock return

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1.Introduction

Practitioners believe that some earnings management level exists in many, if not most, publicly traded companies (Graham et al., 2005). A rather large empirical accounting literature documents various ways and settings in which earnings management occurs. Recent evidence in this literature focused on various forms of earnings management (e.g., Zhao et al., 2012) as well as on more complex relationships such as ones between earnings management and debt/diversification (Rodriguez and Hemmen, 2010), compensation (Ibrahim and Lloyd, 2011), accounting standards (Fornaro and Huang, 2012), and regulations (Holder et al., 2013).

Earnings management can bring about positive or negative results for investors since it can make the information environment more vague or clear; which result may occur depends upon structural elements such as firm growth (Robin and Wu, 2012) or financial elements such as ownership structure (Ali et al., 2007). Most studies that examined earnings management have executed opportunistic earnings management. Examples of such settings include Earnings management and annual report readability (kin et al., 2017), The Role of Earnings Management via Real Activities versus Accruals in SEO Valuation (Kothari et al., 2016), financing (e.g., Cohen and Zarowin, 2010), warranty information (Cohen et al., 2011), firms exempt from Section 404b of Sarbanes Oxley (Holder et al., 2013), and discontinued operations (Barua et al., 2010).

First, researchers of this field, such as Holthausen (1990), indicated that earnings management could have positive and negative results, while few studies assessed its positive dimensions. Prior studies suggest that managers use their reporting discretion to signal private information. However, because managers are often assumed to use their discretion to mislead investors, discretionary accruals might be regarded as opportunistic. But some scholars such as Louis and Robinson (2005) found that at the split announcement, the market construes the pre-split abnormal accrual as a signal of managerial optimism rather than managerial opportunism. Cho et al. (2010) proved that managers could use their accounting discretion to show the firm's real status. Robin and Wu (2012) also state that managers have incentives to signal private information to investors to help them make better decisions; therefore, earnings management has an opportunistic effect and has signaling influence (Guay, 2008). Managers' information reflects the firm's status on the one hand (Subramanyam, 1996) while on the other hand, they may try to apply opportunistic management to add luster to the firm due to various incentives such as firm survival, reward, and other elements (Balsam et al., 2002). The current study focuses on both the opportunistic and predictive dimensions of earnings management. In order to distinguish these two dimensions, disclosure quality has been applied. Firms with appropriate disclosure quality will enjoy predictive earnings management, while those who lack appropriate disclosure quality will have opportunistic earnings management.

Earnings management affect the capital market. In other words, the capital market can be misled by earnings management (Watts and Zimmerman, 1986); therefore, seeking earnings management incentives and its implementation requirements are of considerable importance. Many incentives have been recognized and introduced for earnings management such as capital market pressures, individual reputation concerns, tax savings, bonus compensation, distribution of reported earnings, good image of firm performance, stock price increase, and policy costs decrease (Libby and Seybert, 2009). Another incentive that affects earnings management is a payable reward to the CEO.

This study informs this debate by identifying a rational alignment between earnings management and CEO compensation. Although This study concerning compensation practices is derived using US data and is primarily applicable in the US setting, findings in studies such as Bryan et al. (2006) and Fernandes et al. (2013) suggest

generalizability of results certain non-US settings.

The relationship between earnings management and incentives can be assessed and comprehended from the viewpoint of corporate governance. If the current value of overpayments is positive, more rewards will be presented as the incentive. Such an issue is correct when earnings received from overpayments are more than direct costs—each overpayment dollar in specific conditions. For instance, when information or monitoring environment is of high quality, the final earning may be more than one dollar. But on other occasions, when weak information or monitoring environment avoids external observations, the final earning may be less than one dollar. Thus, the overpayment may or may not enhance value and validity (Davit et al., 2013).

The relationship between stock return and opportunistic and predictive earnings management has also been assessed in the present study. Ball and Brown (1968) state that when accounting earning is announced, the commercial unit's stock price is influenced. It shows that account earning include information content, and because accruals affect earning calculation, accruals quality will provoke a market reaction. The market reaction can be reflected in the stock return. Dargenidou et al. (2011) indicate that accruals and disclosure have the same effect on the expected return on current stock return. Francis et al. (2008) state that earning quality and information disclosure are complementary. Mouselli et al. (2012) found a positive association between accruals quality and disclosure quality, suggesting that firms with higher disclosure quality engage less in earnings management and have higher accruals quality. Asset pricing tests show that an accruals quality factor and a disclosure quality factor explain the time-series variation in similar portfolios' excess returns. This suggests that they contain similar information and confirms the substitutive nature of accruals quality and disclosure quality factors.

Other sections of this study are set in the following manner. The second section includes the theoretical background and hypotheses. The third section is consisting of research methodology, target population, and research sample. The fourth and fifth sections, respectively, include research models and findings. The final section contains the results and conclusion.

2. Theoretical issues

Financial reporting, as a way of transferring information, significantly affects decision-makers' viewpoints. Financial statements mainly aim to supply investors and creditors with sufficient information about their financial and operative status. This aim is only met when reporting is of high quality (Aboody and Hughes, 2005). Annual statements assessment shows that accounting information quality varies. Different information is derived from the type of firms' management, philosophy, and preference for investing intentions (Singhvi, 1968), thus in theoretical accounting literature, there are two following earnings management viewpoints: predictive and opportunistic.

According to Watts and Zimmerman (1986), managers can use earnings management to deliver some useful and superior information that they know about firm performance to shareholders and debt holders. If this is the case, earnings management may not be harmful to the stockholders and the public, since it decreases information asymmetry. Predictive earnings management intends to enhance the information content of earnings when signaling private information. Those who support this viewpoint believe that managers could use their accounting discretion to reflect the firm's real status and profitability.

Based on opportunistic earnings management, managers misuse the existing information asymmetry between themselves and other beneficiaries to maximize their advantages and decrease financial statements' anticipatory capability. Therefore,

managers get advantage of their information to mislead investors and gain more earnings (Burgstahler and Dichev, 1997).

It is expected that corporate governance and earnings management are related. If managers play a significant role in earnings management, corporate governance may have some consequences, limiting managers' abilities, encouraging managers to increase transparency, and permitting managers to increase ambiguity or present their incentives for increasing ambiguity (Davit et al., 2013).

There is no single definition for corporate governance. According to Larcker et al. (2007), corporate governance refers to the set of mechanisms that influence managers' decisions when there is a separation of ownership and control. Some of these monitoring mechanisms are the board of directors, their different committees, payment contracts, uncontrolled policies, internal and external auditing, liabilities contracts, banking institutions, institutional shareholders, and clients. On the basis of agency theory, all these mechanisms can be applied to relate shareholders' and managers' benefits. The combination of these mechanisms varies in different firms.

Accounting information plays an important role in corporate governance and rewarding contracts since payable rewards based on accounting information is more than rewards based on prices. In rewards that are based on accounting information, incentives are mostly derived from management attempts rather than market changes, which are not related to management attempts (Sloan, 1993; Murphy, 2001).

The relationship between incentives and earnings management is objective and intrinsic. Various researches show that earnings management and payments to the CEO are probably related to each other. Core et al. (1999) state that rewards paid to the CEO and board structure are associated. For instance, if the CEO is also the board's director, payment to CEO will increase due to this dichotomy. Moreover, accounting discretion has a relation with the variables of corporate governance. For example, dichotomy enhances discretions (Brown et al., 2008). Furthermore, there is a significant difference between board structure mechanisms and payments to the CEO (Linck et al., 2008).

Considering the abovementioned issues, there is a relationship between payments to CEO and predictive and opportunistic earnings management. For instance, firms that are governed by predictive earnings management consider payments to CEO as an incentive. Core et al. (2003) stated the effect of firm observation on payments to the CEO.

Previous studies show that fundamental analysis can be applied to improve investment performance. Financial statements information helps users to implement investment strategies. Thus, accounting-based information such as the ratio of liability to profitability can be utilized when choosing the stock whose book value is more than the market value (Piotroski, 2000). Another research which emphasizes accounting information for investment manager indicates that market users can get the advantage of results derived from financial statements analyses (Mohanram, 2005). How salespeople benefit from financial statements analyses is another study (Dechow et al., 2001). Therefore, financial reports mainly aim to present suitable information to the users of financial statements to predict future performance and stock return. The relationship between stock return and accruals quality has been assessed in many studies such as Francis et al. (2005), who proved the importance of accruals quality as a criterion of earnings quality and showed that cash could be more suitable earning.

Myers et al. (2003) showed that high levels of accruals, especially discretionary accruals, have low earnings quality. Chan et al. (2006) found that stock return of firms whose earnings quality decreases due to accruals increase will decrease during the next reporting period since investors understand the low level of earnings quality and deflate the prices. Dudin (2017) shows a negative relationship between disclosure quality and

earnings management. Findings of Dargenidou et al. (2011), Francis et al. (2008), Mouselli et al. (2012) show that accruals and disclosure have the same effect on expected earnings on stock return. Moreover, other studies in the stock exchange field demonstrate that disclosure quality can significantly affect stock return (Lundholm and Myers, 2002; Gelb and Zarowin, 2002; Hussainey et al., 2003; Ettredge et al., 2005; and Schleicher, 2007). Thus, it can be expected that if information disclosure is of high quality and earnings management is predictive, a high level of stock return will be gotten. If information disclosure is of low quality due to opportunistic earnings management, a low stock return level will be gotten. Regarding the mentioned issues, research hypotheses can be written in the following manner:

Hypothesis 1: Firms with predictive earnings management give CEOs more payments in proportion to firms with opportunistic earnings management.

Hypothesis 2: Firms with predictive earnings management gain more future returns than firms with opportunistic earnings management.

3. Research methodology

Table 1 shows a sum of the frequency of the research target population.

Table 1. The frequency of Companies

Description	Firm-year	Firm
All listed companies on the exchange	2100	300
Ir	(553)	(79)
F	(154)	(22)
F	(28)	(4)
U	(420)	(60)
F	(308)	(44)
Target population volume	637	91

This study's target population consists of all listed companies on the Tehran Stock Exchange over a period from 2009 to 2016. Selected companies should not be among banks of financial institutions (investing companies, financial intermediations, holding, or leasing). They should be active during the research period without any change in their fiscal year or financial loss. Their financial and management information should be accessible. Considering these criteria, the census sampling method has been applied in the current study.

According to their final score, all listed companies on the Tehran Stock Exchange have been classified into two groups of predictive and opportunistic earnings management. Due to the importance of disclosure quality, Tehran Stock Exchange decided to present the score and ranks of all listed companies regarding their information disclosure quality, so that companies will be aware of their status and encouraged to improve it. Tehran Stock Exchange has two criteria of timeliness and reliability for ranking disclosure quality. Based on the timeliness criterion, the time of sending information and its delay is calculated. The reliability criterion is based on changes in sending predictive information and the difference between predicted amounts and actual audited performance.

At last, the scores are summed, and the final score is regarded as a disclosure quality basis. Thus predictive and opportunistic earnings management can be distinguished in this way. The first, discretionary accruals are estimated through residuals from the adjusted jones model. Then it is required to examine the relationship between discretionary accruals and cash flows (Dechow and Dichev, 2002). In this model, if the relationship between discretionary accruals and the next cash flows is significant, earnings management will exist. If the total annual score is less than 50, earnings

management is opportunistic, and if the total annual score is more than 50, earnings management is predictive. Variable OEM shows firms with opportunistic earnings management, and firms with predictive earnings management are indicated by PEM.

The present study is an applied correlational one whose data has been collected through financial statements, the Rahavard Novin database, and seo.ir. Collected data has been analyzed by Excel software and analyzed through the application of Panel regression models and R Software. The panel data technique has been used to estimate research models.

