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Adv. Math. Fin. App., 2022, **7(**2), P. 489-505

Advances in Mathematical Finance & Applications
www.amfa.iau-arak.ac.ir
Print ISSN: 2538-5569
Online ISSN: 2645-4610
Doi:10.22034/AMFA.2020.1877543.1281

Applied-Research Paper

The Effect of Industry Type on the Relationship between Financial Reporting Transparency and Financial Health in Tehran Stock Exchange

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ARTICLE INFO

Article history:
Received 2019-08-28
Accepted 2020-06-15

Keywords:
Financial Reporting
Transparency
Financial Health
Tehran Stock Exchange

ABSTRACT

This study aimed to evaluate the effect of industry type on the relationship between financial reporting transparency and financial health in companies listed in Tehran Stock Exchange. The statistical population included companies listed in Tehran Stock Exchange during 2005 to 2016. By systematic elimination, 79 companies from 5 industries were selected as statistical sample and were tested by composite regression of hypotheses. Results of significant coefficients test based on fitted regression equations indicated a significant positive relationship between financial reporting transparency and financial health. The moderating relationship of industry type was also confirmed on the relationship between financial reporting transparency and financial health. Hence, business continuity and profitability (financial health) will be greater by investing in companies that have greater financial reporting transparency. Thus, the relationship between financial reporting transparency and financial health is high in industries of automobile, auto part, basic metals, chemicals, cement, lime and plaster, and pharmaceuticals, respectively.

1 Introduction

High importance of financial information disclosure is not hidden for micro and macro decision-making in the business. One of the important reasons for demand for information disclosure is agency problem and information asymmetry. Transparency as a factor in providing information that is relevant to the community needs to serve the public interest, enabling all stakeholders to evaluate activities of the organization. Transparency is not a goal in itself but a means to a goal [1]. Transparency in organized financial markets plays a key role in dealing with vague financial instruments or if political stability of an organization is jeopardized and prevents it from becoming a crisis. Transparency is, therefore, a response mechanism that disambiguates for extra-organizational users who do not have direct access to information and counteracts distortions [2]. Full disclosure coupled with financial reporting transpar-

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ency can provide safe conditions and boost investor trust. Transparency has a positive effect on corporate performance and can protect interests of shareholders [3]. By identifying appropriate (potential) investment opportunities and regulatory role of transparency which regulates management and reduces seizure of investor resources and by reducing information asymmetry between managers, information transparency improves economic performance [4]. Transparency of financial reporting is at the heart of modern financial reporting as the degree of openness of institutions in terms of monitoring and evaluating the actions of people within the company (managers) by those outside the company (shareholders). Therefore, the more reliable, relevant and available information is, the more attractive the company is for investors and this also reduces uncertainty about inherent depreciation of the company. Therefore, transparency of financial reporting can increase awareness and trust of investors, particularly under conditions of information asymmetry. Markets therefore reward voluntary disclosure and transparency. Access to information leads to efficiency in resource allocation and economic growth [5]. The risk and failure of a company as an unwanted phenomenon is an important problem with negative economic and social consequences and needs to be treated seriously.

Financial health at risk is also effective on national economy and trend of major economic indexes. Endangering the financial health of businesses for shareholders, managers, companies and economy can cause irreparable losses. Currently, avoiding bankruptcy is a fundamental strategy that aims to ensure business activities. Financial health is of the utmost importance in the sense of profitability and continuity of activity and ability to pay off business debt to all shareholders and stakeholders. On the other hand, financial statements are the only common source of information for all stakeholders, but one of the problems not specifically reflected in these reports is financial health and relative strength of its continued operation in the future [6]. Measuring and evaluating the financial health of companies can be an important mechanism in resolving the unfavourable situation of companies because recognizing these components can take corrective actions to solve these problems. Meanwhile, specific characteristics of each country affect financial problems of companies. These include changes in local systems, accounting standards, and regulatory frameworks (such as differences in development of financial markets and capital) and macroeconomic conditions [7]. Cheungand Leung [5] reported that transparency of financial reporting is very important from the perspective of investors and stakeholders. On the other hand, financial health is also a determining factor in continuity and survival of companies [6].

Industry is one of the factors that has been addressed in various studies. There are many disagreements about definition of industry. The industry has different definitions and interpretations that are based on product substitutability, production process and geographical constraints. Industry is a group of companies whose products are closely interchangeable. If we consider all economic activities dealing with production of goods and services using man-made machinery and equipment as a whole, every industry is a subset of this whole that encompasses a large number of similar activities. Moreover, some scholars believe that type of industry can be significantly influenced by economic environment. Given the above, the main question of this study is whether there is a significant relationship between financial reporting transparency and financial health; whether type of industry moderates the relationship between financial reporting transparency and financial health.

2 Literature Review

2.1 Financial Reporting Transparency

Bushman et al. [8] believe that information transparency extends access to relevant and reliable information on course performance, financial status, investment opportunities, corporate governance, and

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the risks that each company faces. Thus, as information transparency increases, financial markets become relatively stable and likelihood of crisis diminishes, investor trust increases, and more people enter the market. Investment is basic needs to transition from an underdeveloped to a developed economy, and the amount of investment in any economic system determines the rate of economic growth, market prosperity, and ultimately improvement of general welfare of the society. Sazilah et al [9] define transparency as broad access to relevant and reliable information on periodic performance, financial status, investment opportunities, supervision, value, and risk of companies traded by general public. Barth and Schipper [10] in the field of corporate governance define the concept of transparency as availability of information to corporate stakeholders, particularly those that affect their interests. Despite benefits of transparency of information, in some cases it can cause problems. The cost of missed opportunity of resources to inform the public is one of the problems for this reason; it is best to make the information transparent so that it is not costly and time consuming [11]. Aksu [12] considers transparency as timeliness and adequacy of disclosure of financial and operating functions. According to Brown et al. [14], the best definition of transparency in business is quality financial statements. Vishwanath and Kaufmann [15] define transparency as timely and reliable flow of economic, social and political information available to all relevant stakeholders.

