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Stock market reaction to real earnings management, financial risk and business risk

Seyed Nima Vali Nia[a], Mohammad Hossein Ranjbar[a,*], HojjatAllah Salari[a], Davood Khodadady[a]

[a]*Department of Accounting, Bandar Abbas Branch, Islamic Azad University, Bandar Abbas, Iran*

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Abstract

Studies conducted on real earnings management seek to identify abnormal levels of business unit activities since real earnings management is associated with a change in timing or structure of the real activities of a business unit. However, more limited studies have been conducted on the effect of real earnings management on investors' decisions and market stakeholders and types of companies' risks. Thus, the present study is an attempt to examine the market reaction to real earnings management, financial risk and business risk of companies listed on the Tehran Stock Exchange. The present study is descriptive in terms of nature and correlational in terms of method. The statistical population of the present study is the companies listed on the Tehran Stock Exchange during 2008-2018. A total of 260 companies were selected as statistical samples using the systematic elimination method. The data were collected from relevant and valid databases and analyzed using regression equations and panel data. The results revealed that the market reaction to real earnings management and financial risk of companies is negative and its reaction to business risk is positive. Real earnings management also has a significant effect on the financial and business risk of the studied companies.

Keywords: market reaction, real earnings management, financial risk, business risk.

1. Introduction

Stock exchange and its operating mechanism can gain a suitable position in the financial and economic structure of the country to develop and expand liquidity resources. One of the preconditions for economic development is successful in attracting and providing huge resources so that if these requirements are not met, it will deviate from the path of production and added value and

*Corresponding author
Email addresses: nimavalinia@yahoo.com (Seyed Nima Vali Nia), Mhranjbar54@gmail.com (Mohammad Hossein Ranjbar), Hojjatslr@gmail.com (HojjatAllah Salari), Khodadady47@gmail.com (Davood Khodadady)

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will cause a reduction in economic health [25, 1]. Financial markets, especially the stock market, have been created as a part of the market of production factors to guide stray funds and stagnant savings of the private sector to finance investments in projects and businesses. The Activity of these markets allows the use of private-sector capital in real economic activities such as production and job creation. In fact, the main function of the capital market is to finance manufacturing and service activities [38]. To achieve this important goal, the shares of companies listed on the capital market must be attractive enough for investors to invest. Return on investment is one of the most important indicators of the attractiveness of a given company's stock for investors. Return on investment originates more from stock price changes rather than anything else [16]. A part of the expected return on investment in stocks of companies is provided through dividends, which are a function of the company's performance and profitability as well as dividend policy. Earnings sharing policy has always been considered and has a special place in the modern financial literature. The relationship between dividend policy and company value has also been a controversial issue since the introduction of Miller and Modigliani [31] dividend irrelevance theory. The dividend irrelevance theory hypothesis has been inspired by other hypotheses that seek to explain the effect of dividends on company value. One of the most important hypotheses in this regard is the dividend signalling hypothesis, which states that in a market with asymmetric information, companies pay dividends to provide private information about the company's future prospects to stakeholders. Since dividends are good predictors of future earnings, the announcement of the dividend increase is considered as good news, and thus, the stock market shows favorable reaction and vice versa [7]. The Market pays more attention to timely information and uses this information more effectively in decision making. Although most companies publish the financial statements required by the responsible institutions at given time intervals, it can be argued that the rate of delay in publishing financial statements varies significantly from one company to another company. This relationship is known as the 'good news early, bad news late' model. One of the motivations of managers to report bad news late can be to try to reduce the negative reaction of the market since the market reacts less too late news [8]. Managers always tend to hide negative information and news from investors and accumulate it within the company or manipulate information. This phenomenon is due to the weakness of the company's internal controls by its owners [27, 9]. There is some uncertainty about the outcome of making any investment decision. "Uncertainty" means that we do not know exactly what will happen in future. Although the terms "risk" and "uncertainty" are often used to refer to the same concept, they are different. Uncertainty means not knowing what is likely to happen, but risk deals with the way of determining the amount of current uncertainty. As uncertainty increases, the risk will also increase, and the risk is in fact the degree of uncertainty. As a result, making financial and investment decisions face a variety of risks that can be categorized into different classes. Some types of risk, especially financial risk and business risk are related to the characteristics of companies or their management methods. Financial risk arises from the company's financing policies and the degree of financial leverage, and business risk arises from business policies and the way of allocating the resources to expenditures [10]. It is natural that the degree of each of these risks can affect the value of companies' assets in the market and the interests of stakeholders. The present study was an attempt to investigate the stock market reaction to real earnings manipulation in financial reporting (real earnings management) and financial and business risks. For this purpose, the theoretical foundations and literature of research are reviewed and then the hypotheses are presented based on the theoretical foundations and related scientific frameworks. Then, the research method and results are presented. Finally, the obtained results are discussed and are interpreted and analyzed in a scientific language in the discussion section.

2. Theoretical Foundations and Literature of Research

The stock market reactions to advertisements and news of the company are different, and in some cases, the reaction of investors is not rational and causes abnormalities such as excessive increases in prices. Considering the lower than expected reaction hypothesis, investors expect stocks that have been winners (losers) in the past to maintain positive (negative) growth in the future. This view remains in their minds until an external force neutralizes it. Thus, investors react to the new news published in the market with a delay. Past empirical studies in accounting and financial literature provide evidence to support the efficient market hypothesis. The price drift is the result of a persistent underreaction to earnings news. It suggests that the market underreacts to information on earnings announcements and hence that future returns are somewhat predictable [5], [30]. However, several studies provide strong evidence on stock market abnormalities that seem to contradict the efficient market hypothesis [23, 12]. If the market is efficient, it can be stated that the relevant information is disseminated quickly and completely in the market, and as a result, the pricing system works properly, and cash and savings will be directed towards profitable activities.