4. Research model

Discretionary accruals are estimated through residuals from the adjusted jones model

1) $\frac{\mathbf{TA}}{\mathbf{Assets_{t-1}}} = \beta_0 + \beta_1 \left(\frac{1}{\mathbf{Assets_{t-1}}}\right) + \beta_2 \left(\frac{\Delta \mathbf{Rev}}{\mathbf{Assets_{t-1}}}\right) + \beta_3 \left(\frac{\mathbf{PPEi,t}}{\mathbf{Assets_{t-1}}}\right) + \beta_4\ \mathbf{ROA} + \varepsilon$

TA_{it}: Total accruals

$ASSETS_{it}$: Total assets

ΔREV: Variance of revenues

PPE_{it}: Gross property machineries equipment

ROA_{it}: Return on assets

ε_{it}: Residual error

Accruals in model 1 are calculated as follows:

2) $\mathbf{TA_{it}=NI_{it}-CFO_{it}}$

NI_{it}: Net income

CFO_{it}: Operative cash flow

According to Dechow and Dichev (2002), it is required to examine the relationship between discretionary accruals and cash flows and control variables. Thus, the regression model can be written as follows:

3) $\mathbf{DACC}=\beta_0+\beta_1\mathbf{CFO}_{t-1}+\beta_2\mathbf{CFO}_t+\beta_3\mathbf{CFO}_{t+1}+\beta_4\mathbf{REV}_{i,t}+\beta_5\mathbf{PPE}_{i,t}+\varepsilon_{i,}$

$DACC_{it}$: Discretionary accruals which equal to the amount of residual of adjusted jones model

CFO_{t-1}: Cash from operations (last year)

CFO_t: Cash from operations (current year)

CFO_{t+1}: Cash from operations (next year)

REV_{it}: Revenues

PPE_{it}: Gross property machinery equipment

ε_{it}: Residual error

Mention must be made through that in this model. All variables are homogenized through the book value average of assets.

In this model, if β3 is significant, earnings management will have existed.

The first hypothesis has been tested through the Panel regression equation to determine the relationship between rewards paid to the board of directors and predictive and opportunistic earnings management. The regression model can be written as follows:

4) $\mathbf{BONUSE_{i,t}}=\alpha+\beta_1\mathbf{OEM_{i,t}}+\beta_2\mathbf{PEM_{i,t}}+\beta_3\mathbf{SIZE_{i,t}}+\beta_4\mathbf{FCF_{i,t}}+\beta_5\mathbf{LEV_{i,t}}+\beta_6\mathbf{STDRETURN_{i,t}}+\beta_7\mathbf{ROA_{i,t}}+\beta_8\mathbf{SIZE*OEM}+\beta_9\mathbf{SIZE*PEM}+\beta_{10}\mathbf{FCF*OEM}+\beta_{11}\mathbf{FCF*PEM}+\beta_{12}\mathbf{LEV*OEM}+\beta_{13}\mathbf{LEV*PEM}+\beta_{14}\mathbf{STDRET*OEM}+\beta_{15}\mathbf{STDRET*PEM}+\beta_{16}\mathbf{ROA*OEM}+\beta_{17}\mathbf{ROA*PEM}+\varepsilon_{i,t}$

Where,

$BONUSE_{it}$: Natural logarithm of CEOs' bonus

OEM_{it}: If the total annual score of information disclosure is less than 50, OEM equals 1. Otherwise, it equals zero.

PEM_{it}: If the total annual score of information disclosure is more than 50, PEM equals 1. Otherwise, it equals zero.

$SIZE_{it}$: Natural logarithm of stock market value

FCF_{it}: The 3-year average of (operating cash flows minus stock dividends divided by total assets), if the ratio of book value to market value is more than one, it equals one; otherwise, it equals zero.

LEV_{it}: Financial leverage (ratio of total liabilities to the daily value of shareholders' equity)

$STDRETURN_{it}$ **:** Standard deviation of return on the stock during the years t-2, t-1, and t

In this model, if OEM's coefficient is negative and significant, while PEM's coefficient is positive and significant, the first hypothesis is confirmed.

In order to find the relationship between future returns, predictive and opportunistic earnings management, the Panel regression equation is utilized.

$$\mathbf{5)RETURN_{i,t}=\alpha+\beta_1 OEM_{i,t}+\beta_2 PEM_{i,t}+\beta_3 SIZE_{i,t}+\beta_4 BM_{i,t}+\beta_5 STDRETURN_{i,t}+\beta_6 ROA_{i,t}+\beta_7 CFO_{i,t}+\beta_8 STDCFO_{i,t}+\beta_9 LEV_{i,t}+\beta_{10} FCF_{i,t}+\varepsilon_{i,t}}$$

$RETURN_{it}$: Return on stock

OEM_{it}: If total annual score of information disclosure is less than 50, OEM equals 1, otherwise it equals zero.

PEM_{it}: If the total annual score of information disclosure is more than 50, PEM equals 1. Otherwise, it equals zero.

BM_{it}: Ratio of book value to stock market value

$STDCFO_{it}$: Standard deviation of operative cash during the years t-2, t-1, and t

In this model, if OEM's coefficient is negative and significant, while PEM's coefficient is positive and significant, the second hypothesis is confirmed.

5. Data analysis

5.1. Descriptive statistics

Before examining research hypotheses, research variables are described based on descriptive statistics techniques. Table 2 presents information about firms with predictive and opportunistic earnings management. Findings show that in the firms with predictive earnings management, the average of ECOs' rewards is more than opportunistic earnings management. Furthermore, the size of firms with predictive earnings management is more than opportunistic earnings management. Thus, it can be assumed that firms with predictive earnings management are bigger and, subsequently, more powerful and influential. The average of liabilities leverage for firms with predictive earnings management is 1.11, while for firms with opportunistic earnings management is 2.05. As it can be observed, liabilities leverage in the firms with predictive earnings management is less than the firms with opportunistic earnings management. The former avert risks. This table's results indicate that the average return on assets for firms with predictive earnings management is more than the firms with opportunistic earnings management. Moreover, stock return in the firms with predictive earnings management equals 37.48, while in the firms with opportunistic earnings management equals 35.64. It proves more amount of stock return in the firms with predictive earnings management.

Table 2- Descriptive statistics of variables

	OEM Firms					PEM Firms				
	Mean	Median	Standard deviation	Minimum	Maximum	Mean	Median	Standard deviation	Minimum	Maximum
Bonus	3.34	4.12	3.33	0	8.22	5.02	6.47	3.07	0	9.42

Size	12.60	12.30	1.30	10.21	17.49	13.05	13.09	1.325	9.94	17.51
Lev	2.05	1.66	1.716	0.09	10.41	1.11	0.851	1.01	0.02	8.66
Std Ret	62.89	37.47	69.82	9.22	450.79	45.40	33.48	55.28	1.90	467.30
ROA	0.07	0.06	0.05	0.005	0.23	0.10	0.09	0.05	0.006	0.33
Return	35.64	17.40	60.72	-63.90	243.64	37.48	25.94	67.91	-40.11	734.14
BM	0.97	0.85	0.58	0.16	3.18	0.69	0.59	0.40	0.15	2.39
CFO	0.10	0.09	0.14	-0.20	0.70	0.16	0.15	0.12	-0.33	0.59
Std CFO	0.09	0.08	0.06	0.03	0.31	0.10	0.09	0.05	0.02	0.45

5.2. Hypotheses testing

The panel data technique has been applied to estimate research models. Table 3 shows the results of choosing the adjusted jones model. Since P-value in the Chaw test is less than 0.05, the fixed effects model is selected. Furthermore, the Hausman test should be utilized to choose between the fixed effects model and the random-effects model. P-value in the Hausman test is less than 0.05. Thus the fixed effects model is selected.

Table 3- Goodness of fit for Panel data models

Test	**p-value**	**Result**
F-Limer Test	<0.001	**Fixed Effects**
Hausman Test	<0.001	**Fixed Effects**

Serial autocorrelation should be assessed in the final model by applying the Breusch-Pagan Godfrey test to choose between a fixed-effects model and the generalized linear model. Table 4 presents the results. Because the p-value in the Breusch-Pagan Godfrey test is less than 0.05, serial auto-correlation exists among error statements. As a result, the generalized linear model is applied.

Table4-Assumptions of the classical linear regression model

Test	p-value	Result
Breusch-Godfrey Test	<0.001	**Generalized linear model**

Table 5 indicates the output of the generalized linear model.

Table 5- Estimation of coefficients in the generalized linear model

$$\frac{\mathbf{TA}}{\mathbf{Assets_{t-1}}} = \beta_0 + \beta_1 \left(\frac{\mathbf{1}}{\mathbf{Assets_{t-1}}}\right) + \beta_2 \left(\frac{\mathbf{\Delta Rev}}{\mathbf{Assets_{t-1}}}\right) + \beta_3 \left(\frac{\mathbf{PPEi,t}}{\mathbf{Assets_{t-1}}}\right) + \beta_4\ \mathbf{ROA} + \boldsymbol{\varepsilon}$$

Variables	Estimate	Std. Error	t value	p-value
Intercept	-0.0387	0.0188	-2.1096	0.0348*
$\left(\frac{\mathbf{1}}{\mathbf{Assets_{t-1}}}\right)$	-0.0007	0.0022	-0.3268	0.7438
$\frac{\mathbf{\Delta Rev}}{\mathbf{Assets_{t-1}}}$	-0.0461	0.0263	-1.7512	0.0799*
$\frac{\mathbf{PPEi,t}}{\mathbf{Assets_{t-1}}}$	-0.0917	0.0274	-3.3375	<0.001***
ROA	0.5416	0.0658	8.2256	<0.001***
Log-Likelihood: 247.869				

*Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level

Residual in the generalized linear model showing discretionary accruals is considered a dependent variable in Dechow and Dichev's (2002) model. Table 6 shows the results of choosing Dechow and Dichev's (2002) model. Since P-value in the Chaw test is less than 0.05, the fixed effects model is selected. Furthermore, the Hausman test

should be utilized to choose between the fixed effects model and the random-effects model. P-value in the Hausman test is less than 0.05. Thus the fixed effects model is selected.

Table 6- Goodness of fit for Panel data models

Test	p-value	Result
F-Limer Test	<0.001	Fixed Effects
Hausman Test	<0.001	Fixed Effects

Serial autocorrelation should be assessed in the final model by applying the Breusch-Pagan Godfrey test to choose between the fixed effects model and the generalized linear model. Table 7 presents the results. Since the p-value in the Breusch-Pagan Godfrey test is less than 0.05, serial auto-correlation exists among error statements. As a result, the generalized linear model is applied.

Table7-Assumptions of the classical linear regression model

Test	p-value	Result
Breusch-Godfrey Test	<0.001	Generalized linear model

Table 8 indicates the output of the generalized linear model.

Table 8- Estimation of coefficients in the generalized linear model

$DACC_{it}=\beta_0+\beta_1 CFO_{t-1}+\beta_3 CFO_t+\beta_3 CFOt_{t+1}+\beta_4 REV_{it}+\beta_5 PPE_{it}+\varepsilon$

Variables	Estimate	Std. Error	t value	p value
Intercept	-0.1027	0.0113	-9.0315	<0.001***
CFO_{t-1}	0.0392	0.0216	1.8146	0.0695*
CFO_t	-1.0088	0.0022	-44.2678	<0.001***
CFO_{t+1}	0.1053	0.0156	6.7083	<0.001***
REV_{it}	0.0410	0.0093	4.3705	<0.001***
PPE_{it}	0.0801	0.0160	4.9811	<0.001***
Log-Likelihood: 595.983				

*Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level

Since β3 is significant in Table 8, earnings management will exist. According to their final score, all listed companies on the Tehran Stock Exchange have been classified into two groups of predictive and opportunistic earnings management. If the total annual score is less than 50, earnings management is opportunistic, and if the total annual score is more than 50, earnings management is predictive. Variable OEM shows firms with opportunistic earnings management, and firms with predictive earnings management are indicated by PEM.

5.2.1. First hypothesis testing

The most appropriate model has been used to test the first hypothesis. Table 9 indicates the achieved results of choosing the best model. Because the p-value in the Chaw test is less than 0.05, the fixed effects model is chosen. Hausman test should also be implemented to choose between a fixed-effects model and the random-effects model. P-value in the Hausman test is more than 0.05. Thus random effects model is selected. Breusch-Pagan Lagrange test is also implemented to be able to choose the best model between the random-effects model and the integrated model. P-value in the Breusch-Pagan test for time and place is less than 0.05; therefore, the time- and place-integrated model cannot be applied, and the random-effects model is chosen.

Breusch-Pagan Godfrey test is also utilized to examine serial autocorrelation among error statements. Because the p-value in the Breusch-Pagan Godfrey test is less than 0.05, serial auto-correlation exists among error statements. As a result, the generalized

linear model will be the final model.