They also define non-transparency as a deliberate impediment to access to information, misrepresentation, or market failure to ensure relevance and quality of information provided. Kaufmann and Bellver[16] believe that transparency is closely related to accountability, and reason of demand for transparency is that marketplace holds companies accountable for the policies they adopt and perform. Providing transparent financial information about a business and management reports is the fastest way to inform investors. The only problem with this is to determine the degree of transparency and honesty in reports provided [1]. Public information, in addition to financial information, also includes non-financial information and sub-information; this information can be very useful and effective in making better decisions for investors and corporate executives. But what investors are looking for is access to information about future decisions of the business, which can also influence the future cash flow of the business and how decisions are made. This information can also be useful in business external relations. The key to providing all kinds of financial, non-financial, primary and sub-information is transparency and transparency [16].

Transparency gives access to relevant and suitable information about the decision. Lost public trust in capital markets has led to formulation and amendment of laws aimed at increasing equity and enhancing information quality. Hence the transparency of financial reporting means that financial statements of the business present economic realities of the business in a way that is understood by users of the financial statements [19]. The intrinsic nature of company disclosure by providing useful information enhances the transparency of financial and operating performance to benefit intra- and extra-organizational users in their business and economic decisions. Companies that adhere to principles of transparent reporting and information disclosure have primarily pursued timely, accurate, complete, and quality disclosure to respond to stakeholders. Transparent disclosure of information by management indicates that management responds appropriately to needs of people who want responses and promotes value creation and social justice [27].

2.2 Financial Health

Corporate financial health is a topic linked to persistence of activity, bankruptcy, financial distress and qualitative characteristics of accounting information (relevance and reliability). Therefore, performance of companies should be assessed in the areas of operation, marketing and finance and accounting

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[17]. In the current environment of financial crisis and financial turmoil, avoiding bankruptcy and financial distress can be considered as a fundamental strategy aimed at sustaining and guaranteeing business activity. Therefore, predicting profitability and maintaining financial strength and evaluating the continuity of corporate activities have been considered. Financial health meaning profitability and continuity of business activities is of the utmost importance for all stakeholders [18]. Iranian investors are less likely to invest in financial assets, indicating their uncertainty and understanding of financial markets. To encourage investors and creditors to invest in financial assets, a critical factor that influences investor decisions is financial health of businesses. If financial health can be measured and evaluated in the sense of the ability of the business to meet its obligations and profitability for all investors and stakeholders and to continue operating, there are in fact more secure conditions in the capital market that will help to expand investment in financial markets [18].

Political and economic changes and conditions in society have limited access to profit and increased the likelihood of businesses being unable to fulfil their obligations and stop. In Iran, the existence of financial crises in companies and important domestic industries and their effect on bankruptcy and liquidation of companies leads to the need for transparency and disclosure of financial information with financial health of companies due to environmental conditions [19]. Industry is one of the factors that has been addressed in various studies. Companies in different industries appear to be adopting financial reporting transparency differently. The theoretical underpinning in some studies is based on dual economics theories, in which the industry is divided into two axial and peripheral sectors. Axial sectors are industries that cover the economic and political context of each country and have the most financial resources. There are many disagreements about definition of industry. The industry has different definitions based on product substitutability, production process and geographical constraints. Industry is a group of companies whose products are closely interchangeable. If we consider all economic activities dealing with production of goods and services using man-made machinery and equipment as a whole, each industry is a subset of this whole that encompasses a large number of similar activities. The type of industry was identified by empirical and theoretical scholars as an effective factor on profitability and ultimately corporate financial reporting.

Porter [21] argues that the type of industry is effective in determining the competing laws of companies and policies that are available to the company. He argues about the effect of industry type on profit that competition in the industry continuously works to reduce the rate of return on investment to the rate of basic competitive return. Therefore, different industries will have different effects on sustainability of abnormal profits. Courtis studied the relationship between four selected characteristics and timing of financial reporting at companies listed on the New Zealand Stock Exchange. The four characteristics selected included company life, number of shareholders, number of pages of financial reports and annual audit, and type of industry. Only type of industry had a significant relationship with financial reporting time and the other three had no significant relationship. According to Courtis, companies that were active in fuel and energy industries and financial intermediaries were fast financial reporters. In contrast, companies operating in the mining, extractive, and service industries had slow reporting [21].

2.3 Transparency of Financial Reporting with Financial Health

Financial reporting standards significantly emphasize meeting the needs of extra-organizational users. One of the characteristics of information disclosed is transparency so that it can be relied upon. Transparent disclosure of financial information is expected to minimize information asymmetry; reduce

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the likelihood of fraud and make it easier to detect. On the other hand, transparency of financial information reduces uncertainty and increases company value [22]. Providing useful information and timeliness of financial statements is important for decisions of users of financial statements that enhances the economic value of information. Transparency of financial reporting reduces information asymmetry and reduces the spread of rumors about the health and financial performance of the company. It helps users predict future corporate events or confirm and correct expectations [23]. Low transparency of financial information provides conditions that make it difficult for investors to make decisions and make them face uncertainty and investors and creditors demand more and more transparent information about performance of the company. As companies become more transparent and consistent in their financial statements, uncertainty about intrinsic value of information is reduced. Companies that are financially healthy have greater transparency of financial information [24].