In the last two decades, following the financial scandals of companies such as Enron and WorldCom, internal controls have been in the focus of attention of legislators to increase investor confidence in the reliability of financial statements. Sarbanes Oxley Act of 2002 required companies to publish internal control reports, and investors could be informed of the quality of the company's internal control system. In Iran, in accordance with Article 11 of the Tehran Stock Exchange Admission Guidelines, it has published internal control guidelines for publishers listed on the Tehran Stock Exchange since 2012 [13]. Based on this article, management is responsible for assessing the effectiveness of internal controls and must prepare reports on the results of assessing internal controls. The company's independent auditor is also required to comment on the establishment and apply an appropriate and effective internal control system. Risk-averse investors, on the other hand, avoid entering risky markets or markets with uncertain horizons. Knowing how investors react to corporate earnings returns can make a significant contribution to making optimal decisions. On the other hand, lack of sufficient information and uncertainty in the capital market may affect the reaction of investors to the unexpected earnings of companies [17, 19]. In the case of uncertainty, investors do not have enough information about the companies' future cash flows. Under these conditions, receiving an information signal such as an earnings announcement may lead investors to reconsider their previous beliefs about the future situation [36]. As more information becomes available, the investor's existing (former) beliefs change to later beliefs. When investors become aware of this issue (i.e., any new information over time changes their personal beliefs or uncertainties), a new source of change over time in the set of investment opportunities is created by changing fluctuations in returns. This examination is done by investors or brokers based on new information and changes their previous beliefs is in fact learning over time about the underlying structure of the economy, indicating that moving away from the main assumptions of traditional asset pricing models in the area of complete information. This issue is at the core of growing theoretical literature on the impact of learning on asset pricing [35]. It reflects the behavior of the market and its reaction to various factors. Also, the market reaction in different industries is different based on theoretical views on production and depends on factors such as production volume, production price, sales volume, warehousing costs and other characteristics of companies. Cash and credit sales are one of the main factors influencing the earnings management of companies. It is directly related to the volume of produced and stored products. Increasing or decreasing the produced products based on market reaction originated from long-term management of managers in relation to earnings of companies and can be considered as an influential factor in changes in financial risk. Investors usually seek returns appropriately with

their risks through their financial analysis [41]. In a conventional market, where market agents have information, high returns will always lead to higher risk, meaning that investment decisions are often made based on the relationship between risk and return. Accounting earnings are crucial in several aspects, such as having information content for the capital market with the aim of helping investors make decisions, which emphasizes the relevance and timeliness of earnings. Accounting earnings are also used to evaluate the company and take actions such as the number of managers' bonuses, which emphasizes the certainty of the reported earnings figure. Based on studies conducted in the area of earnings information content, change in stock prices when accounting earnings are announced indicates earnings information content [3]. Prediction of earnings and announcement of earnings of companies is one of the most important criteria for evaluating companies by investors. Company earnings statements provide information to market analysts to evaluate the performance of companies. If the companies' earnings announcement has information content, it will affect the behavior of users, especially actual and potential investors, and causes market reactions and the creation of abnormal returns [39]. The process of measuring earnings and their outcome plays a major role in the management of companies, and usually, users of financial statements give more importance to it. Since the calculation of the companies, earnings are influenced by the accounting methods and judgment of those who have prepared it, and the preparation of financial statements is the responsibility of the management of the business unit, the management may manage the earnings for various reasons [11].

It is also expected that earnings management play a role in increasing or decreasing the cost of capital and financial risk. In general, the current period earnings can be managed in two ways. In the first method, managers can manipulate earnings through discretionary accruals, and in the second method, they can manipulate earnings through real activities. For this reason, they may change the timing and amount of real activities such as production, sales, investment, and financing activities to achieve their desired goal [20]. Unlike accruals-based earnings management, real earnings management changes real operations in an effort to increase earnings in the current period. It may challenge the company's operating cycle and subsequently affect the company's value. Recent studies have found that the entry of companies into real earnings management has a significant negative impact on stock returns and accounting in the coming years, and a decline in the company performance due to real earnings management is more severe than a decline in performance due to accruals management [18]. Schepper [40] defines earnings management as a purposeful involvement in the process of external financial reporting with the aim of gaining personal benefits. also describes earnings management as a selection of accounting practices by a manager to achieve specific goals. Earnings management is different from fraud and distortion of financial statements because earnings management is done entirely within the framework of accounting standards. Earnings management is considered as one of the indicators of earnings quality measurement. It means that earnings that are less managed have higher quality. Various methods such as manipulation of accounting, control of accruals and economic decisions are used to manage earnings. Manipulation of accounting methods involves selecting among different methods or changing estimate rates, and controlling accruals by taking measures such as selecting sales credit procedures and policies to increase sales. Manipulation of real activities occurs when managers predict that earnings will fail to meet their goals unless they take actions that stem from the normal procedure of the company or when other factors restrict the management of discretionary accruals. However, it should be noted that manipulating real activities is not a means of changing the arrangement of accounts. Also, accrual-based earnings management activities have no direct consequences for cash flow [30]. Gunny [22] found in a study that companies are often involved in earnings management by manipulating real activities. Earnings generated through the management of real earnings also have an inverse relationship with the future

