

The relationship between managerial entrenchment, earnings management and firm innovation

Earnings
management
and firm
innovation

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Mahdi Salehi

Ferdowsi University of Mashhad, Mashhad, Iran, and

Mahbubeh Mahmoudabadi and Mohammad Sadegh Adibian

*Faculty of Economics and Business Administration,
Ferdowsi University of Mashhad, Mashhad, Iran*

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Abstract

Purpose – The purpose of this paper is to evaluate the qualitative effect of corporate governance components, in the form of managerial entrenchment index, on earnings management and innovation.

Design/methodology/approach – In this study, the variable of managerial entrenchment, which includes the variables of management independence, dual role of management, management tenure, the board compensation and the board ownership percentage, was initially estimated through the exploratory factor analysis and its effect was evaluated on the dependent variables of the study using the test of multivariable regressions. Hence, a total of 103 listed companies on the Tehran Stock Exchange were selected and analyzed during 2011–2016. In this paper, the Jones model is used as the variable of accrued earnings management and for calculating the real earnings management, the models of abnormal operational cash flows, abnormal production costs and abnormal optional costs are employed. Moreover, the research and development cost to total costs ratio is used for calculating the innovation.

Findings – The results indicate a negative and significant relationship between managerial entrenchment and accrual-based earnings management; moreover, the entrenched managers are less likely to engage in manipulating the real activities accruals in Iran context. Furthermore, the findings show that there is a positive and significant relationship between managerial entrenchment and firm innovation.

Originality/value – What really sets this paper apart from other studies is that this research will make aware investors and stakeholders of this fact that managerial entrenchment will be a good way to diminish the manipulation of financial reporting and improve the corporate situation in emerging markets, particularly those bazaars facing with economic sanctions such as Iran. Undeniably, the study results will complete the knowledge gap between the developed economies and the emerging markets.

Keywords Innovation, Earnings management, Corporate governance, Managerial entrenchment

Paper type Research paper

1. Introduction

Currently, earnings management is one of the central issues in accounting studies. Since the amount of profit is one main factor of decision making for investors, from a behavioral perspective these studies have their own significance. The results of these projects showed that low volatility and profit sustainability are two signs of quality. Hence, investors invest in those projects more confidently that their profit trend is more stable. When companies in unpropitious economic status are under an increasing pressure, managers ask the accounting department to improve the benefit and change the information content. Accounting despite all its flexibilities does not seem to be able to provide useful information for management in such circumstances (Hope and Hope, 1996). Earnings management usually occurs through manipulating the discretionary accruals or the real activities. Real activity-based earnings management includes the manipulation of real operation of a business unit in order to distinguish the reported profit of a current period (Mitra *et al.*, 2013). The manipulation of discretionary accruals bears some costs. When the earnings



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management goes up, managers face the risk of investigation by auditors and lawmakers and are prone to litigation. The question raises here is that by the presence of agency problems, including information asymmetry and the ethical risk of investors and regulatory authorities, how we could be ensured of the quality of reported profit by the managers and in a broader sense the quality of the financial reporting?

The concept of “corporate governance” is proposed given the necessity of combating against the ominous phenomenon of earnings management (that sometimes the scope of which is kept out of sight in lower layers of accounting standards that even if being caught by the sharp eyes the auditors, we could reject them because they are working under the flag of accounting standards), aligning different spectrums of stakeholders, and directing the objectives of the organization by all stakeholders. Since corporate governance is actually concerned about the necessity of close monitoring of management, regular firm auditing, separating an economic firm from its ownership and finally protecting the rights of all investors and stakeholders, it is a response to the agency problem that is derived from the separation of management from ownership. In other words, longer lifespan of an organization is the ultimate goal of the corporate governance, in that it is the corporate governance that determines how and by whom the company should be governed and how the favorable trend of accountability and disclosure of information to stakeholders should be managed. Thus, we could say that companies with more appropriate corporate governance are less likely to be faced with the conflict of interests and its subsequent consequences (Ghodrati and Feizi, 2015). By establishing an efficient strategic system, we would be able to align the interests of managers and owners, to improve the operational performance of the firm, and to develop the companies. Effective corporate governance is a managerial mechanism for the firm resources (Gill and Shah, 2012).

On the other hand, corporate innovation contributes significantly to the creation, preservation and addition of firm value. However, investing in innovative activities relative to other investments with higher rate failure is known as a high-risk investment (Bhagat and Welch, 1995; Holmstrom, 1989). Since the costs of research and development (R&D) cannot turn into capital, investing in innovation could lessen the short-term accounting profit and lower the compensation-based accounting for managers. Therefore, risk aversion managers may not be interested enough in innovation investment. However, companies with no innovation would lose their market value and consequently endanger the long-term interests of their shareholders. Entrenchment or what is called management opportunism is the survival instinct of the managers. It seems that there are some methods for managers who like to increase their power, job security and payment. Few studies are conducted on the quality of corporate governance components in Iran (Hassa Yeganeh *et al.*, 2009; Baratiyan and Salehi, 2013; Salehi *et al.*, 2017; Salehi, Tarighi and Safdari, 2018). Hence, performing some studies to investigate the significance of the quality of corporate governance mechanisms in stock companies of Iran is the matter of the utmost importance. In most of the conducted studies in Iran on the relationship between corporate governance and earnings management, each component of corporate governance entered the models and its effect on firm variables was calculated, separately. In this paper, however, we tried to investigate the simultaneous effect of a set of corporate governance mechanisms, including the board structure (management tenure, the board independence, CEO duality) and some management motivational factors (percentage of share available to the board and the amount of the board compensation) in the form of contributing factors to management power, earnings management and innovation. So from now on, the set of these variables is referred to as managerial entrenchment.