Table 9- Goodness of fit for Panel data models

Test	p-value	Result
F-Limer Test	<0.001	Fixed Effects
Hausman Test	0.9601	Random Effects
LM Test(time effects)	0.2616	pooling
LM Test(individual)	<0.001	Random Effects
LM Test(two-ways effects)	<0.001	Random Effects
Breusch-Godfrey Test	<0.001	Generalized Linear Model

Table 10 shows the output of implementing the best model. This study's findings do not demonstrate any significant difference in CEO compensation between firms with predictive earnings management and opportunist earnings management. This finding is inconsistent with the findings of Davit et al. (2013) and Peng (2011). It shows the deficiency of plans concerning CEO compensation, which makes managers meet their needs through unclear and abnormal ways.

Table 10- Estimation of coefficients in the generalized linear model

$$BONUS_{i,t} = \alpha + \beta_1 OEM_{i,t} + \beta_2 PEM_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 FCF_{i,t} + \beta_5 LEV_{i,t} + \beta_6 STDRETURN_{i,t} + \beta_7 ROA_{i,t} + \beta_8 SIZE*OEM + \beta_9 SIZE*PEM + \beta_{10} FCF*OEM + \beta_{11} FCF*PEM + \beta_{12} LEV*OEM + \beta_{13} LEV*PEM + \beta_{14} STDRET*OEM + \beta_{15} STDRET*PEM + \beta_{16} ROA*OEM + \beta_{17} ROA*PEM + \varepsilon_{i,t}$$

Variables	Estimate	Std. Error	t value	p-value
OEM FIRMS:				
Intercept	5.5850	2.8079	1.9891	0.0466*
OEM	-5.2107	3.9330	-1.3248	0.1852
SIZE	-0.0374	0.2013	-0.1859	0.8524
FCF	4.3658	3.1867	1.3700	0.1706
LEV	-0.3392	0.2297	-1.4765	0.1398
STDRETURN	-0.0009	0.0030	-0.0243	0.9806
ROA	0.7801	3.5396	0.2204	0.8255
SIZE* OEM	0.2046	0.2846	0.8454	0.3977
FCF* OEM	-5.6314	5.2204	-1.0787	0.2807
LEV* OEM	-0.3154	0.2693	-1.711	0.24156
STDRETURN* OEM	-0.0012	0.004922	0.2509	0.8025
ROA* OEM	11.41968	6.8810	1.7393	0.0819*
PEM FIRMS:				
Intercept	0.3743	4.1695	0.0898	0.9284
PEM	5.2107	3.9330	1.3248	0.1852
SIZE	0.2032	0.3032	0.6702	0.5027
FCF	-1.2656	4.2318	-0.2991	0.7648
LEV	-0.0238	0.2628	-0.0906	0.9278
STDRETURN	0.0011	0.0043	0.2662	0.7900
ROA	12.7482	6.1151	2.0847	0.0371*
SIZE* PEM	0.2046	0.2846	0.8454	0.3977
FCF* PEM	-5.6314	5.2204	-1.0787	0.2807
LEV* PEM	-0.3154	0.2693	-1.711	0.24156
STDRETURN* PEM	-0.0012	0.004922	0.2509	0.8025
ROA* PEM	11.41968	6.8810	1.7393	0.0819*
Log-Likelihood: -857.343				

*Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level

5.2.2. Second hypothesis testing

The most appropriate model has been used to test the second hypothesis. Because the p-value in the Chaw test is less than 0.05, the fixed effects model is chosen. Hausman test should also be implemented to be able to choose between a fixed-effects model and

the random-effects model. P-value in the Hausman test shows that the fixed effects model is better to be selected. Breusch-Pagan Godfrey test is also utilized to examine serial autocorrelation among error statements. Due to the fact that the p-value in the Breusch-Pagan Godfrey test is less than 0.05, serial auto-correlation exists among error statements. As a result, the generalized linear model will be the final model.

Table 11- Goodness of fit for Panel data models

Test	p-value	Result
F-Limer Test	<0.001	Fixed Effects
Hausman Test	<0.001	Fixed Effects
Breusch-Godfrey Test	<0.01	Generalized Linear Model

Table 12 indicates the results of the second hypothesis testing. Stock return and opportunistic earnings have a significant negative relationship, while the stock return has a significant positive relationship with opportunistic earnings management at the error level of %5. Thus, the second hypothesis is confirmed, and it is concluded that in firms with predictive earnings management, the stock return is more than firms with opportunistic earnings management.

Control variables have acted as expected. For instance, there is a significant positive relationship between stock return and book value ratio to market value. When the ratio of book value to market value is more, stock return increases. Return on stock and standard deviation return on the stock is positively and significantly associated. Cash flow and stock return have a positive relationship, although this relation is not significant.

Table 12- Estimation of coefficients in the generalized linear model

$$RETURN_{i,t}=\alpha+\beta_1 OEM_{i,t}+\beta_2 PEM+\beta_3 OEM+\beta_4 SIZE_{i,t}+\beta_5 BM_{i,t}+\beta_6 STDRETURN_{i,t}+\beta_7 ROA_{i,t}+\beta_8 CFO_{i,t}+\beta_9 STDCFO_{i,t}+\beta_{10} LEV_{i,t}+\beta_{11} FCF_{i,t}+\varepsilon_{i,t}$$

Variables	Estimate	Std. Error	t value	p-value
Intercept	-11.6456	41.7282	-0.2791	0.7801
OEM	-18.3376	8.2516	-2.2223	0.0262**
PEM	18.3376	8.2516	2.2223	0.0262**
SIZE	-3.5261	2.9971	-1.1765	0.2393
BM	46.9940	11.5226	4.0784	**<0.001*****
STDRETURN	0.4069	0.057	7.1371	**<0.001*****
ROA	119.5336	76.8266	1.5559	0.1197
CFO	13.4545	30.0382	0.4479	0.6542
STDCFO	261.6275	73.1244	3.5778	**<0.001*****
LEV	-1.6675	4.1017	-0.4066	0.6843
FCF	162.8948	67.8415	2.4011	0.0163*
Log-Likelihood: -1977.962				

*Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level

6. Conclusion

The present study aimed to assess the relationship between earnings management and an essential component of corporate governance, the incentives provided through CEO compensation. Because accounting information plays a significant role in corporate governance and specifically in compensation contracts, it was alleged that firms categorized as opportunistic earnings management enjoy lower CEO compensation levels and do not consider them much as incentives. The importance of earning is increasing in studies related to earnings management. Many of these researches focus on the opportunistic dimension of earnings, but according to Guay (2008), earnings

management has an opportunistic effect and has signaling influence. The current study intended to assess two opportunistic and signaling dimensions of earnings management.

Regarding the findings of this study, this conclusion can be drawn that on the Tehran Stock Exchange, there is no significant difference between CEO compensation in firms categorized as predictive earnings management and those categorized as opportunistic earnings management. This finding is inconsistent with the findings of Davit et al. (2013) and Peng (2011). The following elements may have led such a difference between the results of this study and other studies: some industries have not determined any specific CEO compensation in the Annual General Meeting. Thus chief executive officers have to apply other unclear ways to gain rewards. Some firms do not pay due rewards to their officers and allocate the rewards for managing directors of losing companies. Not assigning total rewards to chief executive officers is an anti-incentive and amoral issue.

Furthermore, this study examined the relationship between future stock return and earnings management. Findings showed a significant relationship between predictive earnings management, opportunistic earnings management, and stock return. Because disclosure quality has been applied to distinguish firms with predictive earnings management from the firms with opportunistic earnings management, it can be stated that the findings of this study are consistent with findings of some researches accomplished by Dargenidou et al. (2012), Ettredge et al. (2005), and Schleicher (2007). Thus, disclosure quality is influential in stock return explanation. In other words, there is a significant difference between the firms whose disclosure quality is reported maximum or minimum.

6.1. Suggestions

It is suggested to assess research findings based on specific industries. Regarding the fact that the target population of the research has consisted of all listed companies on the Tehran Stock Exchange, it is suggested that production and non-production firms are separately investigated. This study has used a total score of disclosure quality. It is suggested to use timeliness and reliability scores and their relationship with rewards paid to the board of directors and stock return in future studies.

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Review Article

Risk Management of Covid-19 in Tertiary Institutions of Learning: Challenges, Impact, and Future Preparation

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ABSTRACT

The outbreak of COVID-19 in China and the speed at which it is spreading across the globe in 2019 to 2020 has had devastating consequences on tertiary institutions of learning. The majority of the tertiary institutions of learning have to shift learning from the usual classroom or face-to-face lectures to virtual or online lectures in addressing the challenges broad by the pandemic COVID-19. This paper aims to look at risk management of COVID-19 in tertiary institutions of learning and the responses to the emerging risks, challenges, and prospects in the future. The study also discussed the risk and challenges of COVID-19, reassessing tertiary institutions of the learning risk landscape, managing the risk, effective use of technology, the impact of COVID-19, responses, and future preparation for post-COVID-19. The ability of tertiary institutions of learning and the government to manage the risks of COVID-19 now and in the future is useful for various parties, including students, parents, lecturers, support staff, management team, investors, governments, and other stakeholders.

Keywords: Covid-19, risk management, tertiary institutions of learning, virtual learning, classroom learning

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1. Introduction

Tertiary learning institutions face significant challenges due to coronavirus, just like any other sector in the world. Kelly (2020) asserts that almost all the universities and colleges in the world had a weak academic disruption in the educational sector. The statistic has shown that over 1.5 billion students and youths worldwide are affected by schools and universities' closure due to the COVID-19 outbreak (International Association of Universities, 2020). The closure of universities and colleges worldwide was made in the middle of March, and students were sent home. But as for some universities in the developed world with well-developed information technology on their campuses, learning or lectures were shifted online. This virtual learning is expected to continue to the end of the semester or even beyond. For other universities and colleges without or with inadequate information technology tools, and cannot commence virtual and online teaching model immediately will be expected to remain closed until 2021 (Kelly, 2020), when they have acquired all the necessary information technology tools and are ready, or rather device some other means with safety measures, or wait until the COVID-19 is put under control.

The pandemic coronavirus was responsible for causing the immediate change in operations in tertiary institutions of learning. This sudden change in the mode of operation has increased or changes the risk profile of the institutions upside down and forced them to change the method of learning from campuses based to distance learning, and to task the risk assurance teams to look at new risks and ways to remedy them (Lim, 2020). Thus, Kelly (2020) stated that a lot of universities and colleges could likely face strategic risks emerging due to COVID-19. For instance, some old institutions established in the 90s or 20th centuries that depend on classroom teaching on campuses may find it difficult to adapt to online teaching. But as for those institutions that came up, or will come up newly in this 21st century who are assessing the risk of switch to virtual learning due to the coming of Covid-19, may not have difficulty if they have acquired all the necessary technological tools. The question is, will classroom teaching on campus go to be necessary during or after the coronavirus pandemic? Or will there be a mixture of both virtual learning and classroom now and the future?

Ironically, the first thing that comes to mind immediately Covid-19 stated to spread faster across the globe was," how can the tertiary institutions of learning help" since they are not medical doctors and nurses. As such, they are not going to assist on the front lines. Be as it may, the tertiary institutions of learning have a unique way to assist in responding and managing the emerging risk from crises. Therefore, universities must have to learn and adjust faster to the present unexpected challenges and risks. The ability of these tertiary institutions of learning to manage the risks of Covid-19 is useful for various parties, including students, parents, lecturers, support staff, the management team of the higher institution of learning, investors, and governments.

This paper aims to reflect on the risks management of COVID-19 in tertiary institutions of learning and its preparation for the future. The study considered and discuss issues like risks and challenges of COVID-19 in tertiary institutions of learning, re-examining risk landscape in tertiary institutions of learning, risk management, effective use of technology to manage risk, the effect of COVID-19, and preparation for post-COVID-19 in tertiary institutions of learning.