Roodposhti et al. [27] investigated the effect of disclosing critical accounting procedures on performance appraisal criteria and financial reporting quality. The disclosure of critical accounting procedures emphasizes the appropriate disclosure of accounting estimates in the accompanying notes to the financial statements. Four items of critical accounting items were selected including revenue recognition, inventory, storage of doubtful receivables and depreciation expense; all listed companies in the Tehran Stock Exchange were considered as statistical population to assess the effect of their critical disclosure. Wilcoxon test was used to test the hypotheses due to the use of qualitative data. The results showed that performance appraisal criteria increased in the years when critical disclosure was made, but quality of financial reporting did not change significantly. In short, to ensure financial health of the company, financial statements of that company should be analyzed. Financial ratios are one of the important tools in predicting the stoppage of operations and financial crises of the companies. Financial statement analysis requires tools and techniques that enable analysts to examine current and past financial statements, so that the performance and financial position of a company can be assessed and probability of future and potential risks can be estimated [28]. Bushman et al. [4], using ratios analysis to identify financial stability, pointed to some of financial ratios affecting financial stability in terms of profitability ratios (gross profit margin, operating profit margin, asset return rate, equity return rate), liquidity ratios (current ratio and rapid ratio), debt ratios (debt ratio and interest coverage ratio) and activity ratios (average period of inventory turnover receivables and total assets turnover ratio). In another study, Kritsonis et al. [18] recognized that future financial health of a firm and concluded that deviations in financial ratios could affect balance and financial health of firms. In this regard, the first hypothesis is presented as follows:

H 1: There is a significant relationship between financial reporting transparency and financial health.

The type of industry has been identified by empirical and theoretical researchers as a factor influencing profitability and ultimately corporate financial reporting. Newton [28] states that data such as type of industry is expected to affect anomalous future profitability. Porter [21] believes that the type of industry is influential in determining the competitive laws of companies and the policies that are available to the company. He argues about the effect of the type of industry on profit that competition in the industry continuously works to reduce the rate of return on investment to rate of competitive return. Therefore, different industries will have different effects on sustainability of anomalous profits. Accordingly, the second hypothesis of the study is as follows:

H 2: The industry type moderates the relationship between financial reporting transparency and financial health.

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3 Research Methodology

3.1 Research Pattern

This was an applied research; the research method was correlation in nature and content. The framework used was deductive-inductive arguments. The literature was reviewed by archival studies, papers and websites comparatively and by data collection to test the hypotheses inductively. Multivariate linear regression models were used to test the hypotheses. Statistical tests and analyses were conducted by Eviews10. The model testing the first hypothesis is:

H_1: $FH_{i,t}$= β0+β1TRFi,t+β2SGRi,t+β3SIZEi,t+β4LEVi,t+Ɛi,t

The model testing the second hypothesis is:

H_2:$FH_{i,t}$=β0+β1TRFi,t+β2INDUSi,t+β3(TRFi,t*INDUSi,t)+β4SGRi,t+β5SIZEi,t+β6LEVi,t+Ɛi,t

where, FH denotes financial health; TRF denotes financial reporting transparency; INDUS denotes industry type; SGR denotes sales growth rate (current year sales – last year sales / last year sales); SIZE denotes firm size (total asset logarithm); LEV denotes financial leverage (total debt / total assets).

3.2 Transparency of Financial Reporting (TRF)

To measure transparency of financial reporting based on literature (Pervan and Bartulović [28]; Mashayekh et al. [31]), linear combination of three criteria (lack of income smoothing, profit predictability and accrual quality) was used. The calculated value of financial reporting variable was subdivided into 9 deciles by calculating the deciles, indicating the varying levels of financial reporting transparency. Then, 9 deciles were considered as codes 1 to 9; for scores of 1 to 5, financial reporting transparency was poor and financial reporting transparency was better for scores of 6 to 9. Three criteria (lack of income smoothing, profit predictability and accruals quality), were used to measure financial reporting transparency [26-27].

3.2.1 Lack of income smoothing

One form of profit management is profit smoothing, which suggests that management deliberately manipulates items, particularly profit, in order to reduce profit fluctuations around the level that would seem normal for the company. According to scientific literature, this management action leads to a decrease in level of financial reporting transparency [26]. Therefore, lack of profit smoothing leads to greater financial reporting transparency. First, accruals were determined according to equation 1; then, lack of profit smoothing was measured for any company per year based on the relationship between changes in accruals and changes in cash flows, according to equation 2. Accordingly, the greater the accounting profit smoothing, the lower the usefulness of accounting information as well as financial reporting transparency, in particular accounting profits [27].

$$Acc_{it} = (\Delta CA_{it} - \Delta cash_{it}) - (\Delta CL_{it} - \Delta STD_{it}) - Dep_{it} + \varepsilon_{i,t} \quad (1)$$

where, Acc represents accruals; ΔCA represents variations in current assets, $\Delta cash$ represents variations in cash balance, ΔCL represents variations in current debt, ΔSTD represents variations in short-term financial facilities received, and Dep represents depreciation expense of fixed assets. Note that the index it of each expression indicates that the information is for company i at time t.

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$$\Delta Acc_{it} = a_0 + a_1 \Delta CFO_{it} + \varepsilon_{it} \quad (2)$$

Where, ΔAcc represents variations in accruals; ΔCFO represents variations in operational cash flow and a_1 is a parameter of accounting profit smoothing.

3.2.2 Profit predictability

Auto-regression model was used to measure accounting profit predictability [27]. In this model, standard deviation of residual errors of the model indicates predictability of firm profit. Accordingly, the lower the standard deviation of the residual errors, the greater the predictability of accounting profits.

$$E_t = a_0 + a_1 E_{t-1} + \varepsilon_t \quad (3)$$

Where, E_t indicates net profit of the company at time t, E_{t-1} indicates net profit of the company at time t-1 and ε indicates residual error.

3.2.3 Accruals quality

To measure quality of accruals, the model of Francis et al. [33] was used to relate working capital accruals to cash flows from past, current and future operations. This model is shown in equation (4).

$$Acc_{it} = a_0 + a_1 CFO_{t-1} + a_2 CFO_t + a_3 CFO_{t+1} + a_4 \Delta Rev_t + a_5 PPE_t + \varepsilon_t \quad (4)$$

Where, Acc represents accruals, CFO represents operating cash flow, ΔRev represents variations in earnings, PPE represents assets, machinery and equipment of the company. The model error in fitting accruals to cash flows means the lack of relationship of part of accruals to cash flows. Therefore, standard deviation of these errors is considered as a parameter to measure transparency of accrual profit.