performance of companies. Zhu et al. (2015) investigated the level of earnings management through real activities before merging and acquiring the company. The results showed that increasing earnings management through real activities leads to increasing the value of the company before merging and acquiring [44]. Zang [43] found that companies met earnings goals in the last three months of the year by manipulating real activities such as price reduction to accelerate sales temporarily. Sohn and Kim [28] found that borrowing costs are inversely associated with earnings management criteria such as overproduction and reduction of discretionary spending. Medeiros and Martinez [30] also examined the ability to include earnings management through real activities in expectations compared to the future performance of the business unit by the Brazilian capital market and found that the capital market is unable in including earnings management through real activities in expectations compared to the future performance of the business unit. Usually in economics, especially in investment, it is assumed that investors act rationally. Rational investors prefer certainty to uncertainty, and in this case, it can be stated that investors are not interested in risk, or investors are risk-averse. A prerequisite for investing is performance appraisal and profitability, risk analysis and estimation of return on investment and one of the most important risks is financial risk. In other words, financial risk in relation to details of earnings acquired by companies increases the knowledge and information of micro-stakeholders who have less access to information and increases information transparency [21]. Companies that have earnings stability are far from risk and experience lower capital costs [32].

Risk is the probability of losing all or part of earnings or the capital or volatility of return on investment [42]. Examining the returns formulas, we find that the risk of each share is determined by changes in the price and dividend of that share. Investors looking to maximize their wealth try to invest in assets that have a high rate of return and low risk. If a person invests in securities their return rate is higher than the expected rate of return, the market value of these securities will increase [33]. The economic environment of companies plays a key role in the performance of companies. Risk can be due to macroeconomic policies and factors of the country, such as privatization, GDP, etc. or policies adopted at the level of companies, such as financing methods, liquidity policies, company growth, etc. The most important of these factors are inflation risk, market risk, trade risk, financial risk, political risk and economic risk [15]. The risk that arises from the way of a financing company is called financial risk. In other words, it is the probability of losses that arise from the capital structure of the company and is determined using financial leverage, company size and the current ratio [6]. Due to the risk of inability to repay the principal and guaranteed interest on debt and bankruptcy, which can be the result of using debt, the variability in the company's returns increases due to the use of financial leverage. It is also true for operating leverage, which means a change in operating earnings as a result of a change in sales volume. Provided that other conditions are constant, with increasing operating leverage, the variability in the return on common stock will increase. It can be stated that financial risk is a part of the risk of the whole company that is related to the capital structure and decisions made in this regard. Given what was stated above, it seems that manipulation of real activities (earnings management) can change the level of business and financial risk in companies and, consequently, significantly change market behavior. Also, according to theoretical and scientific foundations of research, it is expected that financial and business risk in companies to change market behavior. Thus, this study is an attempt to examine the effect of real earnings management on financial and business risk and to assess the market reaction to earnings management. It also aims to investigate the variability of market behavior caused by the degree of risk of companies.

3. Research Hypotheses

Hypothesis 1: Manipulation of real activities (real earnings management) increases business risk.
Hypothesis 2: Manipulation of real activities (real earnings management) increases financial risk.
Hypothesis 3: Manipulation of real activities (real earnings management) causes a negative reaction of stock market.
Hypothesis 4: Financial risk of companies causes a negative reaction of stock market.
Hypothesis 5: Business risk of companies causes a negative reaction of stock market.

4. Research Methodology

The present study is descriptive and quasi-experimental research and correlational in terms of method and applied in terms of expected results. In order to prepare the theoretical foundations and research literature, the library method was used based on the study of valid scientific articles and books, and in order to collect the data needed to test the hypotheses, the archived data in the databases of the relevant stock exchange related to the capital market and companies listed in it were used. The statistical population of this study included all companies listed on the Tehran Stock Exchange during 2008 and 2018. A total of 262 companies were selected by applying restrictive judgments and their data were studied in a purposeful manner. Some of the criteria considered to select the sample included industrial and manufacturing companies, the availability of their information, the concurrence of financial periods and lack of long logs of more than three months. The data were also analyzed using regression models with panel data characteristics and using Eviews software.

5. Research model and measurement of variables

To analyze the data and test the research hypotheses and based on the theories and theoretical foundations for each of the hypotheses, a separate regression model was considered as follows:

$$BR_{i,t} = \alpha_0 + \alpha_1 RAM_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MRKTBK_{i,t} + \alpha_5 SR_{i,t} + \varepsilon_{i,t}$$
$$FR_{i,t} = \alpha_0 + \alpha_1 RAM_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MRKTBK_{i,t} + \alpha_5 SR_{i,t} + \varepsilon_{i,t}$$
$$MR_{i,t} = \alpha_0 + \alpha_1 RAM_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MRKTBK_{i,t} + \alpha_5 SR_{i,t} + \varepsilon_{i,t}$$
$$MR_{i,t} = \alpha_0 + \alpha_1 BR_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MRKTBK_{i,t} + \alpha_5 SR_{i,t} + \varepsilon_{i,t}$$
$$MR_{i,t} = \alpha_0 + \alpha_1 FR_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MRKTBK_{i,t} + \alpha_5 SR_{i,t} + \varepsilon_{i,t}$$

In these models:
$BR_{i,t}$: business risk of the company is in year t. Business risk is measured in terms of operating leverage, which is equal to the percentage of changes in sales / percentages of changes in earnings before interest and tax = operating leverage.
$FR_{i,t}$: financial risk of the company i in year t. Financial risk is measured based on the degree of financial leverage, which is equal to the percentage of changes in earnings before interest and tax / the percentage of change in earnings per share = the degree of financial leverage.
$MR_{i,t}$: Market reaction of the company i in year t. This variable is defined as the absolute value of the stock price return of the company i in year t.
$RAM_{i,t}$: Real earnings manipulation in the company i in year t. To measure this variable, standardized means of different criteria for manipulating the real activities of Roychowdhury [37] approach have been used, which is introduced at the end of this section.
$ROA_{i,t}$: return on assets of the company i in year t. This index is calculated as the ratio of net earnings divided by total assets.

