



Research Paper

## **The Impact of Peer Performance on the Benford's Law and Cosmetic Earnings Management**

Majid Zanjirdar\*

*Department of Finance, Arak Branch, Islamic Azad University, Arak, Iran*

### ARTICLE INFO

#### *Article history:*

Received 2020-08-04

Accepted 2021-05-10

#### *Keywords:*

Benford's Law

Cosmetic Earnings

Management (CEM)

Peer Performance

### ABSTRACT

The present study aimed to assess the impact of peer performance on the Benford's law and cosmetic earnings management (CEM) by a related party among declining and strong companies. The sample population included all the companies that were involved in Tehran Stock Exchange (TSE) during 2014-2018, and 114 companies were selected using the targeted method. This applied research was performed with a correlational design. Data were acquired from financial statements, balance sheets, and journal of security exchange. Data analysis was initially performed using variance heterogeneity pretests, F-Limer, Hausman, and Jarque-Bera test, and the multivariate regression test was used to confirm or reject the research hypotheses in the EViews software. The results indicated that the impact of peer performance on CEM, cosmetics sales management, and profit management by the related party differed between the declining and strong companies, which is consistent with the theory of agency costs.

## **1 Introduction**

According to the related domestic literature review, few studies have investigated the subject study so far; therefore, it is highly important to clarify this issue and contribute to the research subject by conducting investigations in Iran and bridging the research gap in this regard. Previous studies have proposed various solutions in this area. Most of the current studies regarding cosmetic earnings management (CEM) have emphasized on the identification of the unexpected accruals. A significant number of studies that have directly examined the CEM via actual activities have mainly targeted investment affairs, such as reducing the costs of research and development. Du and Shen [7] believe that the application of unexpected accruals expands concurrently with the performance of peers. It has also been confirmed by the previous surveys that when the company's earnings deviate from the industry's earnings, the inclination for earning manipulation increases among managers. Companies could manage such situations through the voluntary commitments of the peer performance criteria. Similarly, the voluntary commitments of companies are measured by deviating of the company's earnings from the average income. Lee has argued that the literature of the relative earnings performance (REP) evaluation is primarily focused on the industry REP or other solutions to compensate for loss management. Therefore, few studies have investigated whether investors make intra-industry comparisons for the

\* Corresponding author. Tel.:  
E-mail address: m-zanjirdar@iau.ac.ir

evaluation of earnings performance or in their evaluation-based decision-making. The present aimed to assess the impact of peer performance on the Benford's law and CEM by a related party among the declining and strong companies in Tehran Stock Exchange (TSE), using a solution to identify these components. It is expected that the status of the companies would moderate this impact. Statistics has been confirmed by the previous surveys that when the company's earnings deviate from the industry's earnings, the inclination for earning manipulation increases among managers. The central hypothesis of these studies suggests that a company earnings calendar evaluation is based on the performance level of the company and industry (peers); however, the literature of peer performance evaluation indicates the application of peer performance for decision-making regarding items such as cash flow forecasting and profitability [16]. The Benford's law is a substantial determinant of the accuracy of financial statements and helps to examine data rationality [24]. These insiders and related parties (e.g., controlling directors and shareholders) could enjoy personal earnings by exerting their influence on the company and exploiting the earnings of outsiders such as minority shareholders and creditors. However, the outsiders could take disciplinary action (e.g., changing managers) by identifying these exploits. Accordingly, the insiders are inclined to managing the reported earnings to conceal the actual performance of the company and subsequently masking the earnings of personal control from the outsiders [14]. Company performance is a contributing factor to earnings management. Since the evaluation of peer performance considers the common factors of industry and company, it must also take the peer performance concerning the earnings management into account. The investors could better evaluate a company's business strategies and management capabilities and anticipate profitability based on its specific performance. Therefore, peer performance could produce a timely signal on the position of a company relative to its peers. The companies that experience improvements in the peer performance evaluation are also expected to deliver more accurate operational reports and higher pricing [23]. Consequently, it is worthwhile to monitor peer performance in terms of the company's earnings since a more significant correlation between the company performance and industry indicates a more significant association between the perspective of the company and its counterparts. Accordingly, the shareholders are motivated to invest in companies with higher earnings [28]. In this study, a type of profit management called cosmetic profit management and a method to identify it in the reported profit and loss is introduced. Cosmetic profit management has been reported as a manipulation of profit or loss. The extent of manipulation in this type of profit management, although not significant, but due to its bias, has a significant impact on the value of the company and can mislead users of financial statements. Numerous studies in earnings management have used a model of accruals such as the Jones model and the modified Jones model, while others have shown that accrual models do not have sufficient resolution to distinguish earnings management. Despite significant advances in profit manipulation detection methods, these existing methods are still insufficient and have some limitations. Therefore, in this study, the effect of peer performance on Benford cosmetic management and profit management by affiliates will be investigated. This study consisted of the investors and shareholders who recognized the earning management of the company based on the results of this study. Our research is also a contribution to the current literature reviews and provides new empirical evidence to identify the earnings management and impact of peer performance on financial reporting, while establishing a platform for academic research, so that active stock exchange brokers and financial advisors could benefit from our findings. As such, we attempted to address the question of "How does peer performance impact the Benford's law and CEM by the related parties in declining and strong companies?"

