
Measuring the Quality of Accounting Information in the Face of with Employer Loyalty with Approach PSO Algorithm

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Abstract: Employer loyalty stems from a positive attitude towards a service that is directly related to the working relationship between the auditor and the Employer. This may be due to a better working relationship with the auditor of your choice or an opportunity to influence the auditor. Managers may seek auditing to approve the method because they do not prepare financial statements in accordance with common accounting principles. In this case, the level of quality of accounting information largely depends on the behavior of managers. The present study tries to optimize the quality of accounting information in the face of customer loyalty by using the algorithm (PSO) in a period of 7 years from 2012 to 2018. The results showed that in each group of loyalty and loyalty of the Employer, the number of characteristics with equal desirable and undesirable levels is equal and in Tehran Stock Exchange, managers, whether loyal to their previous auditor or not, the highest level of importance and desirability can be attributed to the characteristic They give confidence and give the lowest level of relevance.

Keywords: quality of accounting information, Employer loyalty, PSO Algorithm.

INTRODUCTION

Accounting is described as an information system used by companies for various economic decisions (Bello, 2009). Many investors and shareholders make their decisions based on accounting information about the company's performance provided by the financial reporting system in annual reports.

Providing useful information for various investors in decision making is the main purpose of financial statements (Dimitropoulos & Asteriou, 2010). Such information helps the owners, stakeholders, company partners, and regulators to control the managers' performance, estimate a company's past performance, and estimate future profits.

The motivation is using the concept of employer loyalty to examine maintaining the auditor from the employer's theoretical perspective. The employer changes the auditor when he/she is not satisfied with the auditor's services. If a employer does not have any changes for a specific period, it is assumed that the employer is satisfied with the auditing company and its services for that period (Bekhradi Nasab & Julanejad, 2019). In addition, (Lennox & Park, 2007) found that the managers' dependence also has a significant effect on auditor selection. Companies that have dependent managers may have better working relationships between the auditor and management or some kind of opportunism to influence the auditor. Thus, the auditor who is selected in the case of the current manager's dependence to the audit firm may face conflicting motivations regarding maintaining objectivity in conducting the audit versus maintaining the relationship with the manager, which influences the decision to select the audit firm. However, it should be borne in mind that loyalty to the previous auditor is not necessarily bad and may not be due to the management's opportunistic goals. Also, given the corporate governance mechanisms to increase the auditor's independence and improve the quality of financial reporting, the potential negative effects of management loyalty to the auditor may be reduced. This is while the basic assumption in Sarbanes_Oxley Act (2002) is that management's influence on selecting the auditor leads to negative results.

On the other hand, some studies suggest that changes in the firms' management can be one of the factors affecting the employer's lack of loyalty to the previous auditor (Schwartz & Menon, 1985). A manager may change the auditor in order to receive the audit report he/she wants, namely, using auditors who have more flexibility or less conservatism in applying accounting standards. On the other hand, the information quality

hypothesis refers to how the audit can improve the quality of information provided by the management of the company in question. According to this hypothesis, the auditor's task is to improve the quality of accounting information.

According to (Trueman & Titman, 1998), the quality of accounting information and financial report is the joint product of at least four main factors: creativity and attitudes of the management, audit quality, audit committee experience, and high quality accounting standards. Presence of weakness in any of these four loops can disrupt the entire chain. Therefore, the task of accrediting the auditors in promoting the reliability and confirming the accounting information is a serious task to reflect usefulness of information for decision making and evaluation of the manager's stewardship task (Nikumaram & Ahmadzadeh, 2013).

On the other hand, according to (Trueman & Titman, 1998), managers want the auditors to approve the financial statements without requesting any correction. When selecting the auditors, managers consider the issue of non-correction of accruals as a selection criterion. According to Glasser's Selection Theory, man makes his choices based on personal interests.

(Glasser, 1998) believes that managers inherently like absenteeism and have greed genes in the new century. According to the above view, the employer management can also be considered as a person who seeks to increase his/her own personal interests and when deciding about his/her own loyalty to the auditor, considers his/her own personal interests including non-correction of financial statements (Ahmadi Loye et al., 2018). Therefore, according to Glasser's selection theory, the company's management tries not to limit its own opportunistic behaviors because of its loyalty to the auditor.

In this regard, the present study seeks to find an answer to the question of what is the quality level of accounting information in companies whose managers face employer's loyalty to the auditor.

Theoretical foundations

One of the main concerns of managers is correct understanding of investors about the future horizon of the company and gaining the trust of the capital market by providing financial statements and transparent and high quality information. Managers, as the owners' representatives and stewards, have a duty to direct and manage the activities of the business unit in line with the interests of the owner; but one of the reasons for information asymmetry separation of the owner from the management.