3.2.4 Composite financial reporting transparency index

To calculate the reporting transparency based on linear composition, the variables (lack of profit smoothing, profit predictability and accrual quality) were used. The calculated value of financial reporting was subdivided into 9 deciles by calculating the deciles, which represent the varying levels of financial reporting transparency. Then, 9 deciles divided were considered as codes 1 through 9; scores of 1 to 5 for poor financial reporting transparency and 6 to 9 for better financial reporting transparency.

3.3 Financial Health

To identify and analyze the financial health of companies, financial and non-financial statements of Taqavi and Pourali [6] models were used, which included 5 general statements and 15 financial and non-financial variables. A financial health model based on financial ratios and financial stability conditions could be selected. Liquidity status, performance activity status, leverage status, market value, and value creation were obtained by using fuzzy neural networks of prediction model by the obtained performance level and based on performance scores of financial health of companies.

1) Liquidity status; 2) Asset management; 3) Leverage; 4) Stock market value; 5) Value creation

1.1) Net working capital to total assets, current and immediate ratio

2.2) Ratio of total assets turnover, accounts receivable turnover, inventory turnover period and average receivables period

3.3) Debt ratio, debt to equity ratio and interest cost coverage

4.4) Market price per share and market price per book value

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5.5) Economic value added, market value added and cash value added

Corporate financial stability decision is based on the extent of financial health through understanding prediction model of financial inability. New studies on ANN based on financial ratios suggest that ANNs are powerful tools for recognition and categorization based on intelligent model because of their nonlinear, nonparametric, and adaptive learning features. The advantage of financial stability models over other econometric and time series models is that models do not require specific statistical assumptions about the behavior of variables such as probability distribution function. This study used multi-layered feed forward neural network (MFNN). FNN with a hidden layer of logistic activation function in the hidden layer, linear activation function in the output layer and sufficient number of neurons in the hidden layer can approximate any financial function (Fig 1.).

X_1: liquidity status

X_2: activity and asset management status

X_3: leverage and debt management status

X_4: stock market value status

X_5: value creation status

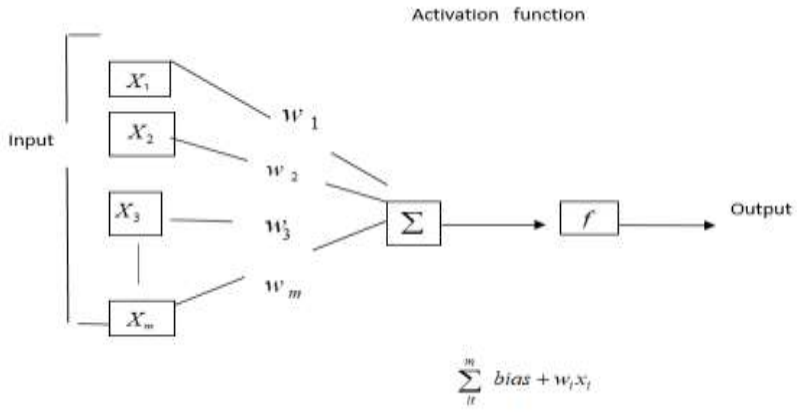


Fig. 1: Schema of multi-layered feed forward neural network

Financial health of companies could be predicted by MFNN based on learning algorithm in recognizing financial rations and continued financial stability.

$$FH(Z) = F(x_1, x_2, \dots, x_7) \tag{5}$$

3.4 Type of Industry (INDUS)

To further explore the relationships of variables, industry type has generally been used by researchers as a moderating factor. In this study, the researchers used industry factor as a moderating variable. For this purpose, the entire statistical population is divided into 5 industries.

Table 1: Type of Industry

Industry	**Type of industry (No.)**	**Number of firms**
Automotive and auto parts	1	21
Cement, lime and plaster	3	17
Basic metals	5	9
Chemicals	4	13
Pharmaceutical materials and products	2	19
Sum		79

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3.5 Composite Index of Financial Reporting Transparency

Because it is not clear in the accounting literature which of the dimensions of profit transparency plays a more important role, with the development of Biddle and Hilary [34] method, and with the idea of Verdi [35] and Teruel and Solano [36], after calculating the figures of each of the dimensions of profit transparency in this research, ie profit conservatism, non-smoothing of profit, profit predictability and quality of accruals (Given the theoretical underpinnings and the use of the aforementioned models), these dimensions were placed in a composite index. The method of combining these cases was that first the values obtained from each of the dimensions of profit transparency were divided into 5 categories (20% classes - Panjak). After that, the smallest figures (the first five), each of the values of the conservative indicators, the quality of the accruals and the predictability of the number 5, the second five of the number 4 and the first five of the number 1 were assigned. Because smaller amounts of each of the predicted models reflect a higher rate of profit transparency.

Unlike the three dimensions mentioned above, because smaller values (first five), number 1, second five, number 2, and fifth, number 5, were assigned. Finally, after encoding each of the values as mentioned, it was possible to combine them into one index. The sum of the codes assigned to each company will indicate the transparency of the company's profits. Obviously, the largest sum obtained can be a maximum of 20 (4×5) and a minimum of 5 (1×5). In other words, the number 20 indicates the highest level of profit transparency and the number 5 indicates the lowest level of profit transparency for each company. To calculate the reporting transparency variable based on the linear combination of profit variables, profitability predictability and quality of accruals have been used. The calculated value of the financial reporting variable is divided into 9 deciles by calculating the deciles, which shows the variables' levels of financial reporting transparency. Then, 9 divided deciles are considered as codes 1 to 9 and based on the amount of points 1 to 5, financial reporting transparency is poor and 6 to 9 financial reporting transparency is considered better. To measure transparency of financial reporting based on literature, linear combination of three criteria (lack of income smoothing, profit predictability and accrual quality) was used. The calculated value of financial reporting was subdivided into 9 deciles by calculating the deciles, indicating the varying levels of financial reporting transparency. Then, 9 deciles were considered as codes 1 to 9; for scores of 1 to 5, financial reporting transparency was poor and financial reporting transparency was better for scores of 6 to 9.