---

## 2 Theoretical Fundamentals and Research Background

Earnings management is a principal theory used in the present study, which assumes the rise and fall of earnings in accordance with various management objectives and purposes. In fact, earnings management is performed by operational decision-making to achieve the desired earnings [17]. Another theory used in this research was reward management, which dictates that if managers are rewarded based on one of the performance criteria (e.g., accounting earnings), they will attempt to use the accounting methods that increase company earnings and their reward. The agency theory defines managers as the individuals who seek to maximize their interests, while their efforts may be interrupted due to conflicts of interest. Therefore, they shift their focus from the earnings of a company to real earnings management or accounting gain [23]. CEM is fulfilled when the unadjusted earnings account is slightly less than the user's desired amount and management attempts to increase it to the desired level [5]. If the numbers in the financial statements are regarded as a set of intertwined figures with each representing one or more financial flows, any manipulation in the company's financial flows will ultimately affect its representative number in the financial statements, altering the distribution of the figures in the basic financial statements as a set of numbers [12]. Based on the several theories and extensive evidence, the poor earnings management performance of companies is due to the opportunistic nature of the company's personnel [13,16,18]. The insiders and related parties (e.g., controlling directors and shareholders) could enjoy personal earnings by exerting their influence on the company and exploiting the earnings of the outsiders (e.g., minority shareholders and creditors). Accordingly, the insiders are inclined to managing the reported earnings to conceal the actual performance of the company and subsequently masking the earnings of personal control from the outsiders. In this regard, Kimbrough and Wang believe that a good performance report by managers is more likely to be attributed to external factors than their professional characteristics and abilities. A company's higher earnings in the market will reduce its incentives for earnings management [14]. Arjang et al have argued that political communication positively affects earnings management through transactions with the related parties [2]. Furthermore, Ebrahimi et al. have evaluated the effects of average stock market return, expected growth rate, profitability, and asset structure of peer companies on the earnings management strategy by Markov chain Monte Carlo and Bayesian hierarchical modelling, discovering that only the expected growth rate variable positively affected the investment management strategy and the t-distribution had the lowest deviation criterion. Similarly, Nemati investigated the role of audit quality in the correlation between the related party transactions and earnings management, confirming a significant correlation between the related party transactions and real earnings management [20]. The study by Sadeghi Panah et al. indicated significant, negative correlations between earnings management and financial leverage with the company's performance in the basic metals industry of TSE [25]. In addition, earnings management was reported to influence the financial leverage and the company's performance as a moderator. Hashemi and Hariri identified and anticipated the financial frauds based on the degree of compliance and deviation of financial statements from the Banford's law, confirming that the distribution of the financial statement figures matched the Benford's law [10]. On the other hand, Hassani and Shafikhani rejected the existence of rounding in the net profit figures of financial statements, arguing that the frequency of the figures in the company's reports of loss and earnings listed in the TSE complied

with the Benford's law distribution [11]. In addition, Sarlak and Akbari reported a positive and significant correlation between the related party transactions and earnings management [27]. Roozbahani and Yazdi in this research, they have tried to investigate the effect of successive news of distributed profits, negative adjustment and late announcement of an adjustment on the market reaction process in Iran [32]. What is summarized in the overall conclusion of the test of research hypotheses is that the successive news of distributed profits has an effect on the market reaction process; moreover, negative adjustment has a negative impact in the forecast of earnings per share and late announcement of the adjustment of the earnings per share on the market reaction process. Finally, the results indicated that the market's negative reaction to the late negative adjustment of the earnings per share forecasting is not lower than timely negative adjustment of earnings per share forecasting, and the positive reaction of the market to adjust the timely positive or zero forecast of earning per share, compared to adjusting the late positive or zero forecast of earnings per share is also no greater [32]. Several studies, such as the research conducted by Du and Shen [7], have investigated the impact of peer performance on earnings management in the stock market. According to the findings, peer performance directly affects the application of accrual items [24]. In this regard, Lee (2017) suggested that companies with more substantial REP could attract better industrial opportunities in the future [17]. Lin et al also investigated whether the board of directors imposes more revenue as a 'fat cat'[19]. The Benford's law argues that the companies that are managed by the fat cats imposing more manipulations compared to other firms; it was also revealed that these companies continue to operate and use a particular share of earnings management. [17] Legislators and investors must examine the appropriateness of the quality of the financial statements created by the listed companies. Papanikolaou investigated the application of the Benford's law as a tool for the detection of fraudulent banking practices, and the obtained results indicated that the financial information of the basic financial statements of banks is a good indicator of accounting distortions one year before the financial scandal. [20] In a diagnostic study of CEM based on the Benford's law conducted by Jordan and Stanley, the existence of CEM before the implementation of the Benford's law was confirmed. Furthermore, Kuan et al. [17] evaluated the correlation of the related party transactions with earnings management, proposing no significant evidence in this regard. Nigrini and Miller, also diagnosed financial data using the second-order tests of the Banford's law, claiming that the analysis method could be useful in identifying the unusual transactions, events, and trends that are often neglected by the other analytical audit methods [21]. Ramzi was able to indicate direct and negative correlations among a weak REP, industry, and discretionary accruals, as well as a negative association between discretionary accruals, while the REP was reported to be a critical factor that influenced the accounting performance of managers. [23]. In addition, Gordon and Henry assessed the correlation between earnings management and the related party transactions, reporting positive correlations among the discretionary accruals and some related party transactions. [9] Gao et al [33] Institutional investors, real earnings management and cost of equity. This paper investigates the association between real earnings management and the cost of equity from the perspective of the heterogeneity of institutional investors. Based on a sample of publicly listed high-tech firms in China from 2008 to 2017, our empirical results suggest that there is a significant negative correlation between earnings management and the cost of equity capital. This finding is contrary to previous conclusion, indicating

that, in China, real earnings management cannot be effectively identified by external investors, and the company could easily obtain financing from the capital market and reduce its cost of equity due to its masked excellent performance by manipulating the real earnings management. Furthermore, we find that compared with transient institutional investors, stable institutional investors with the intention of holding the stock for the long-term can effectively reduce the cost of equity. Our results also show that real earnings management under the supervision of stable institutional investors could be more easily identified by shareholders and stable institutional investors could diminish the impact of earnings management on the cost of equity [33]. Zanjirdar and et al indicate that sales and general administration cost (SGA) as well as the costs of sold goods strongly have sticky behaviors [34]. Another experimental result of study has shown that generally, there is a positive relationship between economic and accounting performance indexes and dividend policy, and that accounting performance indicators also have more explanatory power than economic performance indicators in predicting dividend in Iranian capital market [35].