$SIZE_{i,t}$: natural logarithm is of assets of company i in year t.
$MRKTBK_{i,t}$: ratio of market value to the book value of the company i in year t.
$SR_{i,t}$: systematic risk of the company i in year t.
$m_{i,t}, n_{i,t}, z_{i,t}, l_{i,t}, k_{i,t}, h_{i,t}, v_{i,t}, w_{i,t}, \xi_{i,t}$, and $\varepsilon_{i,t}$ are residuals of company i in year t for research models.

The GMM approach is used to estimate these models. The reason for using the GMM method is the existence of a possible causal relationship between the variables on the right side of the equation, making classical panel methods cannot estimate coefficients and effects without bias. Also, using the GMM approach saves a number of control variables. In other words, in this model, there is no need for the presence of many control variables. Although the presence of control variables in the classical panel is helpful in further explaining the model, it reduces the degree of freedom of the model, and this issue makes the reliability of the model vulnerable. However, considering the measurement of the variable $RAM_{i,t}$, which indicates the manipulation of real activities, the standardized mean of different criteria for manipulation of real activities of the Roychowdhury approach has been used. Roychowdhury [37] have estimated 4 models and their residuals are considered as an indicator of manipulation of companies' real activities:

1. $\frac{CFO_{it}}{ASSET_{it-1}} = B_1 \frac{1}{ASSET_{it-1}} + B_2 \frac{SALE_{it}}{ASSET_{it-1}} + q_{it}$
2. $\frac{PROD_{it}}{ASSET_{it-1}} = X_1 \frac{1}{ASSET_{it-1}} + X_2 \frac{SALE_{it}}{ASSET_{it-1}} + X_2 \frac{\Delta SALE_{it}}{ASSET_{it-1}} + X_2 \frac{\Delta SALE_{it-1}}{ASSET_{it-1}} + r_{it}$
   $PROD_{it} = \hat{C}OGS_{it} + \hat{\Delta} INV_{it}$
   $COGS_{it} = \hat{C}OGS_{it} + o_{it} = \Upsilon_1 \frac{1}{ASSET_{it-1}} + \Upsilon_2 \frac{SALE_{it}}{ASSET_{it-1}} + o_{it}$
   $\Delta INV_{it} = \hat{\Delta} INV_{it} + p_{it} = \Omega_1 \frac{1}{ASSET_{it-1}} + \Omega_2 \frac{\Delta SALE_{it}}{ASSET_{it-1}} + \Omega_2 \frac{\Delta SALE_{it-1}}{ASSET_{it-1}} + p_{it}$
3. $\frac{DIS_{it}}{ASSET_{it-1}} = \Phi_1 \frac{1}{ASSET_{it-1}} + \Phi_2 \frac{SALE_{it}}{ASSET_{it-1}} + \Phi_2 \frac{\Delta SALE_{it}}{ASSET_{it-1}} + y_{it}$
4. $\frac{TA_{it}}{ASSET_{it-1}} = \Gamma_1 \frac{1}{ASSET_{it-1}} + \Gamma_2 \frac{\Delta SALE_{it}}{ASSET_{it-1}} + \Gamma_2 \frac{PPE_{it}}{ASSET_{it-1}} + d_{it}$

In these equations: CFO_{it}: operating cash flow of company i in year t,
$ASSET_{it}$: value of the total assets of the company i in year t,
$SALE_{it}$: sales of the company i in year t,
q_{it}: Regression residual as an unusual cash flow of company i in year t (the first index of manipulation of real data)
$PROD_{it}$: Production cost of company i in year t (equal to the total cost of goods sold plus predicted inventory changes)
$\Delta SALE_{it}$: first-time difference in sales of company i in year t,
r_{it}: Regression residual as the cost of abnormal production of the company i in year t (the second index of real data manipulation)
$\hat{C}OGS_{it}$: estimated cost of goods sold by company i in year t
ΔINV_{it}: Predicted stock changes of company i in year t,
$\hat{\Delta} INV_{it}$: The cost of goods sold by company i in year t,
$COGS_{it}$: Changes in the inventory of company i in year t,
o_{it} and p_{it}: regression residuals
DIS_{it}: discretionary costs of company i in year t, which is equal to administrative, general and sales, research and development and advertising costs
y_{it}: Regression residuals as abnormal discretionary costs of company i in year t (third index of real data manipulation)
TA_{it}: Accruals of company i in year t.
PPE_{it}: The value of the property and equipment of company i in year t,
d_{it}: Regression residuals as non-discretionary accruals of company i in year t (fourth index of real

Table 1: Descriptive statistics of model variables.