On the other hand, evidence shows that managers act in line with their own personal interests and prefer their own interests over the interests of others. Therefore, managers during their tenure may choose strategies that provide the most benefits for themselves (Yaghoubi Salehabadi et al., 2015). Therefore, the selection and tenure of the auditor is influenced by the main shareholder, business environment, and the CEO of the company (Tu, 2012).

In auditing, as in any other profession, if both parties achieve their goals, then the professional relationship definitely continues. Otherwise, the relationship may be disconnected due to the underlying factors (Calderon & Ofobike, 2007). The change of auditor probably occurs if the benefits of the change outweigh the cost of the replacement.

According to (Beattie & Fearnley, 1998) decisions related to change are more influenced by economic factors such as audit costs, while behavioral factors are more important when selecting auditors. Regarding the impact of behavioral and economic factors on auditor changes, (Magri & Baldacchino, 2004) show that behavioral factors prevail economic factors. Due to the use of profit increasing accounting methods managers may be willing to seek an auditor to verify the above method. Therefore, the quality of firms' accounting information largely depends on the behavior of managers.

(Lennox, 2000) considers the non-issuance of the desired statement or report of the employer by the auditor as one of the most important reasons for auditor changing and disloyalty of the employer to the auditor. Employer loyalty stems from a positive attitude toward the service. In fact, the most important factor in explaining employer loyalty is the factor that is directly related to the working relationship between the auditor and the employer. Findings also show that employer loyalty factors have behavioral rather than economic nature (Mie Reheul et al., 2012). Since the manager is one of the stakeholders who should benefit from the verified information, therefore, he/she has mutual interests and it is logical to assume that there is no conflict of interests between the manager and the auditor.

Therefore, in situations where managers feel that a particular audit will lead to discovery of distortion, in this case, the manager may change the current auditor and be disloyal to him/her due to his/her own opportunistic behaviors. In fact, the extent to which managers influence the selection or replacement of an independent auditor is an important factor in maintaining or destroying the auditor's independence (O'Connor, 2002). In situations where the management does not prepare the financial statements in accordance with common accounting principles (Park, 1990) and asks the auditor not to report this non-compliance, the auditor has to choose between accepting the management's unreasonable request or maintaining his/her own independence; and in case of non-acceptance, he/she will face disloyalty of the manager and the auditor will be changed.

(Artanaa et al., 2019) in a study examined the impact of high quality audit and services on employer loyalty. Their results showed that audit quality and service quality significantly affect employer satisfaction. Audit quality, service quality, and employer satisfaction significantly affect employer loyalty. Employer satisfaction can lead to the impact of audit quality and service quality on employer loyalty.

(Forzeh Fossung et al., 2019) in a study examined the independent auditor and quality of accounting and financial information of firms in Cameroon. Their results show that the auditor's expertise has not reduced manipulation of accounting and financial information, but the auditor's tenure time and credibility have a significant effect on the quality of accounting and financial information.

(Alfiyatul, 2018) in a study examined the impact of internal and external factors on auditor selection. The purpose of this study was to fill the gap using a literature review approach and analyzing the determinants of auditor selection based on the findings of previous studies and then classifying them into internal and external factors.

In another study (Farag & Elias, 2011) examined the relationship between auditing fees and the degree of employer loyalty. Their results showed that 1648 employers (65.95%) have been loyal to their auditors and have never changed their auditors in the 7-year period, and 851 employers (34.5%) have not been loyal to their auditors and have changed their auditor at least once during this period.

(Moradi & Yahyaei, 2020) in a study developed a model for selecting an independent auditor in Iran. In development of auditor selection model, the employer's motivations for selecting the auditor have been identified as one of the causal conditions that this selection is made in the context of the macroeconomic situation and the general situation of the capital market. Auditor selection strategies are also different forms and methods of selection which are classified into two legal and real selection groups.

(Bekhradi Nasab & Julanejad, 2019) in a study examined the effect of auditing fees on employer loyalty. Their evidences suggested that increasing the auditor's fee reduces the employer's loyalty to the auditor.

In their study (Zalqi et al., 2019) examined the effect of the CEO's tenure time on continuity of auditor selection in the Tehran Stock Exchange. They found that the CEO's tenure time has a positive and significant relationship with continuity of auditor selection.

(Ahmadi Loye et al., 2018) in a study examined auditor selection right and accrual-based earnings management based on Glasser's Selection Theory. The results of the present study show for the first time that the process of selecting an auditor in Iran follows an opportunistic approach while such a result has not been reported in previous studies.