### 3 Research Hypotheses

#### First Hypothesis

The impact of peer performance on the CEM is more substantial in declining companies compared to strong firms.

#### Second Hypothesis

The impact of peer performance on the cosmetics sales management is more substantial in declining companies compared to strong firms.

#### Third Hypothesis

The impact of peer performance on the related party earnings management is more substantial in strong firms compared to decline companies.

### 4 Methodology

This applied-descriptive research was conducted with a correlational methodology. Data were collected using the library research method and references to financial statements, balance sheets, and Bourse Magazine. Data description and summarization were carried out using descriptive and inferential statistics. Data were initially analyzed using the variance heterogeneity pretests, F-Limer, Hausman, and Jarque-Bera test. In addition, the multivariate regression test was used to confirm or reject the research hypotheses in the EViews software. The sample population included all the companies that were involved in the TSE during 2014-2018, and 120 companies were selected as the sample using the targeted method. The samples were homogenized based on the standards presented in Table 1 and reviewed after screening.

**Table 1:** Different Sample Populations

Companies involved in TSE until the End of 2018	532
Companies uninvolved in TSE during 2014-2018	120
Companies whose fiscal years did not end in March	78
Companies that changed their fiscal year during the study period	30
Companies whose shares were not traded at least once a year	34
Investment firms, banks, and insurance companies	108
Companies whose data were collected (final sample population)	162

In total, 144 companies were selected to calculate the sample size using the Cochran formula, as follows:

$$n = \frac{162 \times 1.96^2 \cdot .5 / 2 \times .5^2}{(162 - 1) \cdot 0.05^2 + 1.96^2 \cdot .5 \times .5^2} = 114$$

Each variable was assigned 700 data per year to examine the statistical hypotheses of the study. The research hypotheses were evaluated by separately estimating the models at two levels for declining and strong companies, and the obtained results were compared. The following formula was used to calculate the first hypothesis:

$$\begin{aligned} \text{ROUNDING\_EARN}_{it} &= \alpha + \beta_1 \text{Pshock}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{MTB}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{ROA}_{it} + \\ &\beta_6 \text{Asset Growth Rate}_{it} + \varepsilon_{it} \\ H_0: \beta_1 &\leq \beta_1^* \\ H_1: \beta_1 &> \beta_1^* \end{aligned} \tag{1}$$

The following formula was used to calculate the second hypothesis:

$$\begin{aligned} \text{ROUNDING\_SALE}_{it} &= \alpha + \beta_1 \text{Pshock}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{MTB}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{ROA}_{it} + \\ &\beta_6 \text{Asset Growth Rate}_{it} + \varepsilon_{it} \\ H_0: \beta_1 &\leq \beta_1^* \\ H_1: \beta_1 &> \beta_1^* \end{aligned} \tag{2}$$

The following formula was used to calculate the third hypothesis:

$$\begin{aligned} \text{ABN RPT}_{it} &= \alpha + \beta_1 \text{Pshock}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{MTB}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{ROA}_{it} + \\ &\beta_6 \text{Asset Growth Rate}_{it} + \varepsilon_{it} \\ H_0: \beta_1 &\leq \beta_1^* \\ H_1: \beta_1 &< \beta_1^* \end{aligned} \tag{3}$$

The variables of the mentioned formula as were as follows:

ROUNDING\_EARN<sub>it</sub>: the virtual variable for the CEM reports by the companies based on the Benford's law;

ROUNDING\_SALE<sub>it</sub>: the virtual variable for the cosmetics sales management reports by the companies based on the Benford's law;

ABN RPT: the abnormal related party transactions;

Pshock: peer performance;

Leverage: the financial leverage;

MTB: the market-to-book ratio;

Size: the company size;

ROA: return on assets;

Asset growth rate

Each of the variables has been explained in the following section:

A. The virtual variable for the CEM reports by the companies based on the Benford's law;

B. The virtual variable for the cosmetics sales management reports by the companies based on the Benford's law.

The present study aimed to determine whether the actual distributions differed from the expected distribution of the Benford's law and these deviations are random or significant. The analysis of the actual and expected deviation of each of the zero-to-nine numbers was performed using the Z-test, which is in line with the study by Thomas [31]. The Z-test could be calculated using the following formula (4):

$$Z_{SD} = \frac{f_{sd}^{\text{observed}} - \text{nprob}(sd)}{\sqrt{\text{nprob}(sd)[1 - \text{nprob}(sd)]}} \quad (4)$$

The CEM is fulfilled when the actual distributions of the second number significantly differs from the expected distribution (Benford's law) and the calculated P-value at 95% confidence level for each zero-to-nine number is less than 5%. Similarly, the analysis of the actual and expected deviations was performed using the Chi-square statistic with nine degrees of freedom using the following formula:

$$X^2 = \sum_{sd=0}^9 \frac{|f_{sd}^{\text{observed}} - \text{nprob}(sd)|^2}{\text{nprob}(sd)} \quad (5)$$

The null hypothesis of the Chi-square statistic indicated no significant differences between these frequencies (cosmetic management disproved). If the calculated Chi-square was higher than the Chi-square of the table, the null hypothesis would be rejected (cosmetic management confirmed). If the calculated Chi-square was lower than the Chi-square of the table, the null hypothesis would be approved (cosmetic management disproved).