2. Risks and Challenges of COVID-19

Every crisis comes with challenges and risks. As such, COVID-19 is not an exception. The challenges and risk faced by tertiary institutions of learning in the face of COVID-19 as opined by Winthrop (2020) are:

2.1. Distance learning will reinforce teaching and learning that everyone knows they do not work well: Almost all tertiary institutions of learning in many countries of the world are shifting from classroom to distance learning approaches through technology (virtual learning or online) or physical packaging of materials to students. There are risks attached to the new approaches to learning and can be very solitary and didactic when telling the students to stay at home and watch videos, click through presentations, or read documents. Sanz et al. (2020) opined that the most challenging and worst form of learning is to stay at home alone and listen, most especially to those who are left behind and finds it difficult to understand. These may be the nature and kind of lectures the students will receive when the learning institution is closed. Exams will be written online, and lazy and unserious students may likely not be the ones to write the exams, since lecturers cannot monitor the process. Thus, the schools cannot be sure whether the student who enrolled is the one taking the lectures and writing the exams.

2.2. Educators will be overwhelmed and unsupported to do their job well:

The pandemic caught everyone unaware. The staff had no prior knowledge of their school closure and transferring lectures from physical contact to virtual or online learning (UNESCO, 2020). According to Winthrop (2020), the sudden change was challenging for all the staff, most especially as concern for sorting materials, filtering through all the resources to find those of the standard, and fitting into the new approaches. Like any other person, lecturers are also feeling the new world order as fathers, aunties, mothers, uncles, trying all possible best to manage themselves, take care of their families, and search for a new method to use in ensuring that learning does not stop.

2.3. Protection and safety of students: The protection and safety of children may be difficult to safeguard. Tertiary institutions of learning already have some measures taken for their students' security against predators, such as pedophiles, to enable them to have access to their students. Thus, once any higher learning institutions or universities switch to virtual learning where students can take lectures at home, it is difficult for the school to safeguard them against predators. So people have to be careful and mindful about the design of virtual or online learning they are using, so bad people do not corrupt their wards.

2.4. Closure of school will widen the equity gaps: There has been great improvement in the number of students having access to digital devices and internet connectivity, facilitating the quick movement to virtual learning possible. But the issue is that not every student has access to electronic devices and connectivity to the internet at home. These categories of students are required to have access to learning materials too. Thus, the learning institutions are required to make learning resources available and accessible on different means possible where every student can have access in the possible way it will reach them.

2.5. It is difficult to get buy-in later for ed-tech students: Students who use ed-tech during COVID-19 will have a poor experience because it is a new and improve learning approach. Additionally, students will also be unhappy and mentally affected health-wise to adapt to the new normal with the isolation due to the pandemic. Initially, student test scores will be terribly impacted when they tried the ed-tech. Therefore, tertiary education needs to identify and know what works and what does not work at these risks and challenges.

3. Re-Examining the Tertiary Institution of Learning Risk Landscape

The main aim of tertiary institutions of learning remains the same despite the effect of COVID-19: Preserving academic integrity, servicing students, achieving financial and budgetary goals, and complying with state and federal regulations. The only thing that has changed for the tertiary institutions of learning is the mode of operation from the classroom's usual instruction to a broad scale distance learning. Thus, the way and manner tertiary institutions risk assessment should be carried outlook radically different (International Association of Universities, 2020; Lim, 2020). Most especially in the following aspects:

3.1. Security: Staff and students make use of their time on online communication. This increases privacy risk in transmitting confidential intellectual property around the internet and protecting personally identified information. The ICT infrastructure of tertiary institutions is prompt to potential risks of cybersecurity vulnerabilities and attacks as off-campus and VPNS become the order of the day. Until recently, students have been targeted by COVID-19 cybersecurity scams, with hackers sending fake email messages from campus administration accounts.

3.2. Liquidity: Staying on campus assist students to save money in some ways, such as lower utility bills, no much spending on sporting events. Thus, time tested budget projection has become obsolete. Invariably, the quest and need for fiscal responsibilities are increasing and growing bigger for the tertiary institution of learning in the face of reducing school fees they may face.

3.3. Academic integrity: How can the institutions be sure that students enrolled or admitted are the actual person who does assignments and writes test online? And the type of test and assignments have to be critical and be put into consideration.

3.4. Student life: In the traditional campus settings, bullying, mental health, and sexual harassment have some regulatory compliance and litigation risks for any school that refused to consider them seriously. Such problems exist even in the online world. Thus, representative bodies and institutions must have to look for new ways to resolve those issues or problems. This shows that immediately an institution implement new procedures and strategies for risk management in response to coronavirus, the institution risk profile would have been changing automatically.

4. Managing The Risk of CCOVID-19

Risk management is designing, selecting, and implementing strategies to reduce risk's adverse effects (Florin and Burkler, 2017). Tertiary institutions of learning encapsulate almost all the risk problems coronavirus can offer. Thus, Collins, Florin, and Burkler (2020) assert that the management of tertiary institutions of learning decision-taking after the careful assessment is instrumental in arriving at the extent of harm the risk will cause. Kelly (2020) identified a few basic procedures for the audit teams to cope in the troubled period. These are:

4.1. Risk assessment triangle: Coronavirus has changed institutional risk profiles to the extent that risk management professionals can hardly maintain the paste of change. This calls for the tertiary institutions of learning to spin out or find another way risk is handled daily (Djalente, Shaw, and Dewit (2020). Therefore, audit teams in the tertiary institutions of learning need to prioritize as a matter of urgency which categories of risk will require re-examination at the moment and which ones can be shifted further, and which ones can wait.

4.2. Remember your enemy and understand your allies: As tertiary institutions of learning came out with new control procedures and policies, lecturers and other staff in the institutions are going to grumble. Some will feel these new steps that are coming up are unnecessary and intrusive because they may not see or consider the risk the

management of the institutions are worried about even though it is due to unforeseen circumstances like the pandemic COVID-19. The audit team must put at the back of their mind that coronavirus is the enemy of tertiary learning institutions. Therefore, the institutions' business is an ally that must have to function and cannot be alienated. To successfully implement the remediation plans and compensate controls without encountering much resistance, audit teams need deft interpersonal skills, collaboration, communication skills, and appreciation to enable the institutions of learning to achieve their goals.

4.3. Monitor and repeat: In real terms, whenever tertiary institutions of learning implement new strategies for managing risk, and strategies and processes in response to the pandemic, the tertiary institutions of learning risk profile may have definitely changed automatically. For instance, the government may have change closure dates for tertiary institutions of learning or rather approved emergency funds to tackle unforeseen risks and emergencies. Note that the situations of coronavirus risk and its management will change from time to time. So it is mandatory to monitor the level or extend of the state of risks, analyze the data, examine and re-examine every situation all over again, and again.

5. Effective use of Technology to Manage Risk

Effective use of modern technology is required to manage the risk of Covid-19 in the tertiary education system. These could be possible with the deployment and use of information technology, which enables people to work remotely, and students receive lectures at a different location and at the same time, performing their work as a team is very important and necessary in this period of pandemic COVID-19 (Wang et al. 2020). Thus, all the normal issues about technology capabilities are relevant and applicable in this era of coronavirus, as stated by Kelly (2020). These are:

5.1. Use of a single, trusted source of data: This is essential, most especially given the vast number of lecturers and students who will be having lectures from home or different locations from each other. Thus, the need for a single, trusted source of data in one platform is safer due to the risk of version control issue or data inaccuracy and completeness, which may be high.

5.2. Collaboration and communication equipment: Coronavirus has separated and keeps lecturers and students apart from each other, across a time zone, out of normal classroom lectures, office usual, without an easy avenue to have lectures and work together spontaneously as it was before. Therefore, collaboration, functional and friendly communication gargets are required to charge and recover from the loss of face-to-face interpersonal relationships experienced during lectures on campus and at work in tertiary institutions of learning before coronavirus.

5.3. Procedure to monitor remediation work and flag steps to achieve it: This is the tendency that many more risk of tasks will arise when lecturers, supporting staff, and students have lectures or worked remotely. It is essential for institutions to devise means and ways to track tasks assigned to lecturers and supporting staff and automated notifications and workflows remediation effectively and functional. At the same time, lecturers should also device means to track the task given to the students

5.4. Strong documentation and testing mechanism: With the coming of many new risks resulting from COVID-19, improvised processes and procedures for emergency controls, testing, and documenting all those things will become very important and essential in the tertiary institution of learning. Since lectures and students must literally stay away from each other, coronavirus has task our ability to work together to prevent infection or contact with the disease. There are some new risks challenges that coronavirus came with, which could be a prior new risk or totally new that shows in a

new dimension, of which tertiary institutions of learning, just like any other sectors, are experiencing similar challenges. In this new world order, audit teams must have to push their capabilities and talents a little bit further, to almost every aspect of the institutions, from assessment of risk to remediation plans, testing and documentation, collaboration, ingenuity, and much of perseverance must have to be put in place. Above all, better use and application of modern technological equipment will be the driving force for success in the new era.

6. Effect of Covid-19 on Tertiary Institutions of Learning

The estimated and real effects of COVID-19 on tertiary institutions of learning, most especially as concerns different actors or stakeholders according to UNESCO (2020) and Sanz, Sainz, and Capilla (2020), are as follows:

Students: The closure of institutions due to COVID-19 means the temporary stoppage of classroom lectures and all other activity most especially for the undergraduates in some countries without a clear view and idea of how long the stoppage will last, the effect on their day to day life, cost to incurred and other financial burdens as well as on the continuation of their studies in particular. The students will feel the effect on how to adjust to daily life, financial cost personally, and burdens as a result of the replacement of face-to-face classes to online lectures and international mobility.

Faculty: Although the effect is mostly focused on students, the study cannot deny that lecturers and other supporting staff also significantly affect their work and professionalism. For instance, not every tertiary institution of learning has in place continuing strategies for a learning activity to be performed with the advent of COVID-19. Thus, part-time, temporary, contract, and visiting lecturers may be terminated. In some countries, full-time lecturing in universities is not common, and the majority of the lecturer operate on a part-time basis. The stoppage of face-to-face lecturing serves as a threat to the staff on contract and temporary appointments.

Alternatively, the management and the contract staff can negotiate for temporary suspension, but the suspension could belong if the situation persists and continues. If virtual technology is put in place, the return to face-to-face or classroom lectures could be risk and difficult. Another effect is that lecturers will continue to lecture using virtual equipment for some universities with the equipment because virtual learning has been going on hand in hand with the classroom lecturing in Europe, some parts of Asia, and America. But in the majority of the African and Latin American universities, virtual learning is none existence. Thus, virtual learning is the source of greater uncertainty, which will result in a set of different effects on the system of their universities. This is because most universities do not have internet service and some basic connectivity and technology to guarantee the continuation of learning in this pandemic.

The majority of the students in the rural areas in most African countries like Nigeria, Niger, Chad, etc. and Latin America and the Caribbean like; Argentina, Colombia, Peru, Bolivia are faced with worse connectivity conditions than in their homes in the cities close to the campus where they study (UNESCO, 2020). In countries where the institutions do not have virtual learning technology, it will take a longer time and cost for such institutions to return and start learning if the problem persists. This means most of the staff who are not information technology compliance may need to be trained. Thus, the demand for quick transformation of tertiary institutions of learning needs the incorporation of technology to be able to survive in this period of COVID-19 and the future.

Non-Academic staff: The non-academic staff in administration and other support services may be at risk, especially when their tasks are no longer considered critical to

learning continuity. For instance, employees who work in the canteens, dining rooms, and cleaning services are not critical, unlike workers connected to the computer and technical support services. However, what will detect the tone in terms of employment and social protection are the government's measures in most cases. The non-academic staff is the most vulnerable in tertiary institutions of learning when possible jobs cut. Most especially in the face of the obvious decrease in students' enrollment and cancellation and reduced fees. The tertiary institution of learning will face possibly financial stringency or shortage and the inability to pay non-academic staff. Hence, cut in staff salaries and entitlements will be the order of the day and possible employment termination of redundant staff.

Tertiary learning institutions: It is now evident that there is a temporary stoppage of classroom lectures in tertiary institutions of learning across the globe. This has disrupted their proper functioning. The disruption's effects depend largely on their ability to sustain themselves financially and remain active and functional in their academic activities rather than a change in training or teaching modalities. To continue virtually teaching courses, as a notice in some institutions across the globe due to transfer from the classroom to the virtual education system, has not been so easy, most especially for those that do not have enough technological equipment for the virtual education system.