In their study (Etemadi, 2009) presented a model of quality of accounting information disclosure based on analysis of managers' financial behavior. The results indicated that based on cognitive psychology, managers' financial behavior affects the quality of accounting information disclosure.

(Shams od-Dini et al., 2017) in their study examined the impact of auditing on quality of accounting information and information uncertainty. The results showed that increased quality of auditing leads to improved quality of accounting information and reduced information uncertainty. Also, the results showed that among the criteria for measuring audit quality, the type of auditor reports is a more appropriate criterion for measuring audit quality.

Research question

Given the importance of quality of accounting information and its vital role in the capital market, the research question is proposed as follows:

1. How is the quality level of accounting information in companies that have employer loyalty to the auditor?

MATERIALS AND METHODS

The data of the present study has been extracted from the audited financial statements and reports of the activities of the board of directors of companies listed on the Tehran Stock Exchange and Internet websites such as the Codal website and the official database of the stock exchange. To determine the statistical sample of the study, some restrictions were applied as follows:

1. Their financial period should end at the end of March each year;
2. The fiscal year should have not changed during the considered periods;
3. The shares of the company should have been traded for at least six months of the year;
4. It should not be part of the investment, intermediation, and financial companies;
5. The information required to conduct this study during the examined period should be available.

Finally, the financial information of 87 companies in a 7-year period from 2012 to 2018 was analyzed as a sample by applying the above restrictions.

Research models and variables

To test the research hypotheses, after screening and selecting the sample from among the population of companies listed on the Stock Exchange and collecting the information on the variables introduced in the operational definition of variables, the following was done:

First step: After performing the calculations of the operational definition of the variables, based on the independent variable of employer loyalty, the sample of the studied companies were divided into two groups of companies with employer loyalty and companies without employer loyalty.

Second step: Using the approximate algorithm of particle swarm, the optimal level of the two groups of companies with and without employer loyalty to the quality of accounting information was measured.

A: Independent variable

Employer loyalty

In this study, a combination of two variables will be used to measure employer loyalty:

First criterion:

This is a virtual variable that is considered one in the case of no change in the CEO's tenure, and zero otherwise.

Second criterion:

This is a virtual variable that is considered one if the employer does not change his/her auditor during the four-year tenure (three years or more), and otherwise is considered zero (Farag & Elias, 2011) and (Bekhradi Nasab & Julanejad, 2019). Finally, the two columns obtained from the above two criteria are compared. Employer loyalty is achieved as follows:

“Employer loyalty: If both contain number one, we put one.”

“Employer disloyalty: If both contain zero or both contain one and zero, we put zero.”

B: Dependent variables

The match between costs and earnings: The rate of match between costs and earnings has been determined based on the (Dichev Ilia & Wei Tang, 2008) model as follows:

$$REV_t = \beta_0 + \beta_1 EXP_{t-1} + \beta_2 EXP_t + \beta_1 EXP_{t+1} + \varepsilon$$

REV_t = Total sales revenues of goods and services in the current year

EXP_t = Total costs in the current year

EXP_{t-1} = Total costs in previous year

EXP_{t+1} = Total costs in next year

- Total cost: equal to general, official, distribution, and sale costs plus the end cost of the goods sold

- In the Tong model, the coefficient $B_2 > 0$ indicates observance of the matching principle.

Timeliness of profits: Timeliness of profits is determined by the model of Kotari and Zimmerman (1995) as follows:

$$R_t = \beta_0 + \beta_1 EBIT_t + \beta_2 \Delta EBIT_t + \varepsilon$$

R_t = Actual stock returns

$\Delta EBIT_t$ = Profit changes before tax and interest deductions

$EBIT_t$ = Profit before tax and interest deductions

“ R_2 Coefficient of determination was the criterion.”

Conditional conservatism: Based on (Dichev Ilia & Wei Tang, 2008) model, it has been determined as follows:

$$REV_t = \beta_0 + \beta_1 EXP_{t-1} + \beta_2 EXP_t + \beta_1 EXP_{t+1} + \varepsilon$$

REV_t = Total sales revenues of goods and services in the current year

EXP_t = Total costs in the current year

EXP_{t-1} = Total costs in previous year

EXP_{t+1} = Total costs in next year

In the Dicho and Tang model, the coefficient $B_1 > 0$ indicates conservatism.

Unconditional conservatism: Based on (Beaver & Ryan, 2000) model, it has been determined as follows:

Book value of equity/Market value of equity $\times (-1)$

Predictive value:

$$RoA_{it+1} = \alpha_0 + \alpha_1 RoA_{it} + \varepsilon_{it}$$

$$\text{Predictive value} = \frac{1}{|\varepsilon_{it}|}$$

ROA_{t+1} = Rate of return on assets in next year

ROA_t = Rate of return on assets in the current year

ε_t = Residual error of the model

Feedback value: Like the study by (Etemadi, 2009), the model by Karmandi and Lip (1987) has been used.

$$IBT_{i,t} = \alpha_0 + \alpha_1 IBT_{i,t-1} + \omega_{it}$$

Three steps should be taken to obtain the value of information feedback.