C. The earnings management by the related party was calculated based on the study by Shawn et al. [29] using the following formula (6):

$$RLPT_{it} = \alpha + \beta_1 \text{Leverage}_{it} + \beta_2 \text{FirmSize}_{it} + \beta_3 \text{MKVE}_{it} + \beta_4 \text{Industry}_{it} + \varepsilon_{it} \quad (6)$$

In the mentioned formula, the related party transactions (RLPT) are the ratio of the average of the following two factors to the total sales in the subdivision companies, as follows:

Mng Sales Month: free market sales by the insiders

$$\sum_J^{\mu} 1, i = \text{sales}_{q+1} \quad (7)$$

Mng Purch Month: free market purchase by the insiders

$$\sum_J^{ji} 1, i = \text{Purchase} \quad (8)$$

LEVERAGE: the ratio of the total debt to the total assets;

FIRMSIZE: the natural logarithm of the entire asset;

MKVE: the ratio of the market value of equity to its book value;

INDUSTRY: the virtual industry variable per CSRC classification

( $\varepsilon$ ): a dependent variable of the abnormal related party transaction and earnings management

The third hypothesis of the research had to be calculated through the determination of the company's specific return using the following formula (9):

$$ISHOCK_{i,q} = Ret_{i,q} - \beta_0 - \beta^{market}(R_{mq} - R_{fq}) - \beta^{market}(R_{industry,q} - R_{fq}) \tag{9}$$

where  $Ret_{i,q}$  is the stock returns of t time frame as calculated using the Rahavard Novin software, in which the returns are calculated per stock price fluctuations, cash dividends, stock dividends, and capital increase using the following formula (10):

$$Stock\ returns = \frac{cashflow\ of\ the\ shareholders - stock\ value\ at\ the\ beginning\ of\ the\ year - stock\ value\ at\ the\ end\ of\ the\ year}{Cashflow\ of\ shareholders + stock\ value\ at\ the\ beginning\ of\ the\ year} \tag{10}$$

In the formula, Industry is the industry returns in time frame.

Peer performance was estimated based on the average specific return of all the peer companies in each industry and the Standard Industrial Classification (SIC) [24].

I. Financial leverage was equal to the ratio of the total debt to the total assets [7].

II. The ratio of the market value to the book value [11].

III. The company size was equal to the natural logarithm of the total assets of the company [7].

IV. ROA was equal to the ratio of the net income of the company in a given period to the total value of the company's assets [10].

V. The asset growth rate was equal to the changes in the total value of the assets divided by the total value assets of last year [11].

The classification of the financially declining to the strong companies was performed using four variables, including the percentage of the sales growth, operating cash flow (OCF), income from the ongoing operations, and Article 141 of the Commercial Code. All the sample companies were divided into declining and strong categories based on the five-year mean values of the mentioned variables. In addition, the companies subjected to Article 141 of the Commercial Code were considered as the declining companies, for which the other three variables were not determined. If they were not met by Article 141 of the Commercial Code, they would be evaluated with the other three variables. If a weak score was reported for all the variables, the companies would be classified as declining, while the companies with moderate average values of the three variables were classified as strong firms. Only the companies whose accumulated losses were higher than half of their capital were evaluated for the data regarding the percentage of the sales growth, OCF, income from the ongoing operations, and Article 141 of the Commercial Code. On the other hand, the companies whose financial characteristics were incompatible with the contents of the mentioned list were excluded from the final samples (Table2) [5].

**Table 2:** Classification of Companies

Financial Classification of Companies	OCF	Sales Growth	Income from ongoing Operations
Strong	High	High	High
Weak	Low	Low	Low

## 5 Findings

### 5.1 Descriptive Statistics of the Variables

According to the information in Tables 3 and 4, the average index indicated the balance point and centrality of the data distribution. The average values of the ROUNDING\_EARNit, ROUNDING\_SALEit, and ABN RPT in the declining and strong companies were estimated at 0.68,



0.69, and -0.04 and 0.67, 0.67, and -0.03, respectively. The mean index was also a central indicator, showing that the data were distributed evenly above and below this point. The similar mean values of the declining and strong companies signified the normality of this index as well. The mean values of ROUNDING\_EARNit, ROUNDING\_SALEit, and ABN RPT in the declining and strong companies were estimated at 1.0, 1.0, and -0.06, respectively.

**Table 3:** Descriptive Statistics of Study Variables for Declining Companies

	ROUNDING_EARNit	ROUNDING_SALEit	ABN RPT	Pshock	Leverage	MTB	Size	ROA	Asset Growth Rate
Average	0.683221	0.691228	-0.0414	-0.0033	0.6474	4.4480	14.4163	0.10778	0.2481
Mean	1.0000	1.0000	-0.0619	-0.0100	0.6300	3.7800	14.0700	0.0800	0.2800
Maximum	1.0000	1.0000	0.21820	0.2800	1.65000	13.9900	19.0700	0.52000	1.1200
Minimum	0.0000	0.0000	-0.2434	-0.7900	0.1300	0.3200	10.5300	-0.2700	-0.2800
SD	0.6912	0.4627	0.1071	0.1397	0.2749	2.8824	2.4053	0.1770	0.2572
Skewness	-0.3141	-0.2518	-0.4543	0.3963	1.6685	0.5235	1.1013	6.0706	5.7252
Kurtosis	1.0987	2.4458	3.4022	1.1571	3.001	3.1372	3.3561	2.9885	3.7454
Jarque-Bera Test	0.2025	0.1658	0.2985	0.1195	0.1145	0.3322	0.1545	0.7255	0.3255
Probability	0.8015	0.8455	0.7114	0.8995	0.8155	0.6774	0.854546	0.1855	0.6884
Observations	201	201	201	201	201	201	201	201	201