The institutions that have enough technology and technical infrastructures for virtual courses will take them some time to provide the technical and technological requirements to support all courses in the institution for all the students. Also, most public and private institutions depend on the students' school fees to operate, particularly private institutions. For instance, tertiary institutions of learning in Chile, Colombia, and most public schools in Mexico that depend solely on school fees from the students will find it difficult to operate as there may not be enough cash flows due to financial difficulty. Financial survival in the case of private universities and some self-financing public universities who have been closed for more than a quarter will worsen. If the problem persists, most especially when they cannot guarantee continuing training in virtual mode, they would have to suspend the collection of fees and possibly close their universities.

The system: Tertiary institutions of learning worldwide have reacted and acted in the same way with the advent of COVID-19. They have continued their academic activities using virtual learning modalities that do not need classroom or face-to-face lectures (Wang et al., 2020; Higher Education Bureau of Macau, 2020). But some tertiary institutions of learning in Africa, South America, and some parts of Asia have stopped due to inadequacy or lack of virtual learning facilities. If the problem of COVID-19 persists, the effect on the system will be many. The issues can only be addressed when tertiary institutions look at the demand and supply side and consider the increase in challenges for the institutions' governance.

7. Preparation For Post-COVID-19

There are five things to do to prepare for post-COVID-19 in tertiary institutions of learning. No one can deny the fact that COVID-19 pandemic has fastened and dramatically changes all aspects of human life all over the world. In the business sector, education, healthcare, and politics. One thing is certain that this COVID-19 will change lives and the way people behave in all facets of life for years or decades to come. Is your business or institution prepared for the five biggest macro trends that are about to unfold (Egan, 2020)?

7.1. Rise in improved websites and digital tools: These revolutions in information technology using new digital tools help tertiary institutions of learning remain afloat

during the COVID-19 disease outbreak. This will be a micro-trend that becomes more important, most especially at a time, social distances are becoming a common practice. This practice may possibly continue for other potential outbreaks in the future. It is pertinent to note that, when coronaviruses started, many tertiary institutions of learning and businesses that sold non-essential goods together with retail shops, hair salons, offices, warehouses, and factories had their office and shops and schools closed. This is because they do not have the technological equipment to survive with their physical location closure. That means tertiary institutions of learning must have to be ready to leap into the digital world to reach out to their students or customers. Thus, for tertiary institutions of learning to survive and thrive, they must improve their websites and digital tools to better serve their students. For instance, tertiary institutions of learning that never used e-learning before most have to adopt it now use advanced product configurations, chatbots, and mobile applications, which are currently in greater demand in this new decades' of the technological revolution.

7.2. Cybersecurity concern takes center stage: With the surge in lecturers and students lecturing remotely through visual devices due to pandemic coronavirus, there are many more data breaches and cyberattacks. The effect of data breach and cyberattack is something tertiary institutions of learning are being or will be forced to tackle squarely. But as for some tertiary institutions of learning, cybersecurity is not a new thing, most especially with the Californian's Consumer Privacy Act, EU's General Data Protection Regulation, and other privacy laws. The major causes of the potential breach are lecturers and students using third party tools, unsecured infrastructures, together with data storage and access practice that violate privacy laws. For instance, there has been an upsurge or increase in oversea cyberattacks in this coronavirus period, such as brute force attacks, denial service attacks, and attempted hacks (Egan, 2020). Thus, Aljawarneh (2019) champions the need for keeping websites and webservers updated and secured as quickly as possible when using virtual learning. Therefore, tertiary institutions of learning are currently forced to invest heavily in information technology accessible remotely, scalable, and secured, due to the onslaught of new data security and privacy regulations.

7.3. Virtual meetings: There has been a tremendous surge in virtual meetings in tertiary institutions of learning immediately after the coronavirus discovery. This is expected to continue for now and years to come even though it cannot substitute face-to-face meetings and handshake. The virtual meeting may apply to any aspect of institutions' life but not to the traditional institutions of learning. For instance, there will be a virtual meeting with your project supervisors, lecturers, therapists, doctors, legal practitioners, bankers, and consultation. And this will increase costs and saves time for parties or individuals involved. Although the virtual meeting trend is not new, it has been in place even before the advent of coronavirus. The event will be amplified as we continue in this new decade.

Tertiary learning institutions most have to be prepared for this trend and go beyond having virtual meetings, space, and software to include tutorials, videos, digital business cards, and brochures and improve website information. These will be mandatory and necessary as tertiary institutions of learning find it difficult to have physical lectures and classes and delivered materials to "students" hand to hand.

7.4. Increase control in expenditures: Covid-19 has brought sudden institutional and businesses captured all over the universe; thus, they have to keep searching for ways to have absolute control over their expenditure. The tertiary institutions of learning will be requesting or insisting on short term contract periods, emergency clauses and provisions in agreements using temporary staff or agencies, have the easily scalable workforce in trying to reduce or cut down expenditure. Thus, presently, tertiary

institutions of learning show interest in lowering expenditure, not because of COVID-19 but as a practice, they will like to continue in the future. Tertiary institutions of learning must answer their students and stakeholders on how to save, reduce contracts terms, or protect their institutions from catastrophes and disasters in the future.

7.5. Even more remote workers: The four trends above will come with a shift or move to remote lectures and work by tertiary institutions. Tertiary learning institutions that are forced to close their institution's offices and schools realize that they cannot work efficiently, effectively, and economically without remote lectures and work, as it is required now and in the future. Increasing needs for remote lectures and work means increasing needs for the four points mentioned above. The trend has been in existence long ago, but the coming of the COVID-19 outbreak has amplified it in these new decades.

8. Conclusion

The study shows that classroom lectures through physical contact may no longer be relevant. The only thing that will apply in 2020 and beyond is only the trends for virtual learning. Thus, making decisions to position tertiary institutions of learning for these changes from face-to-face lectures to virtual devices will ensure that tertiary learning institutions are at the forefront and set for the new remote and digital technological revolution. The paper is summarized as follows; introduction, the risks and challenges of COVID-19 in tertiary institutions of learning, re-examining risk landscape in tertiary institutions of learning, risk management of COVID-19, effective use of technology to manage risk, the effect of COVID-19, and preparation for post-COVID-19 in tertiary institutions of learning. The ability of these tertiary institutions of learning and the government to manage the risks of Covid-19 is useful for various parties, including students, parents, lecturers, support staff, the management team of the higher institution of learning itself, investors, and governments.

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Research Article

Evidence for the Ability of the Regression Model and Particle Swarm Optimization Algorithm in Predicting Future Cash Flows

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ABSTRACT

This study predicts future cash flows using a regression model and a particle swarm optimization algorithm (PSO). The variables of accruals components and operating cash flows were used, and the data of 137 listed companies on the Tehran Stock Exchange during 2009-2017 were studied. Eviews9 software for the regression model and Matlab13 software for the Particle swarm optimization algorithm was used to test the hypotheses. The results indicate that the regression model's variables and the Particle swarm optimization Algorithm in this study can predict future cash flows. Furthermore, the results of the fitting Particle swarm optimization Algorithm show that a structure with eight hidden neurons is the best model for predicting future cash flows, and the proposed neural network model compared with the regression model has higher prediction accuracy in predicting future cash flows. This study shows that the classification of assets and liabilities provides useful information from future operating cash flows.

Keywords: Accruals, Future Cash Flows, Artificial Neural Network, and Particle swarm optimization Algorithm

JEL: M40, M41

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1. Introduction

Cash flow is a vital source for any economic unit. The balance between available cash flows and cash needs indicates firms' economic health and guarantees the continuity of their activities. Cash flows have a central role in many financial decisions, such as stock valuation models and capital project evaluation methods. From an inter-organizational point of view, the ability to properly predict future activities' outcomes, especially future cash flows, enables the efficient management of affairs and leads to making optimum decisions in operational fields, investment, and funds. Cash flow prediction is also essential for extra-organizational users, especially the investors and creditors. Operational cash flow is further used in the new financial analyses. Thus the investment policies and resource allocation will be optimized once the operational cash flow is appropriately predicted (Khakrah Kahnamouei & Khakrah Kahnamouei, 2019)

Previous studies have examined various models to predict future cash flows of business units, and most of these studies have used regression models to predict future cash flows. The differences between studies were related to the models and presented variables, their linear and nonlinear methods, and the analysis methods. Therefore, to obtain a more accurate and comprehensive prediction, it is necessary to examine data mining methods and regression approaches. Neural networks are more important than classical methods because of their nonlinear and uncertain properties. Besides, it is worth noting that neural networks also include linear models within themselves; that is, they are more comprehensive following classical methods. It can be stated that the artificial neural network model is a powerful and efficient model that can be considered with a positive perspective in forecasts; In particular, this network is able to extract even the turbulent data, which is the most prominent feature of this model compared to other models (Khoshal Dastjerdi & Hosseini, 2010)

It is not possible to make wise judgments and decisions to choose the best solution without estimating future cash flow. Therefore, on the one hand, the problem of cash flow prediction has not been solved and needs further study according to previous research. On the other hand, due to the nonlinear relationships between accounting information, it is necessary to investigate the nonlinear and complex factors affecting future cash flow prediction to find new methods and approaches with the least deviation and error.

Because currently, a comparative study has not used regression approaches and artificial intelligence patterns in cash flow prediction and, some variables are new (a number of components of accruals and the implementation of operating flows). Their effects needed further investigation. Thus, most of the research performed in linear regression models were based on profits and accruals, while fewer nonlinear models have been used. As a result, this study uses both regression approaches and an optimized neural network model with a particle swarm optimization Algorithm to predict future cash flows on the one hand and employs new variables derived from research models Panga (2015); Farshadfar and Monem (2017); Larson et al. (2018), on the other hand. By combining these variables into a new hybrid model, we compare the results of both approaches to develop a robust, efficient model with greater explanatory power finally. This has not been investigated in other studies, and the results of this study can be more helpful in financial decisions. In this regard, we can point to its innovative aspect.

2 .Theoretical Bases & Background

2.1. Theoretical Bases

In economic theories, the value of a company is based on the current future cash

flows, and the prediction of future cash has great importance. Therefore, one of the purposes of "financial reporting" is to help investors and creditors to predict future cash flows. Also, the Committee of Iran's editing accounting standards under the theoretical conceptions of the financial reporting noted that "making an economic decision by the users of the financial statements requires evaluating the business units to make cash and cash making certain". Evaluating the cash making power is facilitated by focusing on financial statements, financial functionality, and cash flows of business units and using them in forecasting expected cash flows and measuring the financial flexibility" (Mahdavi & Saberi, 2010). Making a prediction is an inevitable and crucial part of economic and financial analysis, as well as in business practice. Predictions usually lead to decision making. For instance, sales prediction will affect a firm's inventory management; financial analysts' forecasts are used to construct portfolios, monetary and fiscal policies of a country are also made concerning the country's future economic state, etc.

Various methods and techniques have been developed to enhance the predictive power of models used to forecast economic variables. In both economics and finance, academic research is important in explaining the associations and interactions between particular variables. Seeking high accuracy in prediction is of less concern (Panga & at al, 2015).

Considering the importance of cash flows, there is a need to predict cash flows in different economic decision making. National and international standardization bodies support the significance of the forecast. In this regard, researchers have repeatedly used accrual and cash accounting data for the prediction, but the results were inconsistent. There are two issues to consider when determining a company's cash flows. First, variables that are useful and contains relevant information for predicting cash flow to be identified and included in the forecasting model. Second, the type and structure of the models to be applied should be carefully selected to predict accurately. Focusing on estimates is needed to predict cash flows, and since many estimates are not disclosed in the financial statements, it can rely on accruals because most of the accruals are based on estimates. For this purpose, the relationship between the quality and components of accruals with cash flow forecasts (in terms of their usefulness in predicting future cash flows) should be examined. Investigating the relationship between accruals and future cash flows is also an important issue for corporate valuation (Choi & at al, 2015).

Olson et al. (2005) suggested that more clarification regarding the relationship between accruals and predicting future cash flows should focus on attention, and they should be disclosed if needed (Farshadfar & Monem, 2017). Recent studies have emphasized the nonlinear nature of financial information. Thus, a large number of predictive methods and the unknown factors affecting the return of wealth have caused uncertainty among investors and creditors. Consequently, they are trying to find predictive methods that make their estimates closer to reality and most accurate (Panga, 2015).