Table 2: Composite Index

Industry	**High Transparency**	**Low Transparency**	**High + Low Transparency**	**High Transparency Ratio**	**Low Transparency Ratio**
Automtive and the production of parts	135	117	252	0.535714	0.464286
Cement, Lime, and Plaster	74	129	203	0.364532	0.635468
Basic Metals	55	52	107	0.514019	0.485981
Chemical Products	73	82	155	0.470968	0.529068
Pharmaceutical Products	56	47	103	0.543689	0.456311

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3.6 Control variables

In this study, three variables (sales growth rate, firm size and financial leverage) are used as control variables, which are calculated as follows.
SGR = Sales Growth Rate (Current Year Sales - Last Year Sales / Last Year Sales)
SIZE = Firm Size (Total Asset Logarithm)
LEV = Financial Leverage (Total Debt / Total Assets)

3.7 Population and Statistical Sample

The statistical population included all companies listed in Tehran Stock Exchange during 2005-2016. Due to large size of the statistical population and heterogeneity among members of the population, the following conditions were set for selecting statistical sample and hence the statistical sample was selected by systematic elimination. The conditions are as follows:

1. Their financial year ends in March 19;
2. They are listed in TSE before 2005;
3. In order to increase comparability of the selected samples, their activity is production and investment companies are not selected as sample because of their differences in activity.
4. They have no change in activity during the considered financial years.
5. All of their financial statements are submitted to TSE during 2005-2016.

Finally, 79 companies were selected among 5 industries (automotive, cement, lime and plaster, basic metals, chemicals and pharmaceuticals).

4 Estimation and Analysis of Results

4.1 Descriptive Statistics of Data

Table 3 lists descriptive statistics of data related to the variables used.

4.2 Statistical Tests

4.2.1 Normality of Dependent Variable

Before estimating the mode, normality of dependent variable should be tested; in this study, dependent variable was financial health (FH), which was tested by Jarque-Bera statistic. As shown in Table 4, since JB>5% for the dependent variable, the null hypothesis of normal distribution of the variable is confirmed.

4.2.2 Stationarity Test of Variables

Before estimating the model, it is necessary to check stationary (reliability) of the variables. A variable is stationary when its mean, variance, and autocorrelation coefficients remain constant over time. In the present study, Dickey Fuller test was used to determine stationarity of variables. If absolute value of the statistic is greater than critical value at all significance levels, the variable is stationary at all levels. Stationary of variables in this study based on the Dickey Fuller test are shown in the Table 5.

All variables studied had no stationary difference according to the Dickey-Fuller test. The variable is stationary if significance level of the stationarity test is lower than 0.05. To have a stationary variable, absolute value of the corresponding test statistic must be greater than 2, as shown in the table above.

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Table 3: descriptive statistics of variables

Variable	Symbol	Mean	Median	Max	Min	Std.	Skewness	Kurtosis	Observations (n)
Financial health	FH	0.000000015 1	0.000	3.07	-3.07	0.994	-0.000000278	2.898	948
Financial reporting transparency	TFR	7.147	7.000	10.00	4.00	1.422	0.021	2.585	948
Industry	INDUSTRY	2.898	3.00	5.00	1.000	1.548	0.128	1.486	948
Industry in financial reporting transparency	INDUSTRY*TFR	20.29	20.00	50.00	4.000	10.89	0.297	2.034	948
Sales growth	SGR	0.202	0.162	5.21	-0.736	0.430	0.205	2.153	948
Firm size	SIZE	14.06	13.84	19.15	11.08	1.475	0.864	3.838	948
Leverage	LEV	0.382	0.372	0.595	0.074	0.113	0.059	1.955	948

Table 4: Jarque-Bera test

variable	**financial health**
Jarque-Bera	0.407618
Probability	0.815618

Table 5: stationary test of variables

Variable	Stationarity test	Order of difference	Value	Sig.	Stationary/non-stationary
FH	Dickey-Fuller	No difference	-10.67465	0.0000	Stationary I(0)
TFR	Dickey-Fuller	No difference	-11.00635	0.000	Stationary I(0)
Industry	Dickey-Fuller	No difference	-3.549951	0.0070	Stationary I(0)
TFR*Industry	Dickey-Fuller	No difference	-7.253133	0.0000	Stationary I(0)
Sales growth	Dickey-Fuller	No difference	-34.01529	0.0000	Stationary I(0)
Firm size	Dickey-Fuller	No difference	-8.082093	0.0000	Stationary I(0)
Leverage	Dickey-Fuller	No difference	-20.75302	0.0000	Stationary I(0)

4.2.3 Testing Classic Assumptions of Linear Regression Model

Each regression model must have specific assumptions; relying on statistical results without considering assumptions of the regression model is not valid and cannot be used for decision making. Therefore, before making any interpretation of regression results, one must examine the model assumptions to confirm the results (Table 6). Multiple colinearity intensity can be analyzed by examining the magnitude of vif value. Since vif value for each of the variables is less than 10, there is no correlation between independent variables. One of the most important classical assumptions in regression analysis is homogeneity of error variance distribution. If this assumption is violated, disturbance components will have heterogeneity of variance.

If variance homogeneity condition is not met, estimators of ordinary least squares will not have the efficiency (least variance) feature. This causes the confidence interval to be exceeded, and t and F tests are likely to give false results. White test was used in this study to estimate variance homogeneity in order to avoid variance heterogeneity when estimating the model.