**Table 4:** Descriptive Statistics of Study Variables for Strong Companies

	ROUNDING_EARNit	ROUNDING_SALEit	ABN RPT	Pshock	Leverage	MTB	Size	ROA	Asset Growth Rate
Average	0.6732	0.6701	-0.0366	-0.0010	0.6537	4.4440	14.3926	0.1074	0.2534
Mean	1.0000	1.0000	-0.0611	-0.0100	0.6300	3.7800	14.0700	0.0800	0.2800
Maximum	1.0000	1.0000	0.2182	0.2800	1.6500	13.9900	19.0700	0.5200	1.1200
Minimum	0.0000	0.0000	-0.2434	-0.7900	0.1300	0.3200	10.5300	-0.2700	-0.2800
SD	0.46591	0.4709	0.1076	0.1140	0.2755	2.9060	2.3928	0.1786	0.2588
Skewness	-0.0135	-0.0128	-0.2518	-0.4543	0.3963	1.6685	0.5235	1.1013	6.07064
Kurtosis	2.89854	2.9124	2.4458	3.4022	1.1571	3.0010	3.1372	3.3561	2.9885
Jarque-Bera Test	0.33665	0.3366	0.1658	0.2985	0.1195	0.1145	0.3322	0.1545	0.7255
Probability	0.632109	0.674159	0.845553	0.711456	0.899555	0.815557	0.677455	0.854546	0.185565
Observations	369	369	369	369	369	369	369	369	369

**Table 5:** Results F-Limer Test and Hausman Pretest

Hypotheses		F-Limer	Significance Level	Hausman	Significance Level
1 <sup>st</sup> Hypothesis	Declining Company	15.574000	0.0000	18.485118	0.0051
	Strong Company	44.255500	0.0000	15.565305	0.0163
2 <sup>nd</sup> Hypothesis	Declining Company	28.254500	0.0000	16.325540	0.0000
	Strong Company	23.255878	0.0000	14.255500	0.0000
3 <sup>rd</sup> Hypothesis	Declining Company	3.483047	0.0000	31.258550	0.0000
	Strong Company	3.640408	0.0000	11.748167	0.0144

The index of dispersion indicated the extent of the distribution of the data from each other or relative to the mean. Standard deviation (SD) is a critical data dispersion indicator, and the SD values of ROUNDING\_EARNit, ROUNDING\_SALEit, and ABN RPT in the declining and strong companies were calculated to be 0.69, 0.46, and 0.107 and 0.46, 0.47, and 0.107, respectively. The skewness coefficient values of ROUNDING\_EARNit, ROUNDING\_SALEit, and ABN RPT were positive and near zero, which indicated the normal and slightly to the right skewness and positive kurtosis of all the variables. The results the F-Limer test and Hausman pretest for the research hypotheses are presented in Table 5. It shows the different research hypotheses using the panel data method, which involves the fixed effects model and random effects model selected by the Hausman pretest. Since the probability of the Chi-square statistic was less than 5%, the estimation and analysis of the research hypotheses were performed using the fixed effects model.

### 5.2 Testing of the First Hypothesis

The first research hypothesis was that the impact of peer performance on the CEM is more substantial in the declining companies compared to the strong firms. Table 6 shows the results of the first hypothesis. Table 6 shows a significant t-statistic of less than 5% for variables such as Pshock, MTB, Size, ROA, and asset growth rate. The Pshock coefficient for the strong and declining companies was estimated at 0.32 and 0.23, respectively, and the t-statistic for the variable of leverage was higher than 5%. Consequently, the estimated coefficient for these variables was statistically insignificant at 95% confidence interval in the regression model. The adjusted R-squared represented the explanatory power of the independent variables, which was estimated at 0.85 and 0.80 for the strong companies and dependent variables, respectively.

**Table 6:** Summary of Estimated Coefficients of First Hypothesis of Strong and Declining Companies

Variable	Estimated Coefficients of 1 <sup>st</sup> Hypothesis of Strong Companies				Estimated Coefficients of 2 <sup>nd</sup> Hypothesis of Strong Companies			
	Coefficients	SD	t Statistic	Probability	Coefficients	SD	T Statistic	Probability
y-intercept	0.467912	0.420880	1.111746	0.2674	0.091634	0.409157	0.223959	0.8230
Pshock	0.326481	0.022887	14.26517	0.0000	0.239293	0.023826	10.04319	0.0000
Leverage	0.420421	0.236726	1.775987	0.0771	0.048673	0.234154	0.207868	0.8355
MTB	0.062231	0.013178	4.722518	0.0000	0.070859	0.013644	5.193301	0.0000
Size	0.037024	0.002830	13.08201	0.0000	0.012581	0.002641	4.763368	0.0000
ROA	0.170424	0.030838	5.526508	0.0000	0.010481	0.002961	3.540034	0.0005
Asset Growth Rate	0.114855	0.009213	12.46639	0.0000	0.139537	0.009558	14.59900	0.0000
Adjusted R-squared	0.87				0.807			
Durbin Watson (DW)	1.95				1.88			
F-value	0.000				0.000			
Vuong Closeness Test								
Impact of Peer Performance on CEM in Declining Companies							0.24	
Impact of Peer Performance on CEM in Strong Companies							0.33	
Vuong Statistic							-8.32	
Vuong Value							0.0000	

The F-statistic confirmed the statistical significance of the entire model. Based on the hypothesis, the values of the numerical coefficient of the peer performance for the strong and declining companies were 0.32 and 0.23, respectively, which disproved the null hypothesis. In other words, the impact of peer performance on the CEM was more significant in the declining companies compared to the strong firms. Table 6 shows a significance level of less than 5%, which indicated the significant difference between the coefficients of the two models.