The first step is the error in predicting the profits of next years, taking into account the profits of the current year. So, in this step, the remaining value of the low regression model is calculated.

$$IBT_{i,t} = y_0 + y_1 IBT_{i,t} + u_{it}$$

The second step is the error in predicting the profits of next years, without considering the profits of the current year. So, in this step, the remaining value of the low regression model is calculated.

$$IBT_{i,t+1} = y_0 + y_1 IBT_{i,t} + \eta_{i,t+1}$$

- It should be noted that in the above models, in order to match the variables and eliminate the effect of firm size in the study results, all variables have been standardized based on the average assets of the firm.

The third step: To measure the value of financial information feedback, the difference between the absolute magnitude of errors in estimating next year and previous year's profit, before and after taking into account the current year's profit has been used as follows.

$$\text{Feedback value}_t = \{|PE_B| - |PE_A|\}$$

Selecting the specialty: Due to this feature, financial statements only can provide those specialties that can be expressed in terms of money. There are several monetary specialties that can be offered in financial statements, including historical end cost, replacement cost or net sales value. Selecting the specialty that is to be reported in financial statements should be based on its relevance to economic decisions of the users, and non-monetary specialties are transferred to users in explanatory notes (Shurvarzi & Nikumram, 2010). Therefore, in order to determine the feature of selecting the specialty in this study, the annual audit report of the companies in the population is examined and those companies that have not observed selecting the specialty are reflected as the report article and are assigned "zero" and those that have observed it are assigned "one".

Disclosure quality Rank: This is the ranks assigned to companies by the Tehran Stock Exchange, which consists of the following two parts:

First part: Timeliness with an effect factor of 2/3 of the total score;

Second part: Reliability with an effect factor of 1/3 of the total score.

Caution (conservatism): Caution is the use of a degree of care that is required in making judgments to make estimates in conditions of ambiguity, such that revenues or assets are not offered higher than reality, and costs or debts are not offered lower than reality. (Givoly & Hayn, 2000) model is used in this study to evaluate the conservatism index. (Nikumaram & Bani Mahd, 2009) and (Zalqi et al., 2019) have also used this model in their studies (this model has been used in most studies conducted abroad in recent years).

$$\text{Conservatism index} = \frac{\text{Operational accruals before depreciation}}{\text{Sum of assets at the beginning of the period}} = \frac{OI - CFO + Dep_t}{TA_{it}} \times (-1)$$

TA_{it} = sum of assets indicating the firm size

IO = operating profit

CEO = operational cash flow

Dep_t = depreciation cost

Completeness: The financial information contained in the financial statements must be complete with respect to the quality, importance, and considerations related to overrun of benefits to costs and its offering.

Eliminating part of the information may cause the information to be inaccurate or misleading and therefore unreliable and reduce its relevance. The annual audit report is also used for complete accounting information. Companies that have an audit limitation clause or a clause about not fully disclosing items of financial statements (such as tax reserves) are assigned zero because their information is incomplete, and those that do not have the limitation clause or the above condition about audit are assigned one because the information mentioned in their financial statements is provided in full. In the present study such a criterion is considered given the theoretical concepts of financial reporting.

Faithfulness: Information should honestly state the effect of transactions and other events that it claims (or is reasonably expected) to reflect. For example, the balance sheet should honestly reflect the effects of transactions and other events that result in items in the balance sheet history that have met the recognition criteria. Therefore, examining the correlation between profits and stock returns and the explanatory power of earnings is a way to determine the extent of its faithfulness.

According to (Beaver & Ryan, 2000) it is assumed that a change in stock prices is a reaction to profit changes over a specific period of time.

Therefore, return is a function of profit changes and profit change coefficient is considered as a criterion for earnings quality (Nasrollahi & Zohreh, 2010). Accordingly, the coefficient of determination of the following model, which is calculated based on the information of each company's last 5 years, is considered as the amount of its faithfulness.

$$RET_{it} = a_0 + a_1 NI_{it}/P_{it} + \varepsilon$$

RET_{it} : Average monthly stock returns (12 months) for year t

NI_{it}/P_{it} : The ratio of this year's net profit to the stock market price

The coefficient of determination R_2 indicates faithfulness.

"The source for measurement of dependent variables (quality of accounting information) is Sobhani et al., 2019".