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Table 6: Testing classic assumptions of linear regression model

Colinearity	Variable	Financial reporting transparency	Industry type	Sales growth	Firm size	Leverage
	VIF	5.927215	6.705419	1.006016	1.217262	1.029006
Homogeneity of variance	Model	Null hypothesis	White Statistics	P-value	Result	
	1	Null hypothesis that homogeneity of variance of errors is confirmed	1.650015	0.0609	Confirmed	
	2		2.081082	0.0013	Rejected	
Autocorrelation	Model	Null hypothesis	F-value/ Breusch-Pagan	P-value	Result	
	1	No autocorrelation	338.3517	0/0000	Rejected	
	2		305.0444	0/0000	Rejected	
Normality of error terms	Hypothesis	Skewness	Kurtosis	Value	P-value	Result
	1	-0.811937	6.157496	493.7643	0.00000	Rejected
	2	-0.573992	4.293216	117.1191	0.00000	Rejected

Another important classical assumption of linear regression is that there are no serial correlations or autocorrelations between disturbance components that are included in the regression function. Self-correlation is the correlation between observational series members that are lined in tome as time series data or place as cross-sectional data or simply disturbance component of a regression model should not be influenced by disturbance component of another model. Autocorrelation occurs when Errors are related. In order to determine the presence or absence of autocorrelation of error terms, LM serial autocorrelation test was used to detect the presence or absence of autocorrelation. EGLS method is used to resolve the problem of heterogeneity or autocorrelation. One of the most commonly used tests for normality is Jarque-Bera (JB) test. The test statistic follows a $\chi 2$ distribution with a degree of freedom 2 with a null hypothesis that distribution of errors is normal. This means that p-value given for normality test must be greater than 0.05 in order not to reject the null hypothesis at 5% level. According to results of this test in the table above, it shows that the above hypothesis is rejected and disturbance terms do not have normal distribution; however, violating the above assumption does not have much effect on regression estimation, because the central limit proposition is that when observations in the statistical population are greater than 30, non-normality of error terms has little effect on estimation and it can be ignored.

4.3 Model Estimation

4.3.1 F-Limer Test and Husman Test

In the present study, the noted models are estimated using panel data (year-firm) of 79 companies listed in Tehran Stock Exchange. Therefore, before estimating the model using composite data, it is necessary to decide on appropriate method of applying such data for estimation. It must first be determined whether there is a need to consider structure of panel data (firm-specific differences or effects) or that it is possible to combine data from different firms and use it in estimating the model. In single-equation estimates, F-test statistic is used to make the final decision. Based on results of this test, decisions are made to test hypothesis of equality of firm-specific fixed effects and ultimately on choice of classical method or panel data method (Table 7).

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Table 7: F-Limer Test and Hausman Test Results

F-test	Model	H0	F-value	p-value	Result
	1	Pooling method is appropriate.	8.743889	0.0000	H0 rejected (panel data method is selected)
	2		8.546116	0.0000	H0 rejected (panel data method is selected)
Hausman test	Model	H0	$\chi 2$	p-value	Result
	1	Random effects model is appropriate.	15.65875	0.0000	H0 rejected (fixed effects method is selected)
	2		26.415868	0.0000	H0 rejected (fixed effects method is selected)

4.3.2 Hypothesis Testing Results

In Table 8 lists the results of estimating the first model. Hypothesis 1 claims that there is a significant relationship between financial reporting transparency and financial health.

Table 8: statistical results of testing the first model (dependent variable: financial health)

Variable	Coefficients	Std.	t-value	Sig.	Type and sig. (5% error)
TFR	0.076043	0.018086	4.204482	0.0000	Positive and significant
SGR	0.126807	0.054304	2.335108	0.0198	Positive and significant
SIZE	0.435495	0.017934	24.28291	0.0000	Positive and significant
LEV	0.334912	0.202585	1.653194	0.0986	No relationship
C	-5.730480	0.241777	-23.70149	0.0000	-
F-value	62.00301 (0.000000)	Durbin-Watson		1.889165	
R2	0.501630	Adjusted R2		0.493540	

Table 9: statistical results of testing the second model (dependent variable: financial health)

Variable	Coefficients	Std.	t-value	Sig.	Type and sig. (5% error)
TFR	0.210547	0.038847	5.419941	0.0000	Positive and significant
INDUSTRY	0.263707	0.080120	3.291412	0.0010	Positive and significant
INDUSTRY*TFR	0.048490	0.011374	4.263152	0.0000	Positive and significant
SGR	0.102400	0.053198	1.924879	0.0546	Positive and significant
SIZE	0.454394	0.017852	25.45360	0.0000	Positive and significant
LEV	0.271278	0.199979	1.356535	0.1753	No relationship
C	-5.225241	0.331536	-15.76072	0.0000	-
F-value	2.865172 (0.001169)	Durbin-Watson		1.914007	
R2	0.429185	Adjusted R2		0.418528	

As F-value<0.05 (0.000000), significance of the model as a whole is confirmed at 95% confidence. In the second model, d=1.889165 shows no consecutive correlation between residuals. R2=0.501630 and adjusted R2=0.493540 indicates that 49% of financial health is explained by independent and control variables. In the following, the hypothesis is tested:

The first hypothesis claims that there is a relationship between financial reporting transparency and financial health. As shown in the table, the estimated coefficient (0.076043) and t-value (4.204482) of financial reporting transparency (TFR) are positive and significant (0.0000). Therefore, the results obtained for the first hypothesis are confirmed at 5% error level. Based on these results, there is a positive

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and significant relationship between transparency of financial reporting and financial health, and a positive and significant relationship between growth and firm size and financial health and no relationship between leverage and financial health. Table 9 lists the results of estimating the second model.
Hypothesis 2 claims that industry type is effective on the relationship between transparency of financial reporting and financial health.
As F-value<0.05 (0.0.001169), significance of the model as a whole is confirmed at 95% confidence. In the second model, d=1.914007 shows no consecutive correlation between residuals. R2=0.439185 and adjusted R2=0.418528 indicates that 41% of financial health is explained by independent and control variables. In the following, the hypothesis is tested:
The second hypothesis claims that industry type is effective on the relationship between financial reporting transparency and financial health. As shown in the table, the estimated coefficient (0.048490) and t-value (4.263152) of industry type in financial reporting transparency (TFR*INDUSTRY) are positive and significant (0.0000). Therefore, the results obtained for the second hypothesis are confirmed at 5% error level. Based on these results, industry type has a positive and significant effect on the relationship between transparency of financial reporting and financial health, and there is a positive and significant relationship between growth and firm size and financial health, while there is no relationship between leverage and financial health.