### 5.3 Testing of the Second Hypothesis

The second hypothesis was that the impact of peer performance on the cosmetics sales management is more substantial in the declining companies compared to the strong firms. Table 7 shows the results of the second research hypothesis.

Table 7 shows the significant t-statistic of less than 5% for the variables of Pshock, MTB, Size, ROA, and asset growth rate. The coefficient of Pshock for the strong and declining companies was 0.43 and 0.20, respectively, and the t-statistic of the leverage variable was above 5%. Consequently, the estimated coefficient for these variables was statistically significant with 95% confidence interval in the regression model. The adjusted R-squared represented the explanatory power of the independent variables, and the obtained value for the strong companies and dependent variables was 0.88 and 0.79, respectively. The F-statistic confirmed the statistical significance of the entire model.

**Table 7:** Summary of Estimated Coefficients of Second Hypothesis of Strong and Declining Companies

Variable	Estimated Coefficients of 1 <sup>st</sup> Hypothesis of Strong Companies				Estimated Coefficients of 2 <sup>nd</sup> Hypothesis of Strong Companies			
	Coefficient	SD	t Statistic	Probability	Coefficient	SD	t Statistic	Probability
y-intercept	0.106301	0.395604	0.268705	0.7884	0.382828	0.412250	0.928629	0.3541
Pshock	0.434039	0.023046	18.83370	0.0000	0.206754	0.002402	8.609131	0.0000
Leverage	0.138643	0.240531	0.576404	0.5649	0.052335	0.250652	0.208797	0.8348
MTB	0.064952	0.012864	5.049003	0.0000	0.030702	0.013406	2.290193	0.0229
Size	0.446709	0.023804	18.76595	0.0000	0.008181	0.002481	0.329806	0.0001
ROA	0.665932	0.326751	2.038037	0.0427	0.431697	0.034050	12.32454	0.0000
Asset Growth Rate	0.148402	0.013304	11.15479	0.0000	0.178530	0.013864	12.87748	0.0000
Adjusted R-squared	0.88				0.79			
DW	1.95				1.95			
F-value	0.000				0.000			
Vuong Closeness Test								
Impact of Peer Performance on CEM in Declining Companies					0.21			
Impact of Peer Performance on CEM in Strong Companies					0.43			
Vuong Statistic					12.32			
Vuong Value					0.0000			

Based on the hypothesis, the values of the numerical coefficients of peer performance for the strong and declining companies were 0.43 and 0.20, respectively, which disproved the null hypothesis. In other words, the impact of peer performance on cosmetics sales management was more significant in the declining companies compared to the strong firms. The Vuong closeness test was applied to assess the impact of peer performance on the cosmetics sales management in the declining and strong companies, and the obtained results indicated a significance level of less than 5%, showing the significant difference between the coefficients of the two models (Table 7).

### 5.4 Testing of the Third Hypothesis

The third hypothesis was that the impact of peer performance on the related party earnings management is more substantial in the strong firms compared to the declining companies. Table 8 shows the results of the third hypothesis. Table 8 shows a significant t-statistic of less than 5% for the variables of Pshock, MTB, size, ROA, and asset growth rate. The coefficient of Pshock for the strong and declining companies was 0.06 and 0.15, respectively, and the value of the t-statistic for the variable of leverage was above 5%. Consequently, the estimated coefficient for these variables was statistically significant with 95% confidence interval in the regression model. The adjusted R-squared represented the explanatory power of the independent variables, and the obtained value for the strong companies and dependent variables was 0.81 and 0.84, respectively.

**Table 8:** Summary of Estimated Coefficients of Third Hypothesis of Strong and Declining Companies

Variable	Estimated Coefficients of 1 <sup>st</sup> Hypothesis of Strong Companies				Estimated Coefficients of 2 <sup>nd</sup> Hypothesis of Strong Companies			
	Coefficient	SD	Coefficient	SD	Coefficient	SD	Coefficient	SD
y-intercept	-0.014199	0.071309	-0.199124	0.8423	0.074337	0.054726	1.358356	0.1757
Pshock	0.061478	0.004154	14.79931	0.0000	0.159676	0.036942	4.322334	0.0000
Leverage	0.006916	0.043357	0.159522	0.8734	0.045195	0.035537	1.271799	0.2048
MTB	0.005524	0.002319	2.382229	0.0181	0.025440	0.001904	13.36270	0.0000
Size	0.004750	0.000429	11.07022	0.0000	0.057483	0.003377	17.02283	0.0000
ROA	0.239905	0.058898	4.073196	0.0001	0.241230	0.047758	5.051096	0.0000
Asset Growth Rate	0.009481	0.002398	3.953766	0.0000	0.053187	0.021429	2.482011	0.0138
Adjusted R-squared	0.81				0.84			
DW	1.96				1.85			
F-value	0.000				0.000			
Vuong Closeness Test								
Impact of Peer Performance on Related Party in Declining Companies					0.16			
Impact of Peer Performance on Related Party in Strong Companies					0.06			
Vuong Statistic					7.63			
Vuong Value					0.0000			

The F-statistic confirmed the statistical significance of the entire model. Based on the hypothesis, the values of the numerical coefficients of peer performance for the strong and declining companies

were 0.06 and 0.15, respectively, which disproved the null hypothesis. In other words, the impact of peer performance on the cosmetics sales management was more significant in the declining companies compared to the strong firms. The Vuong closeness test was employed to assess the impact of peer performance on the CEM in the declining and strong companies, and the obtained results indicated a significance level of less than 5%, showing a significant difference between the coefficients of the two models (Table 8).