Variables	Mean	Median	Max	Min	SD	Kurtosis	Skewness	Jarque-Bera	Probability level
COGS/ASSET(-1)	1.3890	0.4518	97.3619	0.0000	6.0446	9.1298	99.9774	740091	0.0000
DINV/ASSET(-1)	0.0866	0.0397	10.9429	-0.5136	0.3534	21.1557	593/8006	26663505	0.0000
1/ASSET(-1)	0.0000	0.0000	0.0001	0.0000	0.0000	5.7027	41.6135	123202	0.0000
SALE/ASSET(-1)	1.6901	0.5892	100.5803	-0.0374	6.6864	8.4074	84.3919	524960	0.0000
ΔSALE/ASSET(-1)	0.2298	0.0532	36.1739	-21.7055	2.0633	5.4571	112.7410	924327	0.0000
ΔSALE(-1)/ASSET(-1)	0.1158	0.0285	29.4347	-67.0792	2.4826	9.6134-	336.0024	8455781	0.0000
CFO/ASSET(-1)	0.3025	0.1242	32.0573	-4.3493	1.4456	12.5087	213.8739	3427118	0.0000
PROD/ASSET(-1)	1.4574	0.5299	92.7404	-2.5327	5.9257	8.7008	89.7423	594856	0.0000
DISX/ASSET(-1)	0.0587	0.0552	0.7477	0.0199	0.0254	14.0518	341.4447	8765431	0.0000
TA/ASSET(-1)	0.0116	0.0066	1.9376	-2.2193	0.2057	0.4467-	20.0100	22050	0.0000
ROA	0.2606	0.0879	35.4445	-12.7709	1.8253	10.3194	158.0737	1860010	0.0000
SIZE	14.0705	13.9640	20.6136	9.3471	1.7058	0.3532	3.7076	76	0.0000
FR	-37.2048	0.8460	220.7696	-68116.5600	1595.1390	42.-6564	1821.0380	252000000	0.0000
BR	2.4873	1.0073	1516.7140	-1332.6720	75.8590	1.0001	228.7327	3872905	0.0000
MR	2.2837	0.7600	200.0000	0.0000	8.2149	13.4054	244.1002	4472458	0.0000
SR	-0.5507	0.0000	150.4631	-68.9856	8.1732	-0.6774	101.0365	1259302	0.0000

data manipulation).

As stated above, the residuals of each four main regressions cover an aspect of the real information manipulation component. For this reason, to have a comprehensive index of real information manipulation, it must be measured by four indicators. Here, using the standard z distribution, all four indices were first standardized and then the mean of the standardized indices was considered as the index of real information manipulation, that is, RAM variable.

6. Results

6.1. Descriptive Statistics

The results of descriptive statistics of research variables (Table 1) show the descriptive parameters for each variable separately. These parameters mainly include information about central indices such as minimum, maximum, mean, median, as well as information about dispersion indicators such as standard deviation.

6.2. Investigation of linear regression model assumptions

Unit root test

One of the assumptions considered in the application of conventional and common econometric methods in estimating model coefficients using time series data is the stationarity of the variables used. A time series variable that its mean, variance, and autocorrelation coefficients are constant over time is called stationary. If the variables are non-stationary in estimating the econometric model, the estimated regression will be false and will not be reliable. Thus, to get rid of false regression and reach a reliable model, the stationarity of variables of the model are examined using the unit root test. To get rid of false regression and reach a reliable model, the stationarity of variables of the model are often examined in time series data using the Augmented Dickey-Fuller (ADF) unit root test (ADF). However, several articles have suggested that panel unit root tests are more capable than time series unit root tests.

Table 2: Examining of stationarity of variables using LLC test.

Variable	Statistic LLC	Probability level	Result
$\Delta SALE(-1)/ASSET(-1)$	-11237/8000	0.0000	Stationary
ROA	-6576.2000	0.0000	Stationary
SIZE	-2915.8800	0.0000	Stationary
RI	-159.5910	0.0000	Stationary
BR	-30.6440	0.0000	Stationary
FR	-524.3070	0.0000	Stationary
MRKTBK	-1620.6000	0.0000	Stationary
SIZE	-2915.8800	0.0000	Stationary
ROA	-6576.2000	0.0000	Stationary
$TA/ASSET(-1)$	-7846.6100	0.0000	Stationary
$DISX/ASSET(-1)$	-45.1117	0.0000	Stationary
$PROD/ASSET(-1)$	-7638.6000	0.0000	Stationary
$CFO/ASSET(-1)$	-127.9460	0.0000	Stationary
$\Delta SALE/ASSET(-1)$	-3000.36131	0.0000	Stationary
$SALE/ASSET(-1)$	-24119200	0.0000	Stationary
ASSET	-2600.2517	0.0000	Stationary
$DINV/ASSET(-1)$	-7921.2300	0.0000	Stationary
$COGS/ASSET(-1)$	-423.1570	0.0000	Stationary
SR	-48.5209	0.0000	Stationary

In general, unit root tests in the data panel include LLC, ADF, and IPS tests. Among them, the LLC test is selected as the most appropriate test in most studies. This selection is due to the appropriateness of this test for panels with a small-time period. In addition, LLC is more powerful than IPS, while ADF is also appropriate for the characteristics of time series data not for panel data. The results of this test for the variables used in the research model are shown in Table 2. As Table 2 shows, all variables are at stationary level. In other words, for all regressions in all tests, the null hypothesis that states the existence of unit root is rejected. Hence, it can be concluded that the residuals in all accumulated regressions are from zero and the possibility of false regression in the final model is rejected.

6.3. Modeling and measuring of real activities manipulation

As shown in the previous section, all variables are at the stationary level, so all study models can be estimated for the level of variables. However, since the data used to model and measure the manipulation of real activities are panel type data, it was first necessary to determine the estimation method using the panel data method. In the first step, the F test is performed to examine the presence or absence of a separate intercept for each section. In the second step, the Hausman test is used to test whether the equations should be estimated using fixed or random effects. The results of these tests are presented in Table 3.