Particle swarm optimization

The particle swarm algorithm is inspired by the group flight of birds. Each bird or particle in a group follows a very simple behavior; repeating and mimicking the successful experience of neighboring birds. Modeling of this simple principle has led to creation of one of the simplest and at the same time most widely used meta-heuristic algorithms.

Here, collective movement of birds indicates any qualitative feature of accounting information in companies active in the Tehran Stock Exchange. Now, using the particle swarm algorithm, each group is optimized by sample average approximation method by selecting the equation in (Table 1) in MATLAB software.

Table 1. Conditions of sample average approximation method

Max $\mathcal{F}(X)$	$X \in \Theta$	$\Theta \subseteq \mathbb{R}^d (d < \infty)$	$\mathcal{F}(X) = E[Y(x, \xi)]$
- Given that the values $(\xi_1, \xi_2, \xi_3, \xi_4, \xi_5, \dots, \xi_n)$ all have the same distribution, it is selected and fixed.			
So: $\mathcal{F}_n(X) = \frac{1}{n} \sum_{i=1}^n Y(x, \xi_i)$			
X_n^* is considered as an estimator for the optimal solution of the problem.			

Implementation of particle swarm includes five stages of problem definition, introduction of algorithm settings, initial valuation, main loop, and post-processing. The problem of quality of accounting information is defined; optimization of the categories is set by sample average approximation method; initial valuation is set based on the matrix of data of quality of accounting information; and the main loop is formed. The structure of the response is examined based on the quality level of accounting information based on the theoretical foundations of operational definitions. Here are some of the parameters included in the algorithm.

nVar= 11; % Number of Decision Variables
VarSize= [1 nVar]; % Size of Decision Variables Matrix
VarMin= -10; % Lower Bound of Variables
VarMax= 10; % Upper Bound of Variables
MaxIt= 1000; % Maximum Number of Iterations
nPop= 296; % Population Size (Swarm Size)
w= 1; % Inertia Weight
wdamp= 0.99; % Inertia Weight Damping Ratio
c1= 2; % Personal Learning Coefficient
c2= 2.0; % Global Learning Coefficient
% Velocity Limits
VelMax= 0.1*(VarMax-VarMin);
VelMin= -VelMax

The focus here is on non-bound problems. This method can also be used for bound problems. It can even be applied when a constraint is estimated using simulation.

RESULTS

Descriptive statistics

(Tables 2, 3, and 4) present the descriptive virtual statistics of the two groups of loyalty and disloyalty of the employer of the firms existing in the sample. The employer loyalty variable of 0.486 indicates that less than half of the companies have faced the phenomenon of employer loyalty to the auditor. Given the virtual nature of the variable of completeness and selection of specialty and their average in the employer loyalty group as equal to 0.784 and 0.985, respectively, and in the employer disloyalty group as equal to 0.859 and 0.927, respectively, it can be understood that in this study the employer loyalty group and employer disloyalty group, more than 79% and 86% of the sample companies, respectively have not had an audit report clause during the study period; and 99% and 93% represent the companies that have complied with the specialty selection.

Table 2. Descriptive analysis of the values related to the virtual research variable

Variable	Symbol	Virtual values	Frequency	Percentage of frequency	Number of observations
Employer loyalty	El	0	313	0.514	609
		1	296	0.486	

Table 3. Descriptive analysis of the values related to the virtual variables (employer loyalty)

Variable	Symbol	Virtual values	Frequency	Percentage of frequency	Number of observations
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Completeness	Completeness	0	64	0.216	296
		1	232	0.784	
Specialtyselection	SS	0	31	0.105	
		1	265	0.985	

Table 4. Descriptive analysis of the values related to the virtual variables (employer disloyalty)

Variable	Symbol	Virtual values	Frequency	Percentage of frequency	Number of observations
Completeness	Completeness	0	44	0.141	313
		1	269	0.859	
Specialtyselection	SS	0	23	0.073	
		1	265	0.985	

(Tables 5 and 6) present the descriptive statistics of the two groups of loyalty and disloyalty of the employer in the sample companies.