Therefore, we expect that corporate governance mechanisms to be able to mitigate the agency problems and help the company’s primary goal, which is to increase the value of shareholders’ wealth. Corporate governance, above all, aims at the survival of the firm in the

long run and aims to protect the interests of shareholders against the management of the organizations. The most important point about Iran market is that the majority of Iranian firms had many financial problems due to Iran was faced with severe economic sanctions during the study period between 2011 and 2016 (Salehi, Tarighi and Safdari, 2018). Iran's capital market has experienced strong fluctuations in recent years due to international sanctions, exchange rate' change and economic downturn, so that the information published on the official website of Tehran Stock Exchange indicates that the total index of Tehran Stock Exchange in 2012 was 26,502 and it reached 89,532 in 2013. This means that the total index of Tehran Stock Exchange has grown by 237 percent during almost one year. At the end of 2014, it dropped by more than 45 percent to 61,532 units. These intense fluctuations show the need to pay attention to the general market conditions in the research, as the company's performance is affected by these fluctuations. In such economic situation, it seems that companies try to find ways to get rid of these financial problems using the firm innovation. In fact, we are going to know if corporate governance mechanisms have been able to reduce the agency problems and improve the corporate innovation in Iran context. Undoubtedly, the research results will complete the knowledge gap between the developed economies and the emerging markets.

The remainder of this study proceeds as follow. The next section presents a theoretical framework, hypothesis development and a literature review. Section 3 provides the research methodology and outlines where data are obtained and the sample selection procedure. Section 4 describes the main results and statistical analyses. Finally, the last section provides the conclusion.

2. Theoretical principles, hypothesis development and literature

Prior to the development of capital markets, business firms were operated traditionally. These firms supplied their required capital through the properties of people and their entrepreneur relatives and the approach of founders was based on cooperation not investment. The factor of unlimited responsibility was a barrier to the partnership of individuals in investments. Joint-stock companies proposed from 1,855 upward. The advent of such companies is among the world's major economic evolutions and the separation of ownership from control is one of the consequences of the phenomenon (Sajadi, 2009). The process of separating ownership from control takes place when stock ownership dispersion occurs due to the growth of a firm, the result of which is the decline of shareholders' power and the incremental enhancement of managers' authorities. The separation of ownership from control created the problem of manager accountability, as the agent of owners, and caused the shareholders not to influence the managerial section of the firm. This issue formed the basis of the agency theory (Sajadi, 2009). The agency relation based on the definition of Jensen and Meckling (1976) is a contract through which the employer or owner appoints an agent on their behalf and delegate the decision-making authority. Through the agency relation, it is assumed that each party is trying to maximize its own interests. According to the agency theory, the separation of ownership role from management leads to broker-agent demand, because it is likely that managers pursue their own interests even to the detriment of brokers (Mustapha and Che Ahmad, 2011). Corporate governance system is one of the available mechanisms to curtail the agency problem and information asymmetry between shareholders and managers in the capital markets (Shleifer and Vishny, 1986; Salehi, Tarighi and Safdari, 2018). This study evaluates the mutual effect of a set of corporate governance components and motivational factors on earnings management and firm innovation. Since the components and strategic corporate factors are analyzed in numerous studies, we are concerned about the relationship between these variables, in form of entrenchment indexes, and dependent variables of earnings management and innovative production of firms.

2.1 *The relationship between managerial entrenchment and earnings management*

When managers hold little equity and stockholders are too dispersed to take action against non-value maximization behavior, insiders might organize corporate actions to gain personal benefits, like shirking and privilege consumption (Farinha, 2003). When ownership and control are divided within a firm, agency costs arise. Nevertheless, agency costs drop if the ownership of the firm rises as executives are responsible for a larger cost of these shares. Conversely, given ownership to a manager within a company may convert into greater voting power which makes the manager's workplace more secure. Henceforth, they gain protection against takeover dangers and the current managerial market. Banko *et al.* (2013) proposed two approaches concerning the effect of managerial entrenchment on earnings management. The first approach indicates that the entrenched managers are motivated by earnings management. Several studies are available on this issue. Zhao and Chen (2008) revealed that companies with entrenched managers (the metric for measuring entrenchment is the board dispersion) have fewer earnings management. Stein (1988) also stated that threats related to expropriation are great incentives for short-sighted managers. Since the entrenched managers obliged to lessen the threats related to expropriation, they concentrated on long-term strategic policies rather than short-term ones, like earnings management. In line with such an approach, Pugh *et al.* (1992) realized that managers adopted a long-term approach, like capital as well as R&D costs, to prevent from anti-takeover amendments. The second approach shows that the entrenched managers are actually more motivated for earnings management. The experimental evidence signifies that entrenched managers are those who have weak performance (Gompers *et al.*, 2003; Bebchuk *et al.*, 2009). Moreover, the topical literature shows that personal financial motivations exist among managers for higher income. For example, Healy (1985) and Holthausen *et al.* (1995) noticed that managers manipulate the benefit for compensation plans. Based on the strong evidence from Iran, Salehi, Tarighi and Safdari (2018) investigated the impact of corporate governance mechanisms on audit fees. They classified the board compensation into Delta (Board' cash rewards) and Vega (Board' non-cash rewards). The results showed that there is a positive association between audit fees and delta, but not Vega; this implies that a fee premium is linked to CEO Delta incentives. Their outcomes demonstrated that Iranian firms pay more audit fees when they give managers more rewards. Furthermore, they found that there is not a significant relationship between fees resulting from audit risk and Delta and Vega incentives of the board. Exactly inconsistent with agency theory, they realized that the independence of board members did not affect audit fees. Bergstresser and Philippon (2006) indicated a linear relationship between CEO motivations and the manipulation of discretionary accruals. These studies illustrate that personal motivations for all CEOs and lack of sufficient supervision enable the entrenched managers in search of personal interests to perform the earnings management more freely (Banko *et al.*, 2013). Dechow *et al.* (1996) declared that earnings manipulation is systematically related to the weakness of internal and external supervisions and companies with earnings management are more likely to have managers who influence the board of directors, have CEOs with a dual role and have CEOs who are the firm founder. By evaluating the impact of personality traits of innovative managers on real earnings management, Kouaib and Jarboui (2016) perceived that the characteristics of managers of such firms have a positive relationship with the probability of their earnings management. Ali and Zhang (2015) assessed the changes of CEO motivation during their tenure for earnings management and found that the increasing earnings management is higher during the first years of tenure than the upcoming years because new managers are trying to show the favorable results and to influence the market perception of their competencies during the first years of tenure.