As test F shows, the hypothesis of homogeneity of sections is rejected only for models 1 to 5 of the research, so the use of panel data estimation methods (fixed or random effects) is necessary for them and based on the Hausman test, fixed effects are more efficient than random effects in all five of these models. Therefore, all 5 models are estimated by the fixed effects method. However, based on the F test, in model 6, the assumption of homogeneity of sections is not rejected, so this model

Table 3: F and Hausman test results.

Test	Model	Statistic f	Chi-square statistic	df	Probability level	Result
F	CFO/ASSET(-1)	7.4270		2515.254	0.0000	Rejection of the null hypothesis that states sections are homogeneous
Hausman	CFO/ASSET(-1)		93.0979	3	0.0000	Fixed effects are more efficient than random effects
F	COGS/ASSET(-1)	12.7207		2794 .254	0.0000	Rejection of the null hypothesis that states sections are homogeneous
Hausman	COGS/ASSET(-1)		66.8318	2	0.0000	Fixed effects are more efficient than random effects
F	DINV/ASSET(-1)	2.0087		2789.254	0.0000	Rejection of the null hypothesis that states sections are homogeneous
Hausman	DINV/ASSET(-1)		199.2196	3	0.0000	Fixed effects are more efficient than random effects
F	DISX/ASSET(-1)	1.9512		2789.254	0.0000	Rejection of the null hypothesis that states sections are homogeneous
Hausman	DISX/ASSET(-1)		160/8841	3	0.0000	Fixed effects are more efficient than random effects
F	PROD/ASSET(-1)	8.2368		2531.254	0.0000	Rejection of the null hypothesis that states sections are homogeneous
Hausman	PROD/ASSET(-1)		0.0000	4	1.0000	Fixed effects are more efficient than random effects
F	TA/ASSET(-1)	0.9451		2789.254	0.7186	confirmation of the null hypothesis that states sections are homogeneous
Hausman	TA/ASSET(-1)	Due to the homogeneity of the sections, there is no need to use Hausman test in this model				

Table 4: Results of modeling and measuring the real activities manipulation.

Dependent variable	CFO/ASSET(-1)			COGS/ASSET(-1)			DINV/ASSET(-1)		
Independent variables	Coefficients	Statistic t	Probability level	Coefficients	Statistic t	Probability level	Coefficients	Statistic t	Probability level
intercept	0.2328	3.7490	0.0002	-0.0560	-0.9050	0.3656	-0.2490	-4.2136	0.0000
1/ASSET(-1)	-38152.3400	-6.9814	0.0000	14052.3100	3.1600	0.0016	42323.2800	5.3765	0.0000
SALE/ASSET(-1)	0.2056	4.7825	0.0000	0.7959	18.6349	0.0000	0.0069	5.4213	0.0000
ΔSALE	-0.0257	-1.0200	0.3078				0.0014	1.4626	0.1437
Coefficient of determination	0.6340			0.9774			0.1835		
Adjusted coefficient of determination	0.5966			0.8304			0.1006		
Statistic F	16.9538			516.0119			2.2138		
Significance level of statistic f	0.0000			0.0000			0.0000		
Durbin-Watson statistic	1.6421			1.6133			2.1633		
Dependent variable	PROD/ASSET(-1)			DISX/ASSET(-1)			TA/ASSET(-1)		
Independent variables	Coefficients	Statistic t	Probability level	Coefficients	Statistic t	Probability level	Coefficients	Statistic t	Probability level
intercept	0.0464	8.10E+13	0.0000	0.0402	16.5974	0.0000	0.0251	4.9753	0.0000
1/ASSET(-1)	4561.0850	6.26E+13	0.0000	2159.4210	6.9424	0.0000	-398.4868	-4.2969	0.0000
SALE/ASSET(-1)	0.8214	9.75E+15	0.0000	0.0004	4.4576	0.0000	0.0606	3.4258	0.0006
ΔSALE/ASSET(-1)	0.0058	4.85E+13	0.0000	-0.0001	-0.9195	0.3579		-1.9203	
ΔSALE(-1) /ASSET(-1)	0.0011	1.37E+13	0.0000						
PPE/ASSET(-1)							-0.0277	0.0144	0.0549
Coefficient of determination	94.2142			0.1525			0.0353		
Adjusted coefficient of determination	92.1252			0.0744			0.0343		
Statistic F	95.6185			1.9532			37.0833		
Significance level of statistic f	0.0000			0.0000			0.0000		
Durbin-Watson statistic	1.8740			2.0266			1.8753		

will be estimated by the pooled effects method. The results of the model estimation are presented in Table 4.

6.4. Estimation of research models and analysis of results

In relation to each of the questions (objectives) of this research, a unique model was considered. These models are dynamically specified, so that dependent variable has appeared on the right of them. The presence of a dependent variable on the right of the equations reduces the need for control variables and thus increases the degree of freedom of the estimated models and time dynamics are considered in the model. In data panel data, for models that are dynamically specified, the use of classical data panel regression approaches (pooled effects, fixed effects, random effects, etc.) does not provide efficient results. In this case, it is necessary to use the generalized method of moments (GMM).

Investigating the effect of real activities manipulation on business risk and financial risk Models (4) and (5) are specified with regard to the effect of real activity manipulation on business and financial risks. Estimation of these models is presented in Table 5 by the GMM method. Sargan

Table 5: Results of modeling and measuring the real activities manipulation.