The predicting value variable is on average 29.330 in the employer loyalty group and 26.811 in the employer disloyalty group. Therefore, the sample companies have had a profit predicting error. The lower is the value of this variable it shows the higher predictive value of the information. The variable of feedback value is on average -0.019 in the employer loyalty group and -0.013 in the employer disloyalty group. Negative feedback value indicates low quality of information. The variable of faithfulness is calculated from the coefficient of determination of regression of profit to return, and the profit explanatory power is a way to determine the amount of its faithfulness. As can be seen, it is on average 0.803 in the employer loyalty group and 0.806 in the employer disloyalty group. The higher is this amount it shows high explanatory power and faithfulness. The variable of timeliness of profit on average is 0.805 in the employer loyalty group and 0.811 in the employer disloyalty group. The higher is the coefficient of determination it means that the profit has been disclosed at a more appropriate time. The variable of conditional conservatism is on average 0.150 in the employer loyalty group and - 0.127 in the employer disloyalty group. The negative value indicates that the recognized profit will not be conservative. The variable of unconditional conservatism is on average -0.712 in the employer loyalty group and - 0.675 in the employer disloyalty group. Obviously, the more the book value of equity moves away from market value, the more conservative it is.

Table 5: Descriptive statistics of the research variables (employer loyalty)

Variable	Symbol	Mean	SD	Skewness	Kurtosis	Max.	Min.
Conservatism index (caution)	C SCORE	- 0.441	0.734	10.859	-2.782	-3.809	0.382
Conditional conservatism	CONSV	0.150	1.031	5.264	-0.679	-3.992	2.963
Disclosure quality rank	DC	0.708	0.200	2.862	-0.704	0.060	0.990
Faithfulness	FAITH FULNESS	0.803	0.166	3.033	-0.809	0.172	0.995
Feedback value	Feedback value	-0.019	0.106	10.727	-6.583	-0.985	0.268
The match between cost and revenues	MATCHING	0.769	1.031	5.614	-1.218	- 3.744	2.922
Predictive value	Predictive value	29.330	26.599	6.976	1.880	2.212	141.241
Timely profit	TIMELY PROFIT	0.805	0.151	2.476	- 0.672	0.374	1.000
Unconditional conservatism	UCC	-0.712	0.720	8.504	-2.070	-3.929	0.892
Number of observations: 296							

Table 6: Descriptive statistics of the research variables (employer disloyalty)

Variable	Symbol	Mean	SD	Skewness	Kurtosis	Min.	Max.
Conservatism index (caution)	C SCORE	-0.466	0.818	10.548	-1.958	-4.758	0.315
Conditional conservatism	CONSV	-0.127	1.156	6.155	-0.760	-4.657	3.370

Disclosure quality rank	DC	0.728	0.199	2.919	-0.746	0.080	0.000
Faithfulness	FAITHFULNESS	0.806	0.152	2.979	-0.699	0.291	0.992
Feedback value	Feedback value	-0.013	0.090	7.652	-2.353	-0.739	0.693
The match between cost and revenues	MATCHING	0.586	1.193	4.828	-1.157	-3.655	3.309
Predictive value	Predictive value	26.811	21.178	3.056	0.983	1.610	89.709
Timely profit	TIMELY PROFIT	0.811	0.161	3.684	-1.005	0.199	1.000
Unconditional conservatism	UCC	-0.675	0.630	9.384	-2.273	-3.978	0.009
Number of observations: 313							

Results of particle swarm optimization (PSO) algorithm

As mentioned, in the fifth stage (post-processing), the optimal coefficients according to (Tables 5 and 6) and the diagram for finding the optimal point based on the optimal value according to (Figures 1 and 2) have been extracted for each group. Tables 7 and 8 show the optimal coefficients and analysis of each qualitative feature of accounting information based on theoretical foundations in operational definitions.

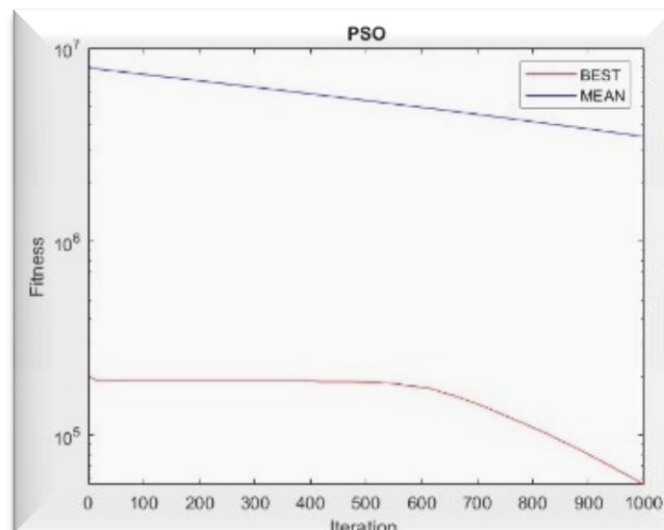


Fig.1: Results of the quality diagram of accounting information in the face of employer disloyalty