In contrast, Dechow and Sloan (1991) declared that within the last years of CEO tenure, managers cut the costs of R&D to raise the short-term benefits. When managers embark on aggressive earnings management, they would be faced with the increase of risk of meticulous investigation of auditors and legal authorities and are more vulnerable to legal claims. Desai *et al.* (2006) noticed that companies with profit restatement may incur some penalties like losing jobs or decline of job opportunities. Within a study entitled “The relationship between market return, corporate governance and earnings management,” Farooque *et al.* (2014) stated that the earnings management has a considerable adverse effect on the market return and in preventing the earnings management the board size has more impact than institutional ownership. Given the impact of managerial entrenchment on earnings management, we could formulate the following hypotheses:

- H1. There is a significant relationship between managerial entrenchment and accrual-based earnings management.
- H2. There is a significant relationship between managerial entrenchment and real earnings management.

2.2 The relationship between managerial entrenchment and firm innovation

R&D costs are known as a proxy for corporate innovation. The significance of R&D is to the point that companies classify into developed and undeveloped ones based on the ratio of R&D funds received from gross national income. R&D costs, in addition to growth incentives and economic development of the community, increase the benefit of the firms. Today, R&D activities are the basis of innovation and pave the way for new demands constantly (Varamesh *et al.*, 2014). Several definitions proposed so far for innovation and opinion-leaders and scholars take into account the topic of innovation from different aspects. By reviewing these definitions, a clean-cut image will be formed in the reader's mind about the issue. Schumpeter was the first who defined the innovation in form of a scientific concept. In fact, he attempted to realize the contributing factors to the economic growth of companies and in this way, he became familiar with the role and significance of innovation in the growth of communities. Schumpeter in his definition of innovation expressed that as a disturbing factor to the existing order and an economic balance. The term “creative destruction” signifies the same issue. According to this theory, innovation is defined in five significant dimensions, all of which are indicative of the process of product development (Swedberg, 2007). These five aspects of innovation consist of new products, new manufacturing methods, the establishment of new markets, achieving novel raw materials and modern organizational methods. It seems that our study includes a combined set of innovation different aspects because the aim of R&D costs of a company is to go along these lines to grow the company in the future. Markides (2000) considered the organizational innovation as a completely different competitive method, which appears by violating the game rules. Broadly, we could define R&D as a planned and basic exploration, which is used with the aim of acquiring new knowledge to create a product and a modern service and to improve the products and manufacturing processes, effectively (Lipczynski *et al.*, 2005). Some studies indicated that managers are able to play a vital and active role in the innovative strategy of a firm (Dooley and O’Sullivan, 2003). Passing and operating the innovative projects may signify the risk-taking capacity of management (Hirshleifer *et al.*, 2012). The results of Helmers *et al.* (2017) show a positive relationship between a committed board and firm innovation. Gua and Zhangb (2017) carried out a study on the impacts of Sarbanes–Oxley Act on the innovation of major corporations and noticed that this Act causes the growth of innovation of major companies, especially in high-tech industries. Kamoto (2016) indicated that instead of the

agency problem, due to the investors' intolerance of failure, the motivational incentives of management for innovation will decline in general companies. In addition, management ownership leads to the improvement of the range of firm innovation. In this paper, the mutual relationship between firm innovation, corporate governance and dividend policy is studied and the experimental results proposed a positive relationship between control stock purchase by management and the range of innovation. Ben-David *et al.* (2013) showed that highly confident managers are able to influence the firm decisions about investment policies. Hirshleifer *et al.* (2012) perceived that companies with highly confident managers invest more in innovative projects. Innovative projects are a type of investment in intangible assets. Such projects are at the same time the most perilous and profitable activities and are a kind of commitment for highly confident managers, so they are potentially important. Such investments are dubious from two sides. First, the risk of failure is high in these projects due to nature of such activities; second, the real manipulation of these projects may develop and increase (Hirshleifer *et al.*, 2012). Ferreira *et al.* (2014) analyzed the management motivations about innovative projects in public and private companies and showed that failure intolerance in public companies lowers the innovative motivations. Sapra *et al.* (2014) found out that there is a U shape relationship between the range of managerial innovation and expropriation costs.

According to the managerial entrenchment theory, it is expected from the growth of entrenchment to debilitate the regulative effects of external control and lead to a lower investment in innovation, so the increase of managerial entrenchment could have an inverse effect on investors' value (Chakraborty *et al.*, 2014). On the other hand, Beyer *et al.* (2012) declare that it is probable that managers invest a little on R&D due to the risk of failure in projects, like decrease of compensation or job loss. Managers, however, may invest at a higher level on innovative projects because of higher compensation and position and more power. They perceived that there is an inverse relationship between the degree of managerial ownership and the costs of R&D. When entrenchment occurs, managers are not afraid of the determining effect of risk of innovative projects on occupation and position and are willing to invest in innovation at a higher level. According to Chakraborty *et al.* (2014), we believe that by intensifying the managerial entrenchment and failure intolerance in innovative projects, the range of investment will decline in innovative activities:

H3. There is a negative and significant relationship between managerial entrenchment and innovation.