## 6 Discussion and Conclusions

The present study aimed to investigate the impact of peer performance on the Benford's law and CEM by a related party in declining and strong companies. The first research hypothesis confirmed that the influence of peer performance on the CEM was more substantial and significant in the declining companies compared to the strong firms. Since these findings are in line with the concept of the agency cost theory, it is possible to evaluate the reports of the company's earnings according to its peer performance in the same industry. Therefore, peer performance is a proper index for the assessment of managers, intra-industry trade comparisons, and earnings manipulation (CEM). It is suggested that peer companies affect corporate policies variably to enhance competition and learning. Du and Shen [7] have argued that higher peer performance results in a better CEM in a company, which is consistent with the findings of the current study. The second research hypothesis confirmed that the impact of peer performance on the cosmetics sales management was more substantial in the declining companies compared to the strong firms. These results are in line with the concepts of "agency cost theory"; It is argued that competition in an industry can be achieved through factors such as product pricing; The quantity and quality of products and other features not related to the price of the product affect a company's strategies. In addition to the competitive effects, companies can get great information from the choices made by their peers. When the cost of obtaining their information increases or when the signals coming from their counterparts are noisy and disruptive, companies simply decide to imitate the decisions of their counterpart companies. The study by Karuna et al. [15] indicated that industry factors play a critical role in CEM, which is in line with the results of the present study. The third research hypothesis verified that the impact of peer performance on the related party earnings management was more substantial in the strong firms compared to the declining companies. According to the agency cost theory, managers seek to expand their interests like the rest of the society. However, their efforts may be interrupted due to conflicts of interests, urging them to shift their focus from the actual performance of the company and manipulate the earning activities, returns, and reports. Therefore, it appears that peer performance could provoke conflicts and increase earnings management by the related parties. The efficient transaction hypothesis implies that sometimes a transaction is made to gain access to the unique experience, expertise and skills of affiliates or to compensate for services, in which case there is no incentive to manage profits. In this regard, Ramzi [23] confirmed the critical role of REP in the accounting performance of managers, which is in line with the results of the present study. After examining the results of the first hypothesis, it is recommended that regulators and auditing organizations establish an appropriate basis for the development of the required standards for stock market companies. It is also advised that shareholders, investors, and other regulatory administrations focus on criteria such as the peer performance and specific characteristics of each industry to determine the value of stock market companies and acquire better financial reports on the shares. After examining the results of the second hypothesis, it is suggested that analysts address the impact of peer performance on the CEM and recognize that higher peer performance could

enhance the CEM. Based on the results of the third research hypothesis, the auditing organization is recommended to deal with earnings management based on peer performance. Auditing organizations should also be aware of two approaches when addressing this issue; first, they must be aware of the risk of financial statement deviations using earnings management tools (e.g., peer performance). Second, they must minimize unrealistic CEM tools (e.g., reduction of the peer performance factors) when establishing accounting standards.

## References

- [1] Amiram, D., Bozanic, Z., Roen. E., *Financial Statement Errors: Evidence from the Distributional Properties of Financial Statement Numbers*, Review of Accounting Studies, 2015, **20**(4), P.1540-1593. Doi: 10.1007/s11142-015-9333-z
- [2] Arjang, S., Valizadeh, A., Azizi, H., *Investigating the Impact of Political Relations on Earning Management through Dealing with Related Parties*. The fourth National Conference on Management, Accounting and Economics with Emphasis on Regional and Global Marketing, Tehran - Shahid Beheshti University, Permanent Secretariat of the Conference. 2019, ACONF04\_031 (In Persian)
- [3] Ball, R., Kothari, S., Robin, A., *The effect of institutional factors on properties of accounting earnings: international evidence*. J. Account. Econ.2000, **29**(1), 1–52. Doi:10.1016/S0165-4101(00)00012-4
- [4] Ebrahimi, M., Vakilifard. H., Talebnia, GA., NikooMaram, H., *The Effect of Average of the Stock return, Expected Growth, Profitability and Asset Structure of Peer Firms on Investment Management Strategy Using Markov chain Monte Carlo Simulation and Hierarchical Bayes*, 2019, **7**(2), P.41-58. Doi:10.22108/AMF.2017.21342 (In Persian)
- [5] Caneghem, T., *Earnings Management Induced by Cognitive Reference Points*, British Accounting Review, 2000, **34**(2), P.167-178. Doi:10.1006/bare.2002.0190
- [6] Cupertino M., Antonio, j., *Earnings manipulations by real activities management and investors' perceptions*, Research in International Business and Finance, 2015, **34**(1), P 309–323. Doi: 10.1016/j.ribaf.2015.02.015
- [7] Du., Qianqian, Shen, R., *Peer Performance and Earnings Management*, Journal of Banking and Finance, 2018, Doi: 10.1016/j.jbankfin.2018.01.017
- [8] Fallah, A., *Benford Distribution and its Applications*. Andisheh.2013. **18**(1), P.71-84.article-1-228-fa.html. (In Persian)
- [9] Gordon, E. A, Henry, E., *Related Party Transactions and Earnings Management*. Applied Financial Economics, 2015, **21**(3), PP.165-181. Doi: 10.1016/j.intaccudtax.2018.07.003.
- [10] Hashemi, S A, Hariri A., *The Analysis of Bedford's Law Ability to Identify and Predict Financial Fraud Detection*, The Iranian Accounting and Auditing Review, 2017, **24**(2), P.283-302. Doi:10.22059/ ACCTGREV. 2017.220346.1007490 (In Persian)
- [11] Hassani, M., ShafiKhani, M., *Analysing the Cosmetic Earnings Management Using Benford's Law by focusing on Accounting Conservatism*, International Conference on Management and Humanities, 2015, UAE-Dubai, Viera Capital Institute of Managers. ICMHCONF01\_313(In Persian)