5 Summary and Recommendations

Due to the role of financial markets as well as the importance of financial reporting transparency in these markets is recommended. In future research, researchers will look at motivational factors and barriers to increasing financial reporting transparency in accounting. Such a study would certainly be of great value and importance to investors and standardizers. One similar study by Pervan and Bartulović [28], which conducted a study on the effect of transparency on the relevance of the value of accounting information among Croatian Stock Exchange companies, showed that companies related to the value of accounting information The higher they are, the higher the transparency of their financial reporting. This research can provide a good topic for researchers interested in both areas of reporting transparency or the relevance of the value of accounting information to examine the different levels of transparency among companies listed on the Tehran Stock Exchange. This study examined the relationship between transparency of financial reporting and financial health of companies. The results showed that there is a direct and significant relationship between financial reporting transparency and financial health. In other words, the more financial reporting companies have transparency, the better they possess financial health. The traditional financial reporting system does not fully meet the information needs of all users. Therefore, users try to use financial reporting transparency as a substitute for financial health. Incomplete disclosure of information by companies causes uncertainty among stakeholders. Uncertainty results in increasing the information risk of investors and creditors.

Therefore, they demand a higher rate of return on the employed capital. Higher rate of return will increase the cost of capital of the company, reducing the stock market price. The findings also showed that industry type moderates the relationship between financial reporting transparency and financial health. In other words, the relationship of financial reporting transparency with financial health is high in automotive and auto part industry, basic metals, chemicals, cement, lime and plaster, and pharmaceuticals, respectively. Stakeholders and all shareholders tend to invest in companies where financial reporting transparency components have significant effect on and relationship with financial health and

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lack profit smoothing that avoids bankruptcy and financial failure, profit predictability to maintain financial strength for repayment of liabilities and profitability as well as accruals quality on qualitative nature of accounting information (relevance and reliability). By investing in those companies that provide greater transparency of financial reporting and increase attractiveness and investor trust, increase investment efficiency and value creation and social justice, corporate performance and profitability (financial health) will ultimately be increased. According to results of hypothesis testing, the following practical suggestions are presented:

Given the results of the first hypothesis, the greater the transparency of financial reporting, the greater the financial health in the sense of continued activity and profitability. Investors are therefore encouraged to invest in companies that are more transparent about financial reporting; because greater financial reporting transparency reduces investment ambiguity and thus increases the efficiency of their investments. On the other hand, by investing in companies that have greater financial reporting transparency, their business continuity and profitability will be greater. Consideration should also be given to firm size that has a positive effect on transparency of financial reporting and, consequently, on financial health. Considering the positive effect of industry type on the relationship between financial reporting transparency and financial health, investors are suggested to invest in the industries studied here. These industries are prioritized as follows: automotive and auto part, basic metals, chemicals, cement, lime and plaster, and pharmaceuticals, respectively. The results of this study can be used in formulation and adoption of financial health system regulations of the Tehran Stock Exchange. Companies can increase the transparency of their financial reporting due to the role of financial reporting transparency with financial health as it is effective in increasing profitability of the company and continuity of business activities. Future studies can:

1. Examine the relationship between social responsibility disclosure and financial health considering the theory of legitimacy
2. Examine the effect of auditing quality on the relationship between financial reporting transparency and financial health
3. Examine the effect of optional disclosure quality on financial health.
4. Conduct a similar study in a statistical population including investment, financial, insurance companies and compare the results with the current study.
5. Investigating the effect of financial reporting transparency on the relevance of value to other criteria in accounting literature

References

[1] Nielsen, C., Madsen, MT., *Discourses of transparency in the intellectual capital reporting debate: Moving from generic reporting models to management defined information*, Critical Perspectives on Accounting, 2009, **20**(7), P. 847-54. Doi: 10.1016/j.cpa.2008.09.007

[2] Roberts, J., *No one is perfect: The limits of transparency and an ethic for 'intelligent'accountability*, Accounting, Organizations and Society, 2009, **34**(8), P.957-70. Doi: 10.1016/j.aos.2009.04.005

[3] Kordestani, G., and Alavi, M., *The Effect of Accounting Profit Transparency on Equity Cost*, Journal of Stock Exchange, 2011, **3**(12). (In Persian).

[4] Bushman,R., Piotroski, J., and Smith, A.,*What Determines Corporate Transparency?* First draft, 2001. Doi: 10.2139/ssrn.428601

www.SID.ir

Archive of SID

[5] Cheung, YL., Jiang, P., Tan, W., *A transparency disclosure index measuring disclosures: Chinese listed companies*, Journal of Accounting and Public Policy, 2010, **29**(3), P. 259-80. Doi: 10.1016/j.jaccpubpol.2010.02.001

[6] Taqavi, M., Pourali, M., *Investigation and Analysis of Financial Ratios in Detection of Different Levels of Financial Health of Iranian Manufacturing Units*, Financial studies, 2010, **8**.(In Persian).

[7] Clapper, D. L., U.S. Patent No. 6,623,080. Washington, DC: U.S. Patent and Trademark Office, 2003.

[8] Bushman, RM., Piotroski, JD., Smith, AJ., *What determines corporate transparency?* Journal of accounting research, 2004, **42**(2), P. 207-52. Doi: 10.1111/j.1475-679x.2004.00136.x

[9] Sazilah, M.S., Syed, N.A., Kamaruzaman, J., Mazlifa, M., and Maisarah, A., *Income Statements Transparency and Firms' Characteristics of Companies Listed on the Bursa Malaysia*, American Journal of Applied Sciences, 2009, **6**(9), P. 1718-1724.(In Persian).