3. Research method

In terms of objective, the present study is practical and in terms of data-analysis method, the study is cross-sectional correlational. Since the study is about the relationship between managerial entrenchment, earnings management and product innovation among companies listed on Tehran Stock Exchange, the desired method for hypothesis testing is a retrospective correlation, so the present study is a type of retrospective research. The information about independent, dependent and control variables was collected from the financial statements of the companies listed on TSE via reliable resources. The time range of the study was (2011–2016) as long as six years.

3.1 Research population and statistical sample

The target population included all companies listed on TSE which involved in the productive goods, during the period 2011–2016. The reason for choosing these types of companies is that accessibility to financial information for these companies is more than other companies. Also, due to the regulations and standards of the Tehran Stock Exchange,

information on the financial statements of these companies is more homogeneous. Common features of the firms to determine the population are as follows:

- (1) According to the research time period (2011–2016), the company is listed on TSE before the year 2011 and its name is not removed from the companies mentioned by the end of 2016;
- (2) the fiscal periods of companies should be finished at the end of the solar year in order to enhance the comparability and homogeneity of companies in terms of time period;
- (3) the company should be continuously active during the research period and its shares have been traded, and there is no trading halt; and
- (4) the type of the company activity is productive and thus investment companies, leasing, credit and financial institutions and banks are not included in the sample due to their different natures.

Taking account of the above conditions, a sample size of 103 companies from firms listed on the TSE has been selected. See Table I.

Looking at the details, as regards sample industry distribution, we can find that our sample includes 618 firm-year observations that represent 21 industries and spans the years 2011–2016. In addition, it was found that the groups such as Production of metal products, Computer-related facilities and services, Agriculture and related services and Extraction of oil, gas and other services except exploration have the lowest and the group of Pharmacy has the highest number of observation in our statistical sample.

3.2 Research models

3.2.1 The first research model. To test the research hypotheses, multivariate regression and data panel method have been used in this study. In the first research model, our purpose is to investigate the association between managerial entrenchment and accrual-based earnings

Industry name	Firm-year obsv.	% of sample
Pharmacy	78	12.62
Automotive and the manufacture of automotive parts	72	11.65
Cement, lime and plaster	66	10.67
Other non-metallic mineral products	54	8.73
Basic metals	48	7.76
Chemical products	48	7.76
Food and beverage products except for sugar	42	6.79
Machinery and appliances	36	5.82
Rubber and plastic	30	4.85
Extraction of metal ores	30	4.85
Electric machines and appliances	24	3.88
Textiles	12	1.94
Transportation, warehousing, and communications	12	1.94
Sugar	12	1.94
Tile and ceramic	12	1.94
Petroleum products, coke and nuclear fuel	12	1.94
Production of metal products	6	0.97
Computer-related facilities and services	6	0.97
Technical services	6	0.97
Agriculture and related services	6	0.97
Extraction of oil, gas and other services except for exploration	6	0.97
Total	618	≈100

Table I.
Firm-year
observations
distributed across the
industry sectors

management among Iranian firms. In order to test the first hypothesis, the following regression model was used. In the below model, Accrual Earning Management (AEM) is defined as a dependent variable. In addition, we consider the Entrenchment variable as an independent variable and the rest of the variables are variable controls.

Model 1:

$$\begin{aligned} \text{Accrual Earning Management}_{it+1} = & \beta_1 \\ & + \beta_2 \text{Entrenchment}_{it} + \beta_3 \text{Institutional Ownership}_{it} \\ & + \beta_4 \text{Ownership Concentration}_{it} + \beta_5 \text{Debt}_{it} \\ & + \beta_6 \text{Dividend}_{it} + \beta_7 \text{Size}_{it} + \beta_8 \text{ROA}_{it} \\ & + \beta_9 \text{Investment}_{it} + \varepsilon_{it}. \end{aligned}$$

Dependent variable. It should be noted that one of the most important issues regarding earnings management is the methods of discovery of profit management in business units, the most important of which is the method of discovery of accrual-based earnings management. Discretionary accruals indicate the difference between accounting profit and its related cash. The general interpretation of accruals is that accrued accruals are subject to the management's perception of financial events. The Generally Accepted Accounting Principles have given companies freedom of action relative to the time of identification and the amount of revenue and expense. In fact, when managers identify the accounting profit as an amount more than the resultant cash, the discretionary accruals will be created (Piri and Tobreh Rizi, 2014). The Jones model is one of the accepted models in this field, which is formulated as follows:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \frac{\Delta S_{it}}{A_{it-1}} + \alpha_3 \frac{PPE_{it}}{A_{it-1}} + \varepsilon_{it},$$

where TA is total discretionary accruals (the difference between operational profit and operating cash flow); A_{it-1} the total assets at the beginning of t period; ΔS the sales changes; and PPE is the property, plant and & equipment value.

Independent variable. In this study, managerial entrenchment is the independent variable. By emphasizing on managerial measurements which influence the interests of shareholders, it is one of the most expensive factors that include several structures, among which we could refer to the following items: issues related to limited-voting shares, golden parachutes, earnings smoothing, poison pills, major amendments, etc. Various methods are proposed to analyze the entrenched behavior of the CEO in resources, the most salient of which is the entrenchment index introduced by Bebchuk *et al.* (2009). This index, known as the E index in references, is the total of six variables, four of which limit the voting power of the shareholders. The other two variables, named poison pills and Golden parachutes, are indicative of anti-takeover actions of the management. Lin and Liu (2013) used the CEO tenure as the entrenchment behavior index. To measure the CEO entrenchment, Lin *et al.* (2014) used the main factor analysis based on the following six characteristics of the CEO:

- (1) Shares available to the CEO: CEOs with a higher proportion of shares have more control over firms and this could enhance their capabilities for following their personal interests. Thus, the higher the proportion of shares available to the CEO, the more probable is the emergence of entrenchment phenomenon.
- (2) CEO duality: CEO duality could weaken the board independence and its related performance, which in turn increases the CEO power. If the manager is the board director at the same time, the range of entrenchment goes up.