Model	**(4)**				**(5)**			
Dependent variable	FR				BR			
Variable	Coefficient	SD	Statistic t	Probability level	Coefficient	SD	Statistic t	Probability level
FR(-1)	-0.3544	0.0038	-94.4078	0.0000				
BR(-1)					0.0075	0.0014	5.3572	0.0000
RAM	-28.9492	9.6711	-2.9934	0.0028	1.1249	0.3488	3.2252	0.0013
ROA	-371.7448	151.8154	-2.4487	0.0144	24.6202	4.9276	4.9964	0.0000
SIZE	-65.0521	20.4387	-3.1828	0.0015	-3.7138	1.4235	-2.6123	0.0091
MRKTBK	0.0027	0.0020	1.3525	0.1764	0.0000	0.0001	0.2881	0.7733
SR	-55.9371	7.0335	-7.9530	0.0000	0.2943	0.0277	10.6425	0.0000
Sargan statistic	24.3361				33.4475			
Probability level of Sargan statistic	0.8893				0.4945			

statistic in relation to both estimated models is larger than the critical value of this statistic so that the level of significant probability of Sargan test in both models is greater than 10%. Hence, both models are sufficiently valid for analysis.

The results show that real information manipulation at the level of 5% probability has a significant effect on financial and business risks, but this effect is negative for financial risk and positive for business risk. The coefficient of real information manipulation in the financial risk model and business risk model is equal to -28.9492 and 1.1249, respectively. In these models, some of the changes in business and financial risks are also significantly explained by their past values. Also, in both estimated models, the company return on assets and company size at the 5% probability level has a significant effect on financial and business risks, but the effects of the ratio of market value to book value of companies on financial and business risks are not statistically significant. Also, the effect of systematic risk on financial risk is negative and its effect on business risk is positive and significant.

6.5. Investigating the market reaction to real information manipulation, financial risk and business risk

Models (1-6) to (1-10) are related to market reaction to poor internal controls, real information manipulation, financial risk and business risk, respectively. These models are also estimated by GMM method in Tables 4,5,6 because they have been specified dynamically. In all 5 estimated models, the Sargan statistic is larger than the critical level of the Sargan table. Therefore, the probability level of the Sargan statistic in all 5 estimated models is greater than 0.10. As a result, the null hypothesis that states variables of tools are sufficient and efficient concerning all 5 models is confirmed. It indicates the validity and reliability of the analysis and conclusions resulting from 5 models. Based on the estimated models, about 2.9 to 4.8% of the current changes in the market reaction (absolute value of the company's stock return) are explained by last year values of the market reaction variable. Thus, the coefficient of the dependent variable on the right side of the models is approximately between 0.029 and 0.048 percent and these coefficients are statistically significant at the probability level of 5%. The coefficient of the financial risk variable in the model (6) is equal to -0.0528 and is statistically significant at the probability level of 5%. It indicates that financial risk has a significant negative impact on market reaction. In model (7), the business risk coefficient is equal to 0.6324 and is statistically significant. Therefore, the market shows a positive and significant reaction to the financial risk of the studied companies. In model (8), the coefficient of the variable of real data manipulation of the company is equal to -0.1629 and is statistically significant at the 5% probability

Table 6: Results of estimating research models related to market reaction to poor internal controls, real information manipulation, financial risk and business risk.

Variable	(6)				(7)				(8)				(9)				(10)			
Dependent variable	RM				RM				RM				RM				RM			
Variable	Coefficient	SD	S statistic	Probability level	Coefficient	SD	S statistic	Probability level	Coefficient	SD	S statistic	Probability level	Coefficient	SD	S statistic	Probability level	Coefficient	SD	S statistic	Probability level
RI(-1)	0.0307	0.0046	6.6398	0.0000	0.0317	0.0048	6.5559	0.0000	0.0290	0.0043	6.6831	0.0000	0.0482	0.0042	11.5900	0.0000	0.0471	0.0045	10.5795	0.0000
FR	-0/0528	0.0397	-1/3288	0.1840																
BR					0.6324	0.1366	4.6312	0.0000												
RAM									-0.1629	0.0579	-2.8149	0.0049								
ROA	0.3879	0.2245	1.7276	0/0842	0.3480	0.1786	1.9486	0.0514	0.4183	0.2146	1.9489	0.0514	0.5180	0.2465	2.1015	0.0357	1.1094	0.3926	2.8255	0.0048
SIZE	1.1917	0.0878	13.5775	0/0000	1.0853	0.0795	13.6467	0.0000	1.1567	0.0892	12.9707	0.0000	1.8229	0.0886	20.5748	0.0000	1.8730	0.1136	16.4947	0.0000
MRKTBK	0.0000	0.0000	-2/6834	0/0073	0.0000	0.0000	-2.5546	0.0107	0.0000	0.0000	-2.7246	0.0065	0.0000	0.0000	-0.9525	0.3410	0.0000	0.0000	0.5300	0.5961
SR	-0/0138	0.0071	-1/9625	0/0498	-0.0141	0.0074	-1.9069	0.0566	-0.0117	0.0065	-1.7821	0.0748	-0.0365	0.0065	-5.6391	0.0000	-0.0338	0.0075	-4.4925	0.0000
Sargan statistic	65.8455				70.9732				65.1129				59.4723				61.0309			
Probability level of Sargan statistic	0.2818				0.1571				0.3034				0.1944				0.1587			

level. It indicates that poor internal controls cause a significant reduction. The coefficient of return on assets is also positive and statistically significant in relation to all 5 models reported in Table 6. Accordingly, with increasing return on assets, market reaction to return on assets will increase. Also, the coefficient of the variable of company size in all 5 estimated models in Tables 4,5,6 is positive and statistically significant, indicating that with increasing size of the company; the market reaction will be more severe. The coefficient of the variable of market value to book value ratio in Table 6 is statistically significant, but its coefficient is almost equal to zero, indicating that with increasing market value to book value ratio, the market reaction will be limited and low. The coefficient of systematic risk in all 5 models estimated in Table 6 is negative and statistically significant.