[10] Kolstad, I., Wiig, A., *Is transparency the key to reducing corruption in resource-rich countries?*World development, 2009, **37**(3), P. 521-32. Doi: 10.1016/j.worlddev.2008.07.002

[11] Barth, M.E., Schipper, K., *Financial reporting transparency*, Journal of Accounting, Auditing and Finance, 2008, **23**(2), P.173-190. Doi: 10.1177/0148558x0802300203

[12] Aksu, M., Kosedag, A., *Transparency and disclosure scores and their determinants in the Istanbul Stock Exchange*, Corporate Governance: An International Review, 2006, **14**(4), P.277-96. Doi: 10.1111/j.1467-8683.2006.00507.x

[13] Agah, M., Malekpoor, H., Bagheri, A., *Investigating the Effect of Financial Constraints and Different Levels of Agency Cost on Investment Efficiency*. Advances in Mathematical Finance and Applications, 2017, **2**(4), P. 31-47. Doi: 10.22034/amfa.2017.536264

[14] Brown, CA., Bacon, SP., *Achieving electric-acoustic benefit with a modulated tone*, Ear and hearing, 2009, **30**(5), P. 489. Doi: 10.1097/aud.0b013e3181ab2b87

[15] Vishwanath, T., Kaufmann, D., *Towards transparency in finance and governance*, Available at SSRN 258978, 1999, Doi: 10.2139/ssrn.258978

[16] Kaufmann, D., and Bellver, A., *Transparenting transparency: Initial empirics and policy applications,* Available at SSRN 808664. 2005, Doi: 10.2139/ssrn.808664

[17] Kramer, P., and Bressan, P., *Ignoring color in transparency perception*, Rivista di estetica, 2010, **43**, P. 147-159. Doi: 10.4000/estetica.1863

[18] Kritsonis, A., *Assessing a firm's future financial health*, International Journal of Scholarey Academic Interlectual Diversity, 2005, **9**(1), P. 2004-5. Doi: 10.1007/s12129-004-1044-z

[19] Pourali, M., *Developing a measurement and evaluation model of financial health in environmental conditions of Iran,* knowledge of investment, 2012, **2**(5), P. 179-206.(In Persian).

[20] Yousefi Asl, F., Molanazari, M., Soleimani Amiri, G., *Evaluation of the suggested financial reporting transparency model based on stock liquidity*, Accounting knowledge, 2016, P. 113-136. (In Persian).

www.SID.ir

Archive of SID

[21] Porter, M.E., *Capital choices: Changing the way America invests in industry*, Journal of Applied Corporate Finance, 1992, **5**(2), P. 4-16. Doi: 10.1111/j.1745-6622.1992.tb00485.x

[22] Courtis, JK., *Relationships between timeliness in corporate reporting and corporate attributes*, Accounting and Business Research, 1976, **7**(25), P. 45-56. Doi: 10.1080/00014788.1976.9729085

[23] Hemati, H., Kazemi, H., Rostami, Z., *Effect of corporate governance system mechanisms on financial performance and information transparency*, Applied research in financial reporting, 2013, **2**(2), P.123-148. (In Persian).

[24] Izadikhah, M. *Financial Assessment of Banks and Financial Institutes in Stock Exchange by Means of an Enhanced Two stage DEA Model*. Advances in Mathematical Finance and Applications, 2021, **6**(2), P. 207-232. Doi: 10.22034/amfa.2020.1910507.1491

[25] Izadinia, N., Fadavi, M.H., Amininia, M., *Investigating the Effect of Accounting Complexity and Transparency of Company Financial Reporting on Delay in Auditor Reporting*, Accounting knowledge, 2011, **54**, P. 87-110. (In Persian).

[26] Kordestani, G., Majdi, Z., *Investigating the Relationship between Qualitative Characteristics of Earnings and Cost of Equity*, Accounting and auditing studies, 2010, **14**(48), P. 85-104. (In Persian).

[27] Rahnamaye Roodposhti, F., Yaghubnejad, A., Nourifard, Y., Goudarzi, A., *Evaluating the effect of disclosure of critical accounting procedures on performance appraisal criteria and financial reporting quality*, Financial accounting studies, 2013, **5**(2), P. 73-92. (In Persian).

[28] Pervan, I., Bartulović, M., *Impact of transparency level on the value relevance of accounting information: empirical analysis for SEE countries*, International Journal of Mathematical Models and Methods in Applied Sciences, 2012, **6**(8), P. 955-62. Doi: 10.1080/1331677x.2014.947132

[29] Poordavoodi, A., Moazami Goudarzi, M.R., Haj Seyyed Javadi, H., Rahmani, A.M., Izadikhah, M., *Toward a More Accurate Web Service Selection Using Modified Interval DEA Models with Undesirable Outputs*, Computer Modeling in Engineering & Sciences, 2020, **123**(2), P. 525-570, Doi: 10.32604/cmes.2020.08854

[30] Rezaei, N., Elmi, Z., *Behavioral Finance Models and Behavioral Biases in Stock Price Forecasting*. Advances in Mathematical Finance and Applications, 2018, **3**(4), P. 67-82. Doi: 10.22034/amfa.2019.576127.1118

[31] Mashayekh, S., Nasiri, S., *Effect of financial reporting transparency on relevance of accounting profit value*, Empirical accounting studies, 2016, **5**(3), P.127-154. (In Persian).

[32] Newton, G. W., *Bankruptcy and insolvenvy accounting*, Practice and procedure, 2010, **1**(7), P. 4-21.

[33] Francis, J., LaFond, R., Olsson, P.M., and Schipper, K., *The market pricing of accruals quality*, Journal of Accounting and Economics, 2005, **39**, 295. Doi: 10.1016/j.jacceco.2004.06.003

[34] Biddle‹, G., Hilary, G., *Accounting Quality and Firm-Level Capital Investment*, The Accounting Review, 2006, **81**, P. 963-982.

[35] Verdi‹ R., *Financial Reporting Quality and Investment Efficiency*, M.I.T. Working Paper, 2006. Doi: 10.2139/ssrn.930922

[36] Teruel, P., Solano, J., *Accruals quality and corporate cash holdings*, Accounting and Finance, 2009, **49**, P.95–115. Doi:10.1111/j.1467-629X.2008.00276.x

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