- (3) Payment: the higher proportion of compensation to the total payment to the manager is indicative of the lower level of CEO entrenchment.
- (4) CEO compensation: the higher proportion of compensation to the total payment to the manager is indicative of the lower level of CEO entrenchment.
- (5) Purchase option for the manager: the higher proportion of compensation to the total payment to the manager is indicative of the lower level of CEO entrenchment. On the other hand, the stock option may be an incentive to the manager.
- (6) CEO tenure: CEOs with longer tenure are more entrenched because they may establish some subgroups and debilitate the quality of internal control.

In this research, similar to Lin *et al.* (2014), Florackis and Ozkan (2009) and also based on the information of the Iranian capital market, we combine a set of corporate governance mechanisms that are probably related to the interest and capability of management to influence the interests of shareholders and evaluate them in the form of managerial entrenchment index. In this paper, we use the explanatory factor analysis (in the form of principal component analysis) to calculate the managerial entrenchment variable. In multivariate statistics, exploratory factor analysis (EFA) is a statistical method used to uncover the underlying structure of a relatively large set of variables. EFA is a technique within factor analysis whose overarching goal is to identify the underlying relationships between measured variables (Norris and Lecavalier, 2010). Mainly, this statistical method is used for two reasons; first, the explanatory factor analysis enables us to combine an extensive set of corporate governance variables to create a managerial entrenchment proxy. However, in the previous studies, a limited set of corporate governance factors were considered as the managerial entrenchment or ignored the multilinearity problem, which could be due to the existence of several corporate governance variables as control or independent variable in the experimental models. On the other hand, controlling the mutually potential relations of the variable is not an easy task. Second, one of the characteristics of explanatory factor analysis is that each variable included in managerial entrenchment has a weight based on the output of correlation coefficient matrix and this method is in contrast with the previous studies, in which the effect of each factor of corporate governance is equal.

Control variables. According to the review of the text, in order to control the impact of other variables that somehow affect research analysis, the variables of institutional ownership, ownership concentration, debt, dividend, company size, ROA and investment will be controlled. Institutional ownership is the total stocks available to the legal entities of firms as the percentage of institutional ownership. Ownership concentration is the number of stocks in the possession of major shareholders, who are among the main shareholders in the firm's financial statement reports or the report of the board to the assembly and possess more than 5 percent of the firm stocks (Hassas Yeganeh *et al.*, 2009). In this paper, total ownership percentage of three major shareholders who possess more than 5 percent of the firm stock is called ownership concentration. The debt ratio is indicative of the amount debts in the capital structure of the firm, which is achieved by dividing total debts to total assets. The following equation is used to achieve the paid dividend: $\text{Dividend} = \text{DPS/EPS}$. Firm size equals the total sale of a firm; in fact, in order to measure the size of the company and also the homogeneity of the data, the logarithm of the company's total sales is calculated. ROA shows information about return on assets. Finally, investment' variable is the ratio of the fixed assets to total assets. What is worth mentioning is that control variables are the same for all study models.

3.2.2 The second, third and fourth research models. In this paper, we are going to know if there is a significant relationship between managerial entrenchment and Real Earnings

Management using three measures of abnormal operating cash flow, abnormal production costs and abnormal optional costs. In order to achieve this goal, the research model is defined as follows.

Models 2–4:

$$\begin{aligned} \text{Real Earning Management}_{it+1} = & \beta_1 + \beta_2 \text{Entrenchment}_{it} + \beta_3 \text{Institutional Ownership}_{it} \\ & + \beta_4 \text{Ownership Concentration}_{it} + \beta_5 \text{Debt}_{it} \\ & + \beta_6 \text{Dividend}_{it} + \beta_7 \text{Size}_{it} + \beta_8 \text{ROA}_{it} + \beta_9 \text{Investment}_{it} + \varepsilon_{it}. \end{aligned}$$

With respect to the second model, REM based on CFO is defined as a dependent variable. In this model, the purpose of the second hypothesis is to investigate the effect of real earnings management on real earnings management using the abnormal operating cash flow' measure. In this regard, the abnormal operating cash flow is as follows:

$$\text{CFO}_t = a + b_1 \text{Sales}_t + b_2 \Delta \text{Sales}_t + e_t,$$

where CFO is operational cash flow ratio to the assets at the beginning of the period; Sales are the sales to the assets ratio at the beginning of period ratio; and Δ Sales are sales changes ratio to the assets at the beginning of period ratio.

In the third model, the research was aimed at examining the second hypothesis of the study in terms of abnormal production costs:

$$\text{PROD}_t = a + b_1 \text{Sales}_t + b_2 \Delta \text{Sales}_t + b_2 \Delta \text{Sales}_{t-1} + e_t,$$

where PROD is the total ratio of production costs (which is equal to the final price of goods sold plus the change of the inventory) to the assets at the beginning of period ratio; Sales are the ratio of sales of the assets at the beginning of the period; and Δ Sales describe sales changes ratio to the assets at the beginning of period ratio.

Finally, we considered that the third hypothesis of this study was examined in terms of optional abnormal costs:

$$\text{DISCEXP}_t = a + b_1 \text{Sales}_{t-1} + e_t,$$

where DISCEXP is general, R&D and advertisement cost ratio to the assets at the beginning of the period; and Sales are the ratio of sales to the assets at the beginning of the period.

3.2.3 The fifth research model. In the last study model, we have a tendency to know if managerial entrenchment affects firm innovation. So as to reach this goal, we designed this model as follows.