- 
- [12] Haw, I., Hu, B., Hwang, L., Wu, W., *Ultimate ownership, income management, and legal and extra-legal institutions*, J. Account. Res. 2014, **4**(2), P.423–462. Doi:10.1111/j.1475-679X.2004.00144.x
- [13] Heyrani, F, Nemati, M., *Investigating the Relationship between Accounting Conservatism, Institutional Investors, and Profit Manipulation Under the Benford's Law*, International Conference on Modern Research in Management, Economics, and Accounting, 2014, **45**(3). Doi:10.22059/ACCTGREV.2016.58467 (In Persian)
- [14] Jordan, C.E, Clark, S. J., *Detecting cosmetic earnings management using Benford's law*, The CPA Journal, 2011, **81**(2), P.32. Doi:0589/4c0747538f97dd6259599cae0e23c12f69fb
- [15] Karuna, C., Subramanyam, and Tian, F., *Industry Product Market Competition and Earnings Management*, 2012, **45**(3). Doi:10.5236/me1012145
- [16] Kimbrough, M., Wang, I., *Are seemingly self-serving attributions in earnings press releases plausible? Empirical evidence*, Account. Rev. 2014, **89**(2), P.635–667. Doi:10.2308/accr-50628
- [17] Kuan, L., Tower, G., Rusmin, R., *Related Party Transactions and Earnings Management*. Journal Akuntansi & Auditing Indonesia, 2010, **14**(2), P.93–115. Doi: 10.1016/j.intaccaudtax.2018.07.003
- [18] Lee, Y., *Market reactions to unexpected relative earnings performance*, Asia-Pacific Journal of Accounting & Economics, 2017, **24**(8)3-4, P.339-357. Doi:10.1080/16081625.2016.1213645
- [19] Lin, F., Lin, L., Yeh, C., *Does the board of directors as Fat Cats exert more earnings management? Evidence from Benford's Law*. Quarterly Review of Economics and Finance, 2017, **6**(15), Doi:10.1016/j.qref.2017.09.005
- [20] Nemati, H., *The Role of Audit Quality in the Relationship between Related Party Transactions and Earnings Management*, Journal of New Research Approaches in Management and Accounting, 2019, **3**(11), P.115-133. JR\_AMA -3-11\_00 (In Persian)
- [21] Nigrini, J., Miller, J., *Data Diagnostics Using Second-Order Tests of Benford's Law*. Auditing, a Journal of Practice and Theory, 2009, **28**(2), P.305–32311. Doi: 1026/j.qref.2017.09.012
- [22] Papanikolaou, N. I, Grammatikos, T., *Using BenFord's Low to Detect Fraudulent Practices in Banking*, Workingpaper, Sussex University, Luxemborg University, 2013, **5**(9), P.324-362. Doi:10.1010/16081625.2016.1213645
- [23] Ramzi, B., *The effect of relative earnings performance on firms' accrual decisions: Evidence from France*, European Journal of Economics, Finance and Administrative sciences, 2006, **6**(5), P.89-102. Doi:10.2149/ssrn.560689
- [24] Rogers, C. *Chrysler Profit Jumps 22% to \$619 Million*. Wall Street Journal (Aug. 6). <http://www.wsj.com/articles/chrysler-profit-jumps-22-to-619-million-1407337376>.2014.
- [25] Sadeghi Panah, J., Garkaz, M., Imanpour A., *Investigating the Impact of Earnings Management and Financial Leverage on the Performance of the Basic Metals Industry Market*. The first National Conference on the Role of Accounting, Economics and Management, Shams Institute of Higher Education of Tabriz.2017.

AEMCNF01\_527 (In Persian)

[26] Saei, A., Naeiji, M., Rezaei M, *Examination of the Relation between Advertainment and Cultural Tourist Attraction in Iran (Case Study: Cultural Tourists of Isfahan)*. MJSS, 2011, **2**(4), P.69-94. (In Persian)

[27] Sarlak, N., Akbari, M., *Relationship between Related Party Transactions and Earnings Management*. 2014,**10** (3), P.77-92. Doi:10.22059/ACCTGREV.2014.36590 (In Persian)

[28] Shahalizadeh, B., Jabarzadeh, S., *Investigating the Relationship between the Bid-Off Price Difference and the Stock Turnover Rate, Market Return and Trading Size on the Tehran Stock Exchange*, The third National and International Conference on Management and Accounting, Hamedan, Iran. 2016. 1337013 (In Persian)

[29] Shawn, T., Ryngaert, M., *Related Party Transactions: Their Origins and Wealth Effects*, University of Pittsburgh. Doi:10.2139/ssrn.970689.2007.

[30] Stigler. G. *Price and non-price competition*, Journal of Political Economy ,1968, **76**(7), P.149–154. Doi:10.1086/ 259391

[31] Thomas, J., *Unusual Patterns in Reported Earnings*, Accounting Review,1989, **64**(4), P.773-787.

[32] Roozbahani, M., Yazdi, H., *Investigating the Effect of Successive News of Distributed Profits, Negative Adjustment and Late Announcement of Adjustment on the Market Reaction Process*, Advances in Mathematical Finance and Applications, 2019. Doi:10.22034/amfa.2019.666212.

[33] Gao, H., Shen, Z., Li, Y., Mao, X., Shi, Y., *Institutional investors, real earnings management and cost of equity: evidence from listed high-tech firms in China*, Emerging Markets Finance and Trade, 2020, **56**(14), P.3490-3506.

[34] Zanjirdar ,M. , Madahi, Z., Khaleghi ,P., *Comparative analysis of sticky SGA costs and cost of goods sold: Evidence from Tehran Stock Exchange*, Management Science Letters, 2014,**4**(3), p.521–526.

[35] Zanjirdar, M., Seifi, M. , *Review of relationship between dividend policy and performance: Evidence of Iran's capital market*, African Journal of Business Management,2012,**6**(40), p. 10507-10513.