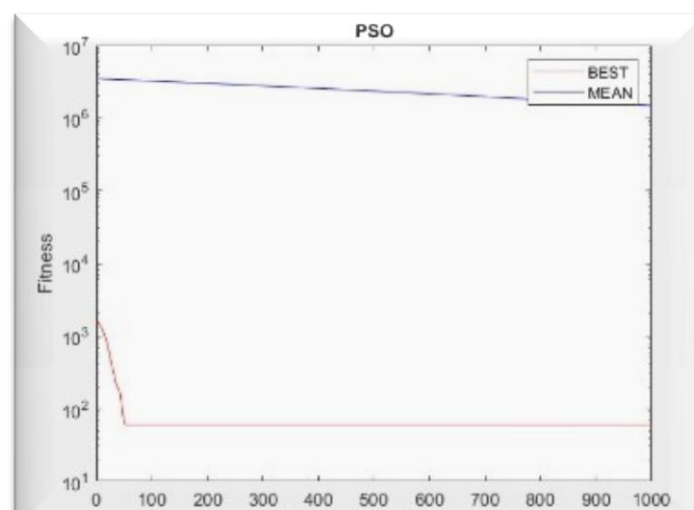


Fig.2: Results of the quality diagram of accounting information in the face of employer loyalty

Table 7. Results of optimal coefficients of particle swarm algorithm (PSO) in the face of employer loyalty

Title	Optimal coefficients	Analysis
Completeness	1	Numerical value of 1 is an indication of completeness of the information provided, which includes non-presence of a condition clause or a limitation clause in the scope of the audit in the annual audit report, that otherwise the numerical value of zero is for companies providing incomplete information. Thus, the value obtained in MATLAB software through particle swarm algorithm shows the desired level of quality of information in the face of employer loyalty.
Caution	-0.382	Smaller (more negative) values of operational accruals indicate higher levels of conservatism. Therefore, the results show the desired level of quality of information in the face of employer loyalty.
Conditional conservatism	0.000	(Dichev Iliia & Wei Tang, 2008) model is a model based on the matching principle. The more positive and large is the β_1 value, the more conservative is the identified profit. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.
Unconditional conservatism	-3.257	(Beaver & Ryan, 2000) model is a balance sheet approach to rapid reporting of debt to assets. In conservative reporting, the ratio of book value of assets to market value will be less than one. The more the book value of equity moves away from the market value it shows more conservatism. Therefore, the results show the desired level of quality of information in the face of employer loyalty.
Faithfulness	0.995	The correlation between dividends and earnings explanatory power is a way to determine the extent of faithfulness. The coefficient of determination of profit regression to dividends in the tenure period and profit explanatory power shows the amount of faithfulness. Therefore, the results show a desired level of quality of information in the face of employer loyalty.
Selecting the specialty	Zero	According to the annual audit report of the member companies in the population, if the companies have complied with the specialty selection, number one is assigned to them and otherwise zero; and this is reflected as a paragraph in their audit report. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.
Feedback value	0.268	If the calculated feedback value ratio is less than or equal to zero, the feedback value is negative. If it is less than one, the feedback value is limited, and if it is greater than or equal to one, the feedback value is positive and indicates high quality of information. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.
Predictive value	0.977	Absolute value of profit predicting regression error based on the current profit is the predictive value. The lower is this value shows high predictive value of information. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.
Disclosure quality rank	0.06	The disclosure quality score is a number between zero and one hundred. The higher is this number it shows the higher quality of disclosure quality of companies. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.
The match between cost and earnings	1.699	Earnings of each year depend on the costs of the current year, the previous year, and the next year. b_2 indicates strict and complete observance of the principle of conformity. The larger is b_2 , the greater is the matching between the costs and earnings of the current year, and higher matching means higher quality of the

		profit. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.
Timeliness of profit	0.399	Dividends depend on the net profit of the current year, and changes of the current profit compared to the previous year. The coefficient of determination obtained from the model estimate indicates the amount of timeliness of profits. The higher is R_2 it is concluded that the information has been disclosed at a more appropriate time. Therefore, the results show an unfavorable level of quality of information in the face of employer loyalty.

Table 8. Results of optimal coefficients of particle swarm algorithm (PSO) in the face of employer disloyalty