Model 5:

$$\begin{aligned} \text{Innovation}_{it+1} = & \beta_1 + \beta_2 \text{Entrenchment}_{it} + \beta_3 \text{Institutional Ownership}_{it} \\ & + \beta_4 \text{Ownership Concentration}_{it} + \beta_5 \text{Debt}_{it} + \beta_6 \text{Dividend}_{it} \\ & + \beta_7 \text{Size}_{it} + \beta_8 \text{ROA}_{it} + \beta_9 \text{Investment}_{it} + \varepsilon_{it}. \end{aligned}$$

Here, innovation variable is identified as a dependent variable. As a matter of fact, the innovation of a company is calculated based on the ratio of the R&D costs to total company costs.

4. Results

4.1 Descriptive statistics

Descriptive statistics are used to describe the basic features of the data in a research (Salehi, Tarighi and Safdari, 2018). To evaluate the data, the descriptive statistics including minimum, maximum, mean, median and standard deviation are calculated and presented in Table II.

The results of Table II are extracted from 103 listed companies on the Tehran Stock Exchange during six financial years. According to the results of descriptive statistics related to the innovation variable and the closeness of the descriptive index to zero (mean, median and Standard deviation of 0.002, 0 and 0.012, respectively), it can be deduced that in general innovation in most Iranian companies is negligible and it is close to zero. In addition, regarding the control variables of this study, it can be stated that on average, three major shareholders owned 73 percent of the shares of the companies under study, in other words, the concentration of ownership in the investigated companies was high and 71 percent of the shareholders of the companies were institutional ones. On average, 82 percent of companies disclosed their intangible assets. In the following, the descriptive statistics related to management entrenchment' components are depicted in Table III.

The results of Table III showed that on average, the board holds 63 percent of the shares of their managed companies, and 67 percent of the board are non-executive members. In general, CEO duality does not exist in most companies, and more than half of the companies have a CEO tenure over three years.

4.2 Kaiser–Meyer–Olkin (KMO) test

The KMO measure of sampling adequacy is a statistic that indicates the proportion of variance in research variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be helpful with your data. If the

Variable	Mean	Median	SD	Min.	Max.
AEM	0.1125	0.0827	0.1072	0.0000	0.8585
REM1	0.1236	0.0828	0.1355	0.0000	1.5338
REM2	0.1369	0.0989	0.1346	0.0000	1.3138
REM3	0.0464	0.0391	0.0480	2.04E-05	0.732107
Innovation	0.0026	0.0000	0.0127	0.0000	0.1389
Debt	0.6005	0.6040	0.4526	0.0127	10.4133
Dividend	0.5887	0.6084	0.6863	0.0000	11.1354
Entrenchment	0.0738	0.1074	0.9600	-2.9806	2.0737
Institutional Own	72.7375	81.3050	24.9314	0.0000	100.0000
Investment	0.2482	0.2124	0.2006	0.0006	2.4797
Ownership Con	70.8238	73.9000	19.6077	0.0000	99.9950
ROA	0.1486	0.1321	0.1611	-0.7896	1.0451
SIZE	13.6633	13.5020	1.7588	7.1017	19.2816

Table II.
Descriptive statistics
of research variables

Variable	Mean	Median	SD	Min.	Max.
Duality	0.010	0	0.101	0	1
Independence	0.669	0.8	0.213	0	1
Tenure	0.514	1	0.5	0	1
Share	62.990	69.295	25.883	0	100
Compensation	7.011	7.09	1.046	2.944	9.384

Table III.
Descriptive statistics
of management
entrenchment
components

value is less than 0.50, the results of the factor analysis probably would not be very useful. In our study, the value of KMO test statistic is 0.59, which means we reasonably can use the factor analysis.

4.3 Factor loadings of exploratory analysis

Factor loadings are numerical values that indicate the strength and direction of a factor on a measured variable. Factor loadings indicate how strongly the factor influences the measured variable. In order to label the factors in the model, researchers should examine the factor pattern to see which items load highly on which factors and then determine what those items have in common (Fabrigar *et al.*, 1999). Whatever the items have in common will indicate the meaning of the factor. In order to calculate the managerial entrenchment variable, EFA based on the matrix of correlation coefficient among five variables, the percentage of board shares, board independence, board tenure, board compensation and the board duality, is performed annually. The new variable called management entrenchment is estimated using the linear combination of five variables of corporate governance based on the following formula:

$$F_j = \sum W_{ji}X_i = W_{j1}X_1 + W_{j2}X_2 + \dots + W_{jp}X_p,$$

where W denotes factor load coefficients and P represents the number of variables. Generally speaking, the results of factor loadings are presented in Table IV.

According to the above results, for example, in 2011, tenure, independence, duality and compensation of the board have a positive relationship with management entrenchment. Among the four variables mentioned above, the compensation of the board has the greatest impact, and the share owned by the board of directors has a negative relationship with management entrenchment.

4.4 F-Limer test

Apparently in accounting studies, when data are collected for several firms over a specific time period, in this case, we are faced with longitudinal data (pooled or panel). Hence, when data are longitudinal, the type of estimation of a model must first be determined. Based on econometric science, first of all, it is necessary to specify whether the model is fitted to the ordinary least squares (OLS) or panel data method. The F -Limer test (Chow) is used for reaching this purpose. In this test, the non-acceptance of the null hypothesis means that the model must be estimated with a panel data pattern and OLS model otherwise (Salehi, Tarighi and Safdari, 2018).

According to the results of Table V, it can be concluded that since the probability value of the H_0 test that is less than 0.05 for all research models, the preference of the OLS method is rejected, while the panel data method is accepted.