Many studies have shown the efficiency and performance of artificial intelligence models (including neural networks) compared to traditional and linear models. Because neural networks, as opposed to linear models, reflect nonlinear effects and complex interactions among variables (Hamidian & at al, 2018), neural networks' main advantage is their flexible nonlinear modeling. In artificial neural networks, there is no need to recognize the model's specific shape, and the model is based solely on the information in the data. This data-based approach is very suitable for many empirical datasets, especially when no theoretical information is available to propose an appropriate data generation process. In recent years, multilayer perceptron neural networks have been extensively studied and applied in forecasting financial markets. Despite all the benefits of multilayer perceptron networks, these networks also have disadvantages, such as the

limitation of the number of input variables to the network. Using combinatorial models or combining different models (combining neural networks with bird flight algorithms) is a common way to improve predictive accuracy and overcome models' limitations. The basic idea in modeling is based on the principle that none of the existing methods is a comprehensive approach to forecast and does not apply to any situation and data type. Therefore, combining different models can improve one model's weaknesses using the strengths of the other model. Experimental and theoretical findings also show that combining different models is an effective and efficient way to improve predictions' accuracy (Kenneth & Lorek, 2019).

2.2. Empirical Background of The Study

Kenneth S. Lorek(2019) reviewed extant work on quarterly cash-flow prediction models. Due to long-term cash-flow forecasts' unavailability, he has placed greater importance upon developing statistically-based cash-flow prediction models given their use in firm valuation. Sarraf (2019), in a study titled "Cash flow forecasting by using simple and sophisticated models in Iranian companies," showed that the accrual regression model could predict future cash flows better than other tested models, and among corporate characteristics, the highest correlation belongs to sales volatility and firm size with accrual regression models. On the other hand, fitting different neural network models indicates that two structures with 8 and 11 hidden nodes are the best models to predict cash flows. Khakrah Kahnamouei and Khakrah Kahnamouei(2017), in a study titled "Providing a Model to Predict Future Cash Flow Using Neural Networks on the Pharmaceutical and Chemical Industries of Tehran Stock Market," have shown that the Multi-Layer Perceptron network is significantly more accurate than the Radius Based Function network and the three hypotheses were accepted.

The results of Farshadfar and Monem's(2017) study titled "Further evidence of the relationship between accruals and future cash flows" using Australian data shows that both working capital and non-current operating accruals are important in explaining future CFO, but financing accruals is not significant. Moreover, the accruals' asset component plays a more critical role in explaining future CFO compared with the liability component. Al-attar et al. (2017), studying "The Effect Of Earnings Quality On The Predictability Of Accruals and Cash Flow Models in Forecasting Future Cash Flows," show that earning quality cash affects the forecasting power of both cash flows and profit. In addition, when "earnings" have high-quality act better than cash flows in predicting annual future cash flow. Yarifard et al. (2016), in a study titled "the prediction of cash flows in the companies listed on the Tehran Stock Exchange," have shown that the price of the sold goods and the public and official price have a meaningful effect in forecasting the cash flows but a sale, changes in payment accounts, changes in receivable accounts, changes in inventories, tax, previous year cash flows do not have a meaningful effect in forecasting the cash flow.

Heydarpour et al. (2016) studied the rational power of the profit variables and operational cash flow in forecasting the future cash flow during three temporal periods (short-term, middle-term & long-term), and regression results show that the earnings and cash flows operations have a forecasting power for the future CFO, but their predictive powers are different. Sagafi et al. (2015), in a study titled "application of artificial neural network to forecast the future cash flow," have shown that two structures with 8 and 11 hidden neurons are the best model to forecast the cash flow. Pang (2015), in a study titled "Designing a dynamic and nonlinear model in cash flow prediction," relied on modeling and designing a new model that can fill the gap between the simple and complicated models such as the cash flow prediction model. Li et al. (2015) studied "Cash flow forecasting for South African firms," and their results demonstrated that depreciation

and inventory do not have a meaningful effect on forecasting cash flows. Shobita(2013) investigated the power of accrual forecast and profit concerning future cash flows in Jordan. Their findings show that accruals and the profit can predict future cash flows, and profit is more predictive than accruals. Sagafi and Sarraf(2013), in a study titled "a model to forecast the cash flow in Iranian companies," have shown that a random walk model can forecast operational cast flow better than the reverse accrual model. However, according to the companies' results in which the government influences their management showed that the accrual model is more suitable to the future cash flow. Rozbaksh et al. (2013), in a study titled "forecasting cash flows operations using artificial neural networks in Tehran Stock Exchange," have shown that artificial neural networks have high capability in predicting the future cash flow because the two hidden layers with 15 and 30 neurons in each layer can predict the cash flows with 99.2 % accuracy. Arndo et al. (2012), in a study titled" The role of accounting accruals for the prediction of future cash flows" in a seven years' temporal period in Spain, concluded that accounting accruals have a predicting power of future cash flows so that by adding accounting accruals to the current cash flows model the error-index is reduced.

2.3. Research Hypothesis

Cash flow is one of the critical resources in the economic units, and the balance between available cash and cash needs is the most critical factor in economic health. Since the judgments of many stakeholders such as investors and shareholders on the position of the economic unit are based on liquidity situation, predicting future cash flow is crucial. Continuity, survival, and existence of an economic unit largely depend on cash flows. Cash flow forecasting is important in many economic decisions because it plays a prominent role in decision-making groups such as securities analysts, creditors, and managers. These groups are interested in the company's future cash flow assessment and reach an explicit future cash flow criterion. In other words, the overall goal of fundamental analysis is forecasting the company's future cash flows.

Cash flows are the base of dividend payments, interest, and debt repayments (Sarraf, 2019). Predicting cash flows and their changes as an economic event have long been the focus of researchers', investors', managers', financial analysts', and creditors' attention. This is due to the use of cash flows in stock valuation models, payables assessment (dividends, interest, and other liabilities), risk assessment, performance evaluation of a business unit and management experience, evaluation of managers' choice of accounting methods, and use of cash flows useful for making useful decisions relevant to decision-making models. If cash flows can be properly predicted, a significant portion of the cash flow information needs will be met.

This study aims to answer whether the optimized model for predicting the Iranian capital market's future cash flows can be provided based on varying approaches. Future cash flow estimation is essential in any economic unit, reflecting management decisions in short- and long-term plans, investment, and finance projects. Without predicting cash flow, judgment, and deliberate decision making and choosing the most appropriate solution would not be possible. Therefore, we should look for a suitable model for the estimation of future cash flows. Considering the growth of the research process for forecasting cash flows in Iran, innovations in designing and modeling for prediction cash flow seem necessary. Studies are basically about models based on linear regression models; however, in this study, in addition to linear regression models (regression model), nonlinear models (Artificial Neural Network; Particle swarm optimization Algorithm) is also used and looking for an answer the question whether nonlinear model(Particle swarm optimization Algorithm) are more appropriate than linear regression model to predict cash flows or not. According to the theoretical bases and

previous research, the following research hypotheses are presented to answer the above question:

Hypothesis1: The regression model is a suitable model to forecast future cash flow.

Hypothesis 2: Particle swarm optimization Algorithm is a suitable model to forecast future cash flow.

3. Methodology of the Research

3.1. Data

In this study, all listed companies on the Tehran Stock Exchange include the statistical population. To choose samples from companies from the statistical population, the following requirements were selected.

1. The sample companies should be listed on the Tehran Stock Exchange from the beginning of 2009.

2. The companies' financial statements or other required data should be available from 2009 to 2017.

3.For comparison purposes, those companies whose financial year did not end in March were excluded.

4. The investment companies and other financial intermediaries were excluded due to their different functional characteristics.

Finally, according to the requirements mentioned above, among all listed companies on the Tehran Stock Exchange, 137 companies (959 Year – Company) were selected for this study. In the present study, the combined model (particle swarm optimization Algorithm) was used to improve the accuracy of predictions and overcome the limitations of multilayer perceptron neural network models (limiting the number of input variables).

3.2. Research Methodology

This study aimed to provide a model for predicting future cash flows for listed companies in Tehran Stock Exchange using the regression model and Particle swarm optimization Algorithm. Other secondary objectives are also considered, including helping investors and creditors make optimal decisions, helping managers to disclose operating cash flow, which is considered the way to access the first target. This research is an applied and a quasi-experimental study. To analyze the relationship between the data, mainly the Rahavard Novin software and databases were used. The regression approach using the Eviews9 software and neural network model using MATLAB13 software was employed. The regression model and an artificial neural network (Particle swarm optimization Algorithm) used in this research have been explained below.

3.3. Variables, Research Model, and Neural Network Architecture

In this research, based on the theoretical and research background of Pang (2015), Farshid Far and Monem(2017), Larson et al. (2018), variables and accrual model have been used to propose an optimal model for cash flow in both approaches, the dependent and the output variables are future operating cash flows, respectively, and the other variables are the independent and input variables which are presented in Table 1. The final model of the research and its components are as follows in equations 1 and 2 bellows.

$$CF_{it+j} = \gamma_0 + \gamma_1 CF - Cerr_t + \gamma_2 CF - Cpaid_t + \gamma_3 CF - NCerr_t + \gamma_4 CF - NCpaid_t + \gamma_5 \Delta COA_{it} + \gamma_6 \Delta COL_{it} + \gamma_7 \Delta NCOA_{it} + \gamma_8 \Delta NCOL_{it} + \gamma_9 \Delta FINA_{it} + \gamma_{10} \Delta FINL_{it} + \gamma_{11} \Delta INV_{it} + \gamma_{12} \Delta Ap_{it} + \gamma_{13} \Delta AR_{it} + \gamma_{14} DEP_{it} \& AMORT_{it} + \gamma_{15} OTHER_{it} + \varepsilon_{it} \quad (1)$$

$$TACi,t = \Delta WCi,t + \Delta NCOi,t + \Delta FINi,t \quad (٢)$$
$$CFO\ it = CF - Cerr_{it} + CF - Cpaid_{it} + CF - NCerr_{it} + CF - NCpaid_{it}$$

Table 1: Research Variables, Operational Definitions, and their Measuring Methods

Variable	Symbol	How to Measure
Dependent and output variable		
future cash flows	CF_{it+j}	(the firm's net cash flow from operations of the next year)
Independent and input variables		
total accruals	TACit	Sum accruals (current operating + non-current operating + financing)
changes in working capital accruals	ΔWCit	Changes in working capital accruals during the year
changes in non-current operating accruals	ΔNCOit	Changes in non- current operational accruals during the year
changes in financing accruals	ΔFINit	changes in financing accruals during the year
cash flows from operations	CFO_{it}	the firm's net cash flow from operations, as disclosed in the statement of cash flows
changes in current operating assets accruals	ΔCOA_{it}	Changes in (total current assets – cash - current investments) during the year
changes in current operating liabilities accruals	ΔCOL_{it}	Changes in (total current liabilities - short-term facilities) during the year
changes in non-current operating assets accruals (investment)	$\Delta NCOA_{it}$	Changes in (total non-current assets - long-term investments) during the year
changes in non-current operating liabilities accruals (investment)	$\Delta NCOL_{it}$	changes(total non-current liabilities - long-term facilities) during the year
Changes in financing assets accruals	$\Delta FINA_{it}$	Changes in investments (short-term + long-term) during the year
Changes in financing liabilities accruals	$\Delta FINL_{it}$	Changes in receivable facilities (short-term + long-term) during the year
cash flows received from sales of goods and providing services	$CF\ Cerr_{it}$	cash flows received from customers (Net sales -increase/+ decrease of Net received accounts+ increase/-decrease Perceived sales –the cost of claims)
cash flows Payments For the purchases of goods and services	$CF\ Cpaid_{it}$	cash flows Payments For purchases (Net purchases +increase/-decrease of inventories -increase/+ decrease Net payment accounts increase/-decrease of Prepayment of goods
other received cash flows (except for sales of goods and providing services)	$CF\ NCerr_{it}$	(related Revenue - increase/+decrease of related receivables Revenue +increase /-decrease related Per-received revenues)
Other Payments cash flows (except for purchase of goods and services)	$CF\ NCpaid_{it}$	cash flows Payments For costs (Total costs items with the exception of non- cash costs, interest, and tax - increase /+decrease of payable costs)
Changes in inventories	ΔINV_{it}	Changes in inventory
Changes of payable accounts	ΔAP_{it}	Changes in account payable
Changes of receivable accounts	ΔAR_{it}	Changes in account receivable
tangible and intangible assets depreciation cost	DEP_{it} & $AMORT_{it}$	Depreciation and amortization
Other accruals	$OTHER_{it}$	Other accruals, calculated as earnings before interest, tax, depreciation, and amortization. (EBITDA) – (CF + ΔAR + ΔINV – ΔAP – DA).