Title	Optimal coefficients	Analysis
Completeness	1	Numerical value of 1 is an indication of completeness of the information provided, which includes non-presence of a condition clause or a limitation clause in the scope of the audit in the annual audit report, that otherwise the numerical value of zero is for companies providing incomplete information. Thus, the value obtained in MATLAB software through particle swarm algorithm shows the desired level of quality of information in the face of employer disloyalty.
Caution	3.033	Smaller (more negative) values of operational accruals indicate higher levels of conservatism. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.
Conditional conservatism	-7.147	(Dichev Iliia & Wei Tang, 2008) model is a model based on the matching principle. The more positive and large is the β_1 value, the more conservative is the identified profit. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.
Unconditional conservatism	-22.646	(Beaver & Ryan, 2000) model is a balance sheet approach to rapid reporting of debt to assets. In conservative reporting, the ratio of book value of assets to market value will be less than one. The more the book value of equity moves away from the market value it shows more conservatism. Therefore, the results show the desired level of quality of information in the face of employer disloyalty.
Faithfulness	0.791	The correlation between dividends and earnings explanatory power is a way to determine the extent of faithfulness. The coefficient of determination of profit regression to dividends in the tenure period and profit explanatory power shows the amount of faithfulness. Therefore, the results show a desired level of quality of information in the face of employer disloyalty.
Selecting the specialty	Zero	According to the annual audit report of the member companies in the population, if the companies have complied with the specialty selection, number one is assigned to them and otherwise zero; and this is reflected as a paragraph in their audit report. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.
Feedback value	0.6489	If the calculated feedback value ratio is less than or equal to zero, the feedback value is negative. If it is less than one, the feedback value is limited, and if it is greater than or equal to one, the feedback value is positive and indicates high quality of information. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.
Predictive value	169.310	Absolute value of profit predicting regression error based on the current profit is the predictive value. The lower is this value shows high predictive value of information. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.
Disclosure quality rank	1	The disclosure quality score is a number between zero and one hundred. The higher is this number it shows the higher quality of disclosure

		quality of companies. Therefore, the results show the desired level of quality of information in the face of employer disloyalty.
The match between cost and earnings	1.514	Earnings of each year depend on the costs of the current year, the previous year, and the next year. b_2 indicates strict and complete observance of the principle of conformity. The larger is b_2 , the greater is the matching between the costs and earnings of the current year, and higher matching means higher quality of the profit. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.
Timeliness of profit	0.211	Dividends depend on the net profit of the current year, and changes of the current profit compared to the previous year. The coefficient of determination obtained from the model estimate indicates the amount of timeliness of profits. The higher is R_2 it is concluded that the information has been disclosed at a more appropriate time. Therefore, the results show an unfavorable level of quality of information in the face of employer disloyalty.

DISCUSSION

As the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) focus on the importance of high quality financial reporting, operationalization and measurement of “quality” is still a major problem, and there are concerns about creating a favorable accounting system. In fact, accounting information provides a mechanism by which information within an organization is transmitted to investors and capital markets. The quality of accounting information increases if elimination of various methods as well as increasing a range of accounting measures that reflect the economic situation limit the authority of managers in biased reporting of the accounting values.

Obviously, one of the important purposes of financial reporting is to provide useful information for decision making. Users of accounting information make the necessary decisions based on the information reported in the financial statements. Given the essential role that independent auditors have in accrediting financial statements and accounting information published by companies, managers may seek to achieve their own opportunistic goals when selecting auditors or being loyal to the previous auditor. Due to the importance of this issue, the present study has measured the quality of accounting information in the face of employer loyalty with a particle swarm algorithm approach in 87 companies listed on the Tehran Stock Exchange during the years 2012 to 2018.

CONCLUSION

Considering the results obtained from the particle swarm algorithm, it can be said that in both groups of loyalty and disloyalty of the employer the number of desirable and undesirable features have been equal. In general, observations show that all companies have experienced a desirable level in the face of loyalty or disloyalty in the qualitative features of 1) completeness, 2) unconditional conservatism, and 3) faithfulness; and have experienced an unfavorable level in the qualitative features of 1) conditional conservatism, 2) Specialty selection, 3) Predictive value, 4) feedback value, 5) cost and earning matching, and 6) Timeliness of profits. Different features, especially the two features of relevance and reliability, often contradict each other, and strengthening one leads to weakening of the other. Financial information cannot have all the qualities at a high level at the same time. Therefore, it seems that in the Tehran Stock Exchange, managers, whether they are loyal or disloyal to their previous auditor, they give the highest level of importance and desirability to the feature of reliability and the least level to the feature of relevance. This is while according to agency theory, it is possible that managers do not act impartially in providing the information, and move toward personal interests that leads to misuse of information and reduced reliability of accounting information. Selected auditors, in any case, attach more importance to reliability of information which is required for non-biased evaluation of the evidences. This result is consistent with the studies by (Kenedy et al., 1995). They concluded that auditors value reliable evidences more than relevant information. According to the study results, the impact of managers on the quality of accounting information should not be ignored. So, if there is a demand for high quality of accounting information, the organizational structure of companies and their corporate governance should be effectively improved, and rules and regulations should be developed to strengthen the management constraints so that in this way the quality of accounting information and transparency of them will be improved.

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