7. Discussion and Conclusion

Investors enter the capital market intending to gain benefits and earn the expected returns, and generally expect to gain more returns than other parallel markets due to the serious risks of this market. Given higher uncertainty in this market compared to other markets, they react more to information and their expectations from future cash flows and risk classes are different from other markets. Uncertainty on the future situation in this market also causes more fluctuations in asset prices and creates more risk, and consequently, the tendency of risk-averse investors to operate and invest in this market decreases. As a result, investing in this market requires higher rewards to tolerate more risk. When there is uncertainty in predicting asset price sensitivity to new news, investors may not have the ability or tendency to transform a set of distributions into a single probability distribution. In such a situation, they adopt a conservative or pessimistic approach in making decisions, which leads to asymmetric behavior in which investors give more weight to bad news than good news. Deliberately manipulation of earnings or real earnings management is one of the factors that can cause changes in investors' estimates and expectations. It also seems that earnings management by companies and their degree of financial and business risk cause a reaction in market behavior and, consequently, change in investors' decisions. Given the importance of this issue and lack of research to examine simultaneously the relationships between real earnings management, financial risk and business risk and market reaction to these variables, this study was conducted the examine the relationships between these variables simultaneously and by studying data of 262 companies operating in the Tehran Stock Exchange during 10 years from 2009 to 2008, it provided results that are explained below.

In this study, according to theoretical foundations, 5 regression models were considered and the

collected data were analyzed using the GMM method. In this regard, following the research of Roychowdhury, S. [37], 4 independent models were estimated to calculate the real earnings management, and the residues of these 4 models were considered as indicators of real information manipulation. Each of these indicators covers one aspect of the real information manipulation component. For this reason, to have a comprehensive index of real information manipulation, it was necessary to calculate an index from four regression residues of Roychowdhury, S. [37]. For this reason, using the standard z distribution, all four indices were first standardized and then the mean of standardized indices was considered as an index real information manipulation.

Results of testing the first and second hypotheses of the study in examining the relationship between real activities manipulation and business risk and financial risk show that real earnings manipulation at an error level of 5% has a significant effect on financial and business risks. This effect is negative regarding financial risk and positive regarding business risk. Also, investigating market reaction to real information manipulation, financial risk and business risk shows that financial risk has a negative and significant effect on the market reaction and the business risk coefficient is equal to 0.6324 and is statistically significant. Therefore, the market shows a positive and significant reaction to the financial risk of the studied companies. In other words, financial risk has a positive and significant effect on the market reaction, with increasing the size of the company, the market reaction will be stronger, and with increasing the ratio of market value to book value, the market reaction will be very limited and low. Also, systematic risk coefficients in all 5 estimated models are negative and statistically significant. In other words, with increasing the systematic risk of companies, the market reaction will be in the opposite direction. Thus, based on these results, strong internal controls in the financial and administrative structures of companies can systematically reduce opportunistic management behaviors, so it can decrease deviations caused by conflicts of interest and moral risk. Also, improving the quality of financial reporting has a positive effect on the way of managing using and investing these resources. Creating confidence in internal controls improves information asymmetry and reduces conflicts of interest between stakeholders in the company, since the flow of information is provided completely and transparently, and internal processes do not allow opportunistically behaviors due to weaknesses in internal control systems. As a result, internal controls can improve the quality of financial reporting increase information symmetry reduce conflict of interest and increase monitoring and supervising on the management. As a result, it is expected that internal controls increase the efficiency of investment of used resources used and moderate the inefficiency caused by over-investment and under-investment. Poor internal controls can lead to shareholders' information risk and consequently increase the company's cost of capital, increased deviations (intentional or unintentional), bias in profitability reporting, and reduced effectiveness and efficiency of business operations. These results are completely consistent with the results of studies conducted by J.S. Hammersley. [24] Yiwen Li et al. [29] and in line with the results of the study conducted by Roychowdhury [37], which showed to avoid reporting losses and present better earnings margins, companies reduce discretionary spending. Results of the study conducted by DA Cohen, et al. [18] showed a higher willingness of executive managers to manage earnings through real activities to manipulate accruals so that in real earnings management, cash becomes the victim of accrued earnings and its most important loss is loss of value of company due to the reduction of cash flows in the future period. These results are also consistent with those of the research conducted by Chapman [14], who states that companies meet earnings goals in the last three months of the year by manipulating real activities such as price reductions to temporarily accelerate sales. They are also in line with a part of the results of studies conducted by Gunny [22] on the relationship between earnings management using manipulation of real activities and future performance, Cohen and Zarowin [18] on real earnings management activities based on accruals and based on the supply

of seasonal stocks, Izadnia et al. [26] and Friday Kennedy Ozo [34] on examining the stock market reaction to cash dividends and Hyungjin et al. [17] on employee tenure and earnings management through manipulation of real activities, and on earnings manipulation by managing real activities and investors' perceptions. They are also consistent with the results of the studies conducted by Ahmadpour and Amouzadeh Mehdiraji [4] in confirming the results of the stock market impact on financial risk and business risk.

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