Source: Pang(2015), Farshadfar and Monem(2017), Larson et al. (2018), and standard No 2 of IRAN accounting.

Artificial Neural Network Theory

Artificial neural networks offer a completely different approach to problem-solving, and they are sometimes called the sixth generation of computing. They provide a tool that programs itself and learns on its own. Neural networks are structured to provide the capability to solve problems without the benefits of an expert and the need for

programming. They are capable of seeking patterns in data. Artificial neural networks (ANN), as they are often called, refer to a class of models inspired by biological nervous systems. Neural networks forecasting has recently enjoyed considerable success in pattern recognition and prediction and, as such, has gained considerable research attention resulting in a plethora of articles on this subject. The concept is based on computing systems that are able to learn through experience by recognizing patterns existing within a data set. Neural systems require their implementer to meet a number of conditions. These conditions include:

- A data set which includes the information can characterize the problem.
- An adequately sized data set to both train and test the network.
- An understanding of the basic nature of the problem to be solved so that basic first-cut decisions on the network can be made.
- These decisions include the activation and transfer functions, and the learning methods.
- An understanding of the development tools.
- Adequate processing power (some applications demand real-time processing that exceeds what is available in the standard, sequential processing hardware. The development of hardware is the key to the future of neural networks).

Once the necessary inputs (factors) are identified, it is relatively simple to train a neural network to form a nonlinear model of the underlying system and then use this model to generalize to new cases that are not part of the training data. (Kumar &Walia, 2006)

The model consists of an output variable, which is future operating cash flow. At the next stage, the data were prepared. The preparation of data is one of the complicated stages in the use of neural networks. A part of this complexity depends on the selection of proper training patterns. Another part depends on changes in the scale of data because the best status for neural networks is when all the inputs and outputs range from 0 to 1.Since it is not possible to predict which of the functions will produce the best response at the beginning of the study, a neural network with hypothetical functions should be considered, and the best results can be obtained after analyzing and evaluating the results. Hypothetically, based on the researchers' experience, the Levenberg-Marquardt training function, the fastest Gradient Descent With Momentum, and the Mean Square Error function are used as the default functions. In backpropagation networks, the Hyperbolic Tangent Sigmoid, log sigmoid and linear function are used. In the beginning, the transit function is used for the hidden layers, and the pure function is used for the output layer. In the neural network, layer-by-layer calculations are performed, and the output is calculated. First, the outputs of one layer of nerve cells are calculated, and these outputs are used as inputs for the next layer. Then, from these inputs, the second layer's outputs are calculated, so the process is continued to obtain the output vector of the network. In the meantime, the learning functions are of particular importance. The particle swarm optimization algorithm (PSO) structure is presented in fig 1.

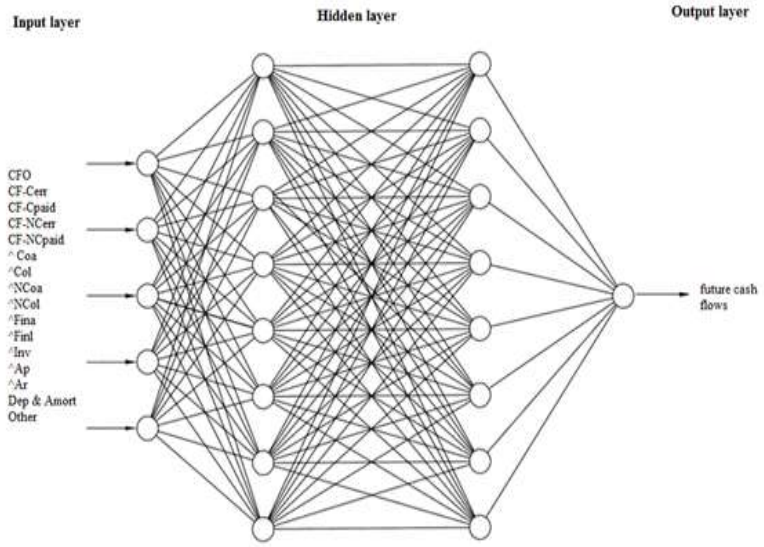

Fig 1: Particle Swarm Optimization Algorithm (PSO)

3.4. Implementation of Particle Swarm Optimization Algorithm

To propose a neural network model for forecasting future cash flows, the necessity of standard normalization for the model's appropriacy will be discussed. Then, the number of network hidden layers, the number of neurons in each layer, learning algorithm, transfer function, application function, and the number of repetitions, the size of learning and training collection will be specified for which there is no unique systematic method. Therefore, the best-designed network will be achieved by trial and error.

In recent years, due to the limitations of mathematical methods, lots of research has been done on the use of evolutionary algorithms for optimization. One of the most effective methods is the bird flight algorithm. In this study, according to the study of Asadi and Naqdi (2018), combining and developing the integrated neural network model with particle swarm algorithm (Birds' Flight) for prediction were implemented as follows.

Table 2: The Summary of Particle Swarm Optimization Algorithm (PSO) Process

Parameter	Description
Network type	Particle swarm optimization Algorithm(PSO) Multi-Layer Artificial Neural Networks (MANN) (Feedforward) by a new function
Normalization of data	mapminmax function
Removing random data	Dividend function
The number of Neurons of hidden, input, and output layers	15 neuron, 4-12 neuron, 1 neuron
Size of population	20
Weight and inertia coefficient	{1- 0} and 0.5
Number of particles	85
Cognitive and collective learning coefficient	1.5 - 2
The number of repetitions(Epochs)	500
numbers of collection	Training 65%, accreditation 10%, and test 25%
evaluation criteria and choosing the best structure to experimental results and test	Mean squared error (MSE) Root-mean-square error(RMSE) Normalized Mean Squared Standard Error (NMSE) Mean Absolute Error(MAE) Mean Absolute Percentage Error(MAPE) the correlation coefficient(R2)
Choosing the most efficient variables to forecast	Sensitivity Analyze (weight factor)

1.Building the initial population and evaluating it
2. Determining the best personal memories and the best collective memories
3. Updating speed and position and evaluating new responses
4. if stopping conditions were not met, we would return to step 2
5. End.

The summary information of the main parameters and fitting stages of the neural network optimized with the research flight pattern is shown in Table 2.

4. Research Findings

4.1. Descriptive Statistics

Table 3: Descriptive Statistics of Research Variables

Variable/Statistic Index	Mean	Median	Minimum	Maximum	Standard Deviation
CF	0,169	0,138	-1,007	1,356	0,206
CFO	0,143	0,123	-0,723	1,147	0,165
COA	0,451	0,562	-0,011	2,213	0,151
COL	0,154	0,069	-0,854	1,054	0,214
NCOA	0,129	0,513	-0,754	3,333	0,201
NCOL	0,201	0,134	-0,087	2,041	0,176
FINA	0,098	0,017	-0,314	0,821	0,037
FINL	0,112	0,035	-0,425	1,678	0,142
CF_Cerr	1,070	0,867	-0,0۲۳	11,017	0,858
CF_Cpaid	0,992	0,776	0,002	10,336	0,860
CF_NCerr	0,117	0,057	0,000	1,812	0,170
CF _NCpaid	0,048	0,034	0,001	0,622	0,048
INV	0,065	0,062	-1,512	1,563	0,141
Ap	0,041	0,026	-0,289	0,851	0,094
AR	0,065	0,031	-0,721	2,021	0,174
DEP & ***AMORT***	0,021	0,017	0,013	0,126	0,017
OTHER	-0,048	-0,037	-3,321	1,863	0,302

Number of Observations: 959
source: Calculations of the Research

Descriptive statistics (regression and central tendency indices) of the research variables are provided in Table 3. The main central tendency index is the "mean" which shows the balance point and distribution mean center. The mean index of all variables was positive, and the highest index was related to cash flows received from sales of goods and providing services (CF-Cerr) with 1.070 around which most of the data had been concentrated. Generally, the regression parameters are criterion to determine the regression value from each other or their regression value concerning the mean. One of the most important regression parameters is the standard deviation. The amount of this parameter for paid cash flows variable to purchase goods and services (CF-CAPID) is 0.86, and for the variable of tangible and intangible assets depreciation, it is 0.017 that shows these two variables have the lowest and the highest regression value among the research variables.

4.2. Results of the Regression Approach

Table 4: Results of the Normality and Stability of Dependent Variable (Research) and Flimer and Hasman Model Test.

Variable	Jarque-Bera Test		Lewin, lin, Chu Test		Result
	Statistic	Prob.	Statistic	Prob.	
CF	1369,6	0,000	-20	0,000	Normal-Stable
Model/Test	Redundant Fixed Effects Tests		Hasman Test		Model Process Method
	Statistic	Prob.	Statistic	Prob.	
The First	1,816	0,000	222,18	0,000	Fixed Effects, Panel Data

source: Calculations of Research

Because the statistical probability of the Jarque-Bera test in Table 4 for the dependent variable of the future operating cash flows is smaller than the 5% error level, the null hypothesis of the normality of the variable mentioned above is rejected. It means that the data does not follow the normal distribution for the dependent variable. If the model is big enough in size (many of the resources consider thirty observations and so as a big size), even if the distribution of the estimated proposed model statements is normal, the calculated co-efficient will have minimum variance, and they will be efficient, and we can rely on these models to test the research hypothesis (Badavarenahndi & at al, 2019). As a result, and considering the big size of this research sample, it is assumed that the research's dependent variable is normally distributed. Table 4 shows that the significance level of the Lowin, Lin, and Cho test is less than 5% for the dependent variable of the research, which shows the research's reliability. Therefore, the confidence level of 95% shows that the dependent variable for the data was reliable and did not have a unique root. In addition, based on the results in Table 4 Flimor significance level in the research model is less than 5%. Therefore, the Hasman test will determine the regression type. According to the Hasman test results, when the Flimor significance level is less than 5%, the fixed effect panel data method is used, and if it is more than 5%, the random data–panel method is used. The results of the tests indicate the fixed effects panel data method.

Table 5: Results of the Regression Test

Variable	Coefficient	Std. Error	t-Statistic	P-Value
C	502646.9	76558.43	6.565	0.000
CF_Cerr	0.133	0.051	2.6	0.009
CF_Cpaid	-0.118	0.047	-2.47	0.013
CF_NCerr	0.271	0.063	4.285	0.000
CF_NCpaid	-0.019	0.217	-0.087	0.030
ΔCOA	0.257	0.041	6.237	0.000
ΔCOL	-0.127	0.034	-3.651	0.000
$\Delta NCOA$	0.0348	0,025	1,378	0,008
$\Delta NCOL$	0.026	0.025	1.052	0.292
$\Delta FINA$	0.148	0.062	2.373	0.017
$\Delta FINL$	0.007	0.05	0.157	0.074
ΔINV	0,257	0.054	5,154	0.000
ΔAp	-0,21	0,061	-3,25	0.002
ΔAR	0.214	0.04	6.145	0.000
DEP & $AMORT$	1.542	0.398	4.452	0.000
$OTHER$	0.202	0.045	6.987	0.000
R-squared	0.789	F-statistic	16.8	
Durbin-Watson stat	2,15	Prob(F-statistic)	0.0000	
Adjusted R-squared	0.655			

source: Calculations of Research

As the results of the Table 5 show, the calculated significant level for each of the thirteen independent variable cash flows received from sales of goods and providing services(CF-cerr), other received cash flows (except for sales of goods and providing services) (CF-NCerr), cash flows payments for the purchases of goods and services(CF-Cpaid), other payments cash flows (except for purchase of goods and services) (CF-NCpaid), current operating asset accruals (COA), current operating liability accruals(COL), non-current operating asset accruals (NCOA), financing asset accruals (FINA), changes in account receivable (AR), changes in account payable(AP), changes in inventories(INV), tangible and intangible assets depreciation cost (DEP & AMORT)