Table IV.
Exploratory analysis
factor loadings of
management
entrenchment variable

Variable	2011	2012	2013	2014	2015	2016
Duality	0.024	0.006	0.021	0.001	0.106	0.000
Independence	0.160	0.254	0.216	0.997	0.376	0.334
Tenure	0.024	0.000	0.102	0.005	0.084	0.001
Share	-0.196	-0.173	-0.144	-0.078	0.093	0.240
Compensation	0.997	0.997	0.997	0.159	0.616	0.997

4.5 Hausman test

Following confirming the use of the panel data method in all research models, the Hausman test is used to determine whether a panel data with fixed effects should be used or a panel data with random effect (Salehi, Tarighi and Safdari, 2018). The Hausman test is an important factor in identifying the presence or absence of correlation between the error of regression and independent variables. Random effects model is used if such a relationship exists (the acceptance of H_0), and if it does not, fixed effects model is be used.

What stands out from Table VI is that since the probability value of H_0 is less than 0.05 for the first four research models, the preference of the fixed effects model is accepted and the random effects model is rejected. However, the results of the last model went in opposite direction. Hence, the preference of the random effects model is accepted for the fifth study models.

4.6 Variance inflation factor (VIF)

In statistics, the VIF measures the severity of multicollinearity in an OLS regression analysis. It provides an index that measures how much the variance of an estimated regression coefficient is increased due to collinearity (Salehi, Tahervafaei and Tarighi, 2018). If the linearity is high within a regression equation, this means that there is a high correlation between the independent variable and it is probable that the model lacks high reliability due to the high coefficient of determination. The VIF test is used for the test of linearity. Since the value of calculated VIF in this study is less than 10, there is no linearity among the independent variables. In addition, we annualized the two-by-two correlation of variables and found no high correlation which shows there is no linearity among the variables.

4.7 The results of research models

After performing various statistical tests and identifying its results, the findings of the hypotheses of this research are shown in Table VII.

It is necessary to test the significance of the model before variables examination, approval or rejection of the hypothesis. This can be done by calculating the F -statistic and p -value of this statistic. Since p -value calculated for this statistic is less than 0.05, the

Model	Null hypothesis	Statistic	p -value	Result
Model 1	Preferred OLS	1.95	0.000	H_0 denial
Model 2	Preferred OLS	2.21	0.000	H_0 denial
Model 3	Preferred OLS	1.98	0.000	H_0 denial
Model 4	Preferred OLS	3.36	0.000	H_0 denial
Model 5	Preferred OLS	3.19	0.000	H_0 denial

Table V.
F-Limer test

Model	Null hypothesis	Statistic	p -value	Result
Model 1	Preferred random effects model	27.95	0.000	H_0 denial
Model 2	Preferred random effects model	61.08	0.000	H_0 denial
Model 3	Preferred random effects model	42.32	0.000	H_0 denial
Model 4	Preferred random effects model	70.82	0.000	H_0 denial
Model 5	Preferred random effects model	4.32	0.823	H_0 support

Table VI.
Hausman test

Variable	Model 1 (AEM)	Model 2 (CFO)	Model 3 (PROD)	Model 4 (DISCEXP)	Model 5 (Innovation)
(Intercept)	-0.7846***	-0.5353***	-0.5447***	-0.1961***	0.06339***
Entrenchment	-0.0284***	-0.0318***	-0.0231***	-0.0900***	0.0019***
Institutional Own	-0.0033	-0.0061***	-0.0384**	-0.0022***	0.00015***
Ownership Con	0.0033	0.0086***	0.0060***	0.0032***	-0.0005***
Debt	0.2211	-0.0976***	-0.0623***	-0.0302***	0.0046***
Dividends	-0.1090***	0.3502***	-0.0286***	0.0075***	0.0025***
SIZE	0.0349***	-0.0781***	0.0298***	0.0145***	-0.0048***
ROA	0.5769***	0.4426***	0.3153***	0.0596***	-0.0180***
Investment	0.2693**	-0.2477***	-0.2359***	-0.0712***	-0.0182***
<i>Summary model</i>					
R^2	0.54	0.53	0.54	0.60	0.31
Adj. R^2	0.27	0.33	0.35	0.43	0.17
F-statistic	2.02	2.69	2.80	3.53	3.82
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000
Durbin-Watson	2.13	2.12	2.24	2.17	1.95

Table VII.
The results of the
research models

Note: **,***Statistical significance of 5 and 1 percent

significance of all models can be confirmed at the five-percent error level. According to the result, the high value of R^2 shows all our models will fit better our data. One of the important assumptions in the classical regression model states that the regression residuals should have the lack of serial autocorrelation. Since the amount of Durbin-Watson state for all models is between 1.5 and 2.5, this provides strong evidence of the lack of serial autocorrelation in the residuals.

The first hypothesis deals with investigating the relationship between managerial entrenchment and accrual-based earnings management. Given the obtained results of the first study model, the level of possibility of managerial entrenchment is less than 5 percent. Consequently, H_0 , namely the insignificance of the obtained coefficient is rejected and H_1 is accepted and the obtained coefficient is statistically significant. The results of this hypothesis showed a negative and significant connection between managerial entrenchment and accrual-based earnings management. Regarding the control variables of this model, it can be mentioned that the variables of Investment, firm size and ROA are positively connected with managerial entrenchment; however, the relationship between the Dividends variable and dependent variables is significantly negative.

With respect to the second hypothesis, we decided to evaluate the effect of managerial entrenchment on real earnings management using the different measures of abnormal operating cash flow (CFO), abnormal production costs (PROD) and abnormal optional costs (DISCEXP) by three separate models. The results suggested that there is a negative and significant association between managerial entrenchment and Real Earnings Management (REM) in Iran market. The outcomes also indicated that Real Earnings Management is high when the amount of debt decreases; in addition, companies with a better financial position are more likely to engage in real earnings management activities. We also found strong evidence that firms in which the ratio of the fixed assets to total assets is high have less tendency to involve in real earnings management behavior. Finally, according to the outcomes of the fifth model, we realized that the probability level of managerial entrenchment is less than 5 percent, which means the relationship between managerial entrenchment and firm innovation is significant. The positive sign of managerial entrenchment coefficient signifies a positive and significant relationship between these two variables.