and other accruals (other) is smaller than 5% error level, and the calculated coefficient for ten variables is positive, and for three variables it is negative. Therefore, it can be said that cash flows received from sales of goods and providing services(CF-cerr), other received cash flows (except for sales of goods and providing services) (CF-NCerr), cash flows payments for the purchase of goods and services(CF-Cpaid), other payment cash flows (except for purchase of goods and services) (CF-NCpaid) current operating asset accruals (COA), current operating liability accruals(COL), non-current operating asset accruals (NCOA), financing asset accruals (FINA), changes in accounts receivable (AR), changes in accounts payable(AP), changes in inventories(INV), tangible and intangible asset depreciation cost (DEP & AMORT) and other accruals (other) have a direct and meaningful effect on future cash flows of the accepted companies in Tehran Stock Exchange. Furthermore, cash flow payments for the purchase of goods and services (CF-Cpaid), current operating liability accruals (COL), changes in accounts payable (AP) have a meaningful reverse effect on future cash flows of the accepted companies in Tehran Stock Exchange". Nevertheless, the significant calculated level for the variables of non-current operating liability accruals (NCOL) and financing liability accruals (FINL) is larger than 5%, implying that these variables' effect on forecasting cash flows is not meaningful. In addition, according to the results from the balanced determination coefficient, which is 65.5 %, it can be said that 65.5% of the dependent variable changes can be explained. Since the Durbin –Watson statistic of the model is nearer to 2(2.15), it can be said that there is no first-order autocorrelation in this model (confirming one of the regression hypotheses). In addition, the results of Table 5 show that the F test significant level is less than 5%. Since the F statistic shows the model's total reliability, it can be stated that this model is %95 meaningful and has high reliability. Based on the research model results, the regression model is a suitable one for forecasting future cash flows. Thus, the first research hypothesis is accepted, and this model with 13 effective and predictive variables is able to forecast future cash flows as follows:

$$\begin{aligned} CF_{it+j} = \gamma_0 &+ \gamma_1 CF-Cerr_t + \gamma_2 CF-Cpaid_t + \gamma_3 CF-NCerr_t \\ &+ \gamma_4 CF-NCpaid_t + \gamma_5 \Delta COA_{it} + \gamma_6 \Delta COL_{it} \\ &+ \gamma_7 \Delta NCOA_{it} + \gamma_8 \Delta FINA_{it} + \gamma_9 \Delta INV_{it} + \gamma_{10} \Delta Ap_{it} \\ &+ \gamma_{11} \Delta AR_{it} + \gamma_{12} DEP_{it} \,\&\, AMORT_{it} + \gamma_{13} OTHER_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

4.3. Results of Particle Swarm Optimization Algorithm (PSO)

A convergence diagram of the particle swarm optimization algorithm based on the number of iterations is presented in diagram1. The horizontal axis indicates the number of evaluations of the target function during optimization. As shown, the particle optimization algorithm is rapidly converging, and from the number of 150 evaluations on, the target function value remains constant, indicating the algorithm's power to optimize.

In this current study, fitting different neural network models particle swarm optimization algorithm (PSO) in the form of 9 structures were fitted. In this study, due to the paper space's limitation, only the best neural network model structure with eight hidden neurons in Table 6 was presented. Based on the model's predictive accuracy, the least square error of standard error was (4.68), and the highest correlation coefficient was (0.95), and this structure is the best in predicting future cash flows.

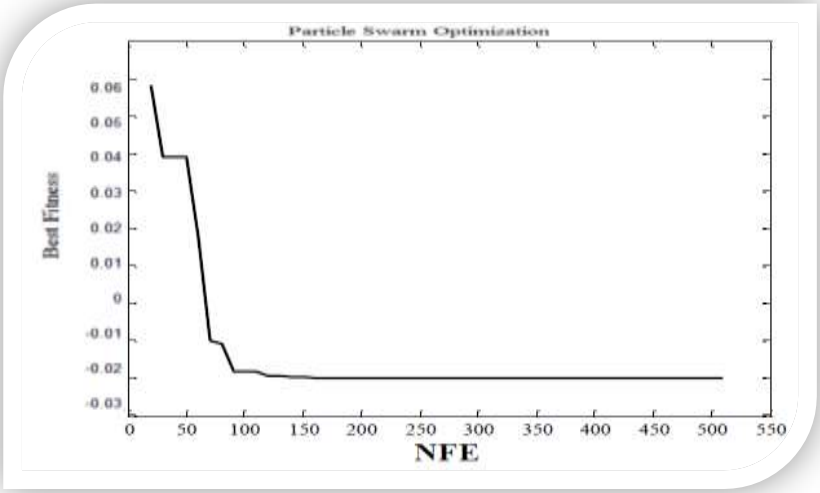

Diagram 1: Convergence Chart of Particle Swarm Optimization Algorithm

Table 6: Results of Neural Network Performance Evaluation Criteria Particle Swarm Optimization Algorithm(PSO) (8 Hidden Neuron).

Evaluation Criteria and parameters	Amount of	
	Training Data	Test Data
Mean Squared Error (MSE)	٩,٠٤	٤,٦٨
Root Mean Squared Error (RMSE)	٦,١	٤,٥
Normalized Mean Squared Standard Error (NMSE)	١,٠٥	٠,٦٣
Mean Absolute Error (MAE)	٥,١	٣,٨
Mean Absolute Percentage Error (MAPE)	٩٢	٧٣,٩
R Squared(R2)	٠,٨٨	٠,٩٥

source: Calculations of the research

Table 7: The Results of Sensitivity Analyze (Weight Factor) Inputs of the Particle Swarm Optimization Algorithm(PSO)

Variable	Sensitivity Analyze
Cash flows from the sale of goods and the provision of services	0.138
Cash flows for the purchase of goods and services	0.142
Other cash flows (except sales of goods and services)	0.125
Other paid streams (except the purchase of goods and services)	0.138
Operating Assets Accruals	0.247
Current operating debt accruals	0.179
Non-operating assets accruals	0.118
Non-performing operating debt accruals	0.101
Financing Accruals	0.113
Financing Accruals	0.134
Changes in the inventory of goods	٠,١٢٩
Payable Account Changes	٠,١٥٢
Payable Account Changes	٠,١١٦
The cost of depreciation of tangible and intangible assets	٠,١٢٤
Other accruals	٠,١١٦
Financing Accruals	0.113

source: Calculations of the Research

The sensitivity analysis results of the research variables are presented in the best structure of (8 hidden nodes) particle swarm optimization algorithm(PSO) in Table 7. Sensitivity analysis was used to select the most influential variable in predicting cash flows. Naturally, the greater the sensitivity analysis (Weight coefficient) of the variable, the greater the impact and weight on the network output and the prediction of future cash flows. The sensitivity analysis process shows how sensitive the model is to its input variables. In this study, according to Asadi and Naqdi (2018), we have obtained the input variables' sensitivity coefficient values by dividing the total network error in the absence of one variable by the total network error in the presence of all input variables. As can be seen from the above diagram results, almost all the weighting coefficients of the variables are larger than one and close to one, indicating the ability of almost all variables to predict cash flows. And among the variables, operating current assets accruals (COAs) with a weighting coefficient of (0.247) and NCOLs with a coefficient (0.101) have the highest and the least influence on the prediction of future cash flows, respectively. As a result, the second hypothesis is accepted, and this model predicts future cash flows with all 15 variables. This model predicts the future cash flows with 15 predictive variables by the following relationship (4):

$$CF_{it+j} = \gamma_0 + \gamma_1 CF - Cerr_t \gamma_2 CF - Cpaid_t + \gamma_3 CF - NCerr_t + \gamma_4 CF - NCpaid_t + \gamma_5 \Delta COA_{it} + \gamma_6 \Delta COL_{it} + \gamma_7 \Delta NCOA_{it} + \gamma_8 \Delta NCOL_{it} + \gamma_9 \Delta FINA_{it} + \gamma_{10} \Delta FINL_{it} + \gamma_{11} \Delta INV_{it} + \gamma_{12} \Delta Ap_{it} + \gamma_{13} \Delta AR_{it} + \gamma_{14} DEP_{it} \,\&\, AMORT_{it} + \gamma_{15} OTHER_{it} + \varepsilon_{it} \quad (٤)$$

The actual and predicted values of operating cash flows based on a neural network model optimized with the bird flight model is illustrated in Diagram 2. As the Figure shows, the results of a neural network optimized with the bird flight model are closer to the actual results.

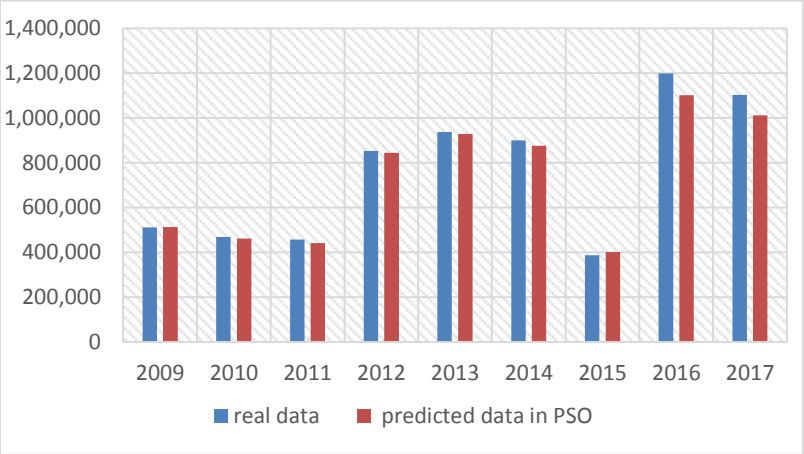

Diagram 2: Comparison of Real Data with Predicted Data in PSO

6. Conclusions and Suggestions

The future forecasting has been a necessity in everyday life and is a common area of interest in many scientific fields. One of the areas in which prediction has great importance is economical and financial issues. The effect of the stock exchange market in the economic development of a country is undeniable. The main task of this market is the effective operation of the capitals and the optimal allocation of the resources (Etemadi & at al, 2018)

Previous studies have examined various models to forecast future cash flows of the business units, and most of these studies have used regression models to forecast future cash flows. Therefore, it is necessary to try other new methods to attain a more exact prediction. In a world where there are tremendous changes in the economy every

moment, predicting future events will be a key factor in capturing profit opportunities. While traditional techniques such as regression have proved to be ineffective in some cases, many people are interested in predicting future events more accurately.

Regarding the alignment of the results of this study with those of other studies, it can be stated that there is no similar study with these variables, so it cannot be thoroughly compared with other research results. The results of the first hypothesis of the study showed that "the regression model with 13 predictor variables is a proper model for predicting future cash flows". The results of this hypothesis are in line with the results of the Farshadfar and Monnem's (2017); Shubita (2013); Arendo et al.' s(2012); Saghafi & Sarraf's (2013); Sarraf's (2019) studies and the results of the second research hypothesis show that "particle swarm optimization algorithm (PSO)" with 15 predictor variables is a proper model for predicting future cash flows. Due to the lack of a similar study using this method (with similar variables), it was impossible to accurately compare the results.

Therefore, based on this study's results, the components of the operating cash flows compared with accruals components have a greater relative ability to predict future cash flows. However, it is recommended that investors, financial analysts, and other financial statement users pay more attention to new data mining techniques in their predictions so that they can make more rational decisions. Based on the results of this paper, creditors evaluate customers' ability to generate cash flows, investors to cash flow prediction in business units, and managers in various decision-making that require cash flow estimations and analysts in interpreting and helping users could benefit from this research results.

Considering the future research, it is suggested that a study under the same title with other new models of artificial intelligence (neural network optimized with a genetic algorithm, support vector machine, etc.) can be performed, and its results can be compared with those of this study. Given the new variables introduced in this study with which to date no studies have been conducted using a similar model in Iran, it is suggested that research under the same title together with future profit prediction and earning quality can be performed using modern patterns and the results can be compared. Besides the variables studied in this study, other variables can help improve the proposed models so that new variables can be incorporated with the existing variables with the mentioned patterns. Since predicting cash flow is a multifaceted approach, it is convenient that other approaches can be investigated, too. Finally, it is recommended that future studies of probable networks whose structure includes one input and three information-processing layers (pattern layer, classification, and output layer) can be investigated and compared to the results of this paper.

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