5. Discussion

Consistent with agency theory, different corporate governance mechanisms in the form of managerial entrenchment led to reducing the manipulation of financial reporting. In this regard, our findings will warn investors and stakeholders that managerial entrenchment might be the best way in decreasing the earnings management and the agency problems in emerging economies, especially those markets struggling with financial sanctions like Iran.

Inconsistent with the managerial entrenchment theory suggesting the growth of entrenchment leads to a lower investment in innovation, and managers may have little investment in R&D activities due to the risk associated with project failures (Chakraborty *et al.*, 2014; Beyer *et al.*, 2012), the results showed that the managerial entrenchment contribute to the firm value when the firms are full of financial problems. As previously mentioned, the majority of Iranian firms experienced financial distress because of severe economic sanctions during the study period. In such economic environment, our findings showed that the manager who has a higher proportion of shares, the manager who is the board director at the same time and those with longer tenure have a better power to improve the financial situation of a firm. In other words, the entrenched managers were not afraid of the determining effect of risk of innovative projects on occupation and position and had tendency to invest in innovation at a higher level in order to get rid of financial problems.

It is strongly recommended that creditors, analysts, investors and other stakeholders to place more emphasis on the quality of corporate governance and the characteristics of the board of directors in their economic decisions. Considering the importance of R&D costs and the possibility of manipulating them, it is suggested to the authorities of the stock exchanges in developing countries to provide the mandatory requirements for better and more accurate disclosure of such costs for investors to examine.

What is worth mentioning is that researchers always have limitations in their research. Of course, it should be noted that research constraints do not mean the research failure in the stages of development, implementation, analysis and explanation of the results. As with other studies, this research has encountered some limitations:

- The limitation of access to financial information of companies led to the use of public corporations listed to Tehran Stock Exchange for research purposes. Therefore, research results for other companies will not be generalized.
- Financial statements are not subject to moderation due to the effects of inflation, and this may affect the results of the research.
- Many companies prevent disclosure information about salary, management-owned shares and CEO compensation as the highest executive, so there is no possibility to carefully check the management entrenchment index for all firms listed on TSE.

6. Conclusion

Due to the importance of the existence of the necessary mechanisms and the desirable quality of profit, most societies have made efforts to provide the appropriate corporate governance system. In recent decades, there have been different theories about the relationship between corporate governance mechanisms and profit management, and various empirical research studies have been carried out on these theories that led to the confirmation or rejection of the aforementioned theories. This research also explores the relationship between the quality of corporate governance in the form of the "managerial entrenchment" and earnings management among the firms listed on Tehran Stock Exchange. The results of the study indicate a negative and significant relationship between managerial entrenchment and accrual-based earnings management. This means that the entrenched managers are less likely to engage in manipulating discretionary accruals in the

Iranian context. The second purpose of this study was to examine the link between managerial entrenchment and real earnings management using three different measures. In this paper, the measures of abnormal operating cash flow (CFO), abnormal production costs (PROD) and abnormal optional costs (DISCEXP) were used as a proxy for evaluating the real activities manipulation. The results witnessed that sanctuary managers are really interested in decreasing the level of activities related to real profit management in Iranian market. Hence, our findings are consistent with the studies of Pugh *et al.* (1992), Stein (1988), Gompers *et al.* (2003), Zhao and Chen (2008), Bebchuk *et al.* (2009) and Banko *et al.* (2013).

In the second step in this paper, our goal was investigating the influence of managerial entrenchment on firm innovation. The evidence experiences a positive association between management entrenchment and firm value. This implies that Iranian managers who have more executive power in the decision-making process of a company have been able to drive the corporate innovation. In keeping with this notion, Hirshleifer *et al.* (2012) believed that the provision and operation of innovative projects can be a sign of management risk-taking capacity. When entrenchment takes place, since management has the power to decide, it is not afraid of the determining effect of risk in innovative projects in that it is willing to invest in such projects. Kamoto (2016) indicated that there is a positive relationship between the purchase of control stock by the management and the range of innovation. On the other hand, Chakraborty *et al.* (2014) concluded that by the increase of entrenchment the regulative effects of external control are declined and this could cause a lower investment in innovation.

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About the authors

Dr Mahdi Salehi is Associate Professor of Accounting Department at the Ferdowsi University of Mashhad, Mashhad, Iran. His research interest focuses on auditing, accounting and finance. So far, he has published papers in referred journals including *Management Decision*, *Asian Journal on Quality*, *Money and Economy*, *Banks and Bank Systems*, *Periodica Polytechnica*, *Social and Management Sciences*, *Finance India*, *Investment Management and Financial Innovations*, *International Journal of Law and Management*, *International Journal of Economics and Business Research*, *Zagreb International Review of Economics & Business*, *Journal of Asia Business Studies*, *Industrial and Commercial Training*, *Problems and Perspectives in Management*, *Humanomics*, *International Journal of Accounting, Auditing and Performance Evaluation*, *Management Research Review*, *International Journal of Social Economics*, *Journal of Management*

Development, Qualitative Research in Financial Markets, Asia Pacific Journal of Innovation and Entrepreneurship, International Journal of Productivity and Performance Management, Journal of Economic and Administrative Sciences, Journal of Economics, Finance and Administrative Science, International Journal of Development Issues and Grey Systems: Theory and Application. Dr Mahdi Salehi is the corresponding author and can be contacted at: mehdi.salehi@fum.ac

Mahbubeh Mahmoudabadi obtained her MA in Accounting from the Ferdowsi University of Mashhad, Mashhad, Iran. Her research interest focuses on auditing, accounting and finance.

Mohammad Sadegh Adibian is doing his PhD in Economics at the Ferdowsi University of Mashhad, Mashhad, Iran, His research interest focuses on general economics and micro economics.

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