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The Effect of Disclosure Quality on Information Efficiency of Prices and Expected Return

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ABSTRACT

Generally speaking, the price of an asset is efficient when its price is close to fundamental value of that asset. Price contains information for valuable market economy, since it helps efficient resource allocation. The purpose of this study is to explore the effect of disclosure quality on information efficiency of prices and expected return. It is descriptive from methodological aspect and applicable from objective aspect and is an ex-post facto research because the current situation of variables has been analyzed via data collection through previous information. Four hypotheses were proposed and 110 firms (880 year-firm) were selected using systematic sampling for the time period 2012-2019. The collected data was analyzed in Excel software by means of STATA 15. The obtained results revealed that disclosure quality has a negative and significant effect on expected return (CAPM model). Disclosure quality has a positive and significant effect on expected return (the Fama-French model); but disclosure quality is not effective on information efficiency of prices (variance of monthly returns and stock price bubble).

Keywords: Disclosure Quality, Information Efficiency of Prices, Expected Return

INTRODUCTION

It has been concluded in several studies that because disclosure quality of accounting information can decrease information asymmetry, the related risk will be lower and will enhance the firm value. However, some few studies have concluded that there is a positive relationship between disclosure quality and cost of capital. Therefore, some scholars have proposed theoretical models to explain the relationship between disclosure quality and cost of capital under various circumstances. Theoretically, some studies have found a negative relationship between disclosure quality and cost of capital. Diamond and Verrecchia (1991) showed that disclosure of public information to reduce information asymmetry can decrease the cost of capital. This is realized through increasing of demand attraction by great investors due to increased liquidity of its securities. Lambert et al. (2007) have found that high quality accounting information and financial disclosure are effective on the evaluated covariance of the liquidity flow with other firms. This effect moves uniformly toward cost of capital and closer to the risk-free rate.

According to theoretical principles of financial reporting, the primary purpose of financial reporting is to assist the investors to adopt economic decisions which are about optimal allocation of resources. Moreover, one of the most important economic decisions are those related to investing in stocks which is a function of quality of the presented information by invested firms. The capital market is one of the major elements of economic growth and development in each country. Rezaei and Hesar (2013) point out that whatever the quality of accounting information is better in the market, more optimal investment decisions will be adopted. In logical decision-makings, more accurate information is more important and investment decisions are more dependent on accounting information. In recent studies, researchers have shown that information risk is the undiversifiable risk in the capital markets. They believed that the role of information asymmetry among the investors to determine the cost of capital is the reason for occurrence of information risk. Investors who have less information are faced with a higher level of information risk than those who have more information. In other words, this undiversifiable information risk obliges uninformed investors to demand higher stock returns with more private information (Esli & Ohara, 2014). The factor through which the effect of information environment in discovering the stock price can be explored is the information risk. Firms with high information risk have less public information and the shareholders are informed about the firm's news privately (Zhang, Ki & Kisee, 2013). Francis et al. (2004) indicate that it is important for managers to pay attention to the point that the information risk is effective on the investors' expected return. Private information of managers and lack of accuracy in the reported information will enhance the information risk.

One of the methods that help investors explain investment risk and return is the use of capital asset pricing model. This model was introduced by William Sharpe in 1960. In this model that is referred to as the standard capital asset pricing model, the effect of systematic risk on the investment portfolio is evaluated via beta coefficient. The capital asset pricing model represents a framework to show the relationship between risk, return, and risk premium. By assuming an efficient capital market, the market portfolio pricing in each time interval reflects the balanced relationship for consensus on risk and expected return. In the capital asset pricing model, normal distribution of returns is assumed and it is concluded that the mean variance criterion can be an optimal rule for decision-making by assuming people' risk-aversion and normal distribution of returns while distribution of returns is not essentially normal and it often has considerable difference with normal distribution. This model has highly been considered by investors and

financial analysts so that it has been utilized in many recent studies such as Zhosung and Chengh (2008) in Shanghai Stock Exchange and Roghros and Rroberto (2009) in Sao Paulo Stock Exchange (Fathi et al., 2012). Braven and Rily (2002) indicate that investments have mainly risk because of fluctuation in their return. Elliot and Peter (1994) have shown that less disclosure of information will be led to increased information risk and more disclosure of information will decrease information risk. Sharof et al. (2013) have explored the effect of correctional securities that eliminates the restrictions of "undisclosed information" as well as free disclosure of information before equity. They have concluded that firms have higher pre-release disclosure after adjustments significantly and this pre-release disclosure is associated with decreased information asymmetry and reduced cost of capital of equity. Besides, some studies have found that higher disclosure quality is important for firms that have high market friction which is shown with less attention of the investor or stock liquidity.

Botosan (1997) found that the firm's analyst does not have a positive effect on the relationship between the firm's disclosure level and cost of capital of equity. Armstrong et al. (2011) have concluded that when the markets are imperfect which is shown by the few numbers of shareholders, information asymmetry will have a positive relationship with cost of capital in many standard risk factors. Neg (2011) investigated the relationship between high quality information and low liquidity risk and found a relationship between them. Besides, reduction of cost of capital due to this relationship is economically considerable.

Some studies have shown that any change in disclosure quality is effective on cost of capital for active firms in a country that does not have special rules for disclosure like the US. For instance, Leuz and Verrecchia (2000) have examined German firms which had changed their method from German reporting standards to the international reporting standards and undertook them to enhance their disclosure level. They concluded that components of information asymmetry of cost of capital behave like bid-ask spread and volume of transactions for change in the predicted direction (reduction of bid-ask spread and increasing of volume of transactions). Hill (2002) has maintained that because the Swiss firms have much authority in reporting and compulsory disclosure level, it seems that Switzerland is highly suitable for the analysis of relationship between disclosure quality and cost of equity. Moreover, there is a negative and significant relationship between the two variables. Considering the above issues, the present study seeks to answer this question: Is disclosure quality effective on information efficiency of prices and expected return?

RESEARCH BACKGROUND

In a survey entitled "information efficiency and the investor's sensitivity to stock price", Adams et al. (2017) showed that when the price has information efficiency in the market, price bubble is created that is effective on investors' decision-making regarding the stock price. Oliver and Mikhail (2017) explored financial restrictions of the firm and asset pricing with the role of risk. Using factor of safety as the criterion for information risk, they discussed about the Fama Macbeth regression to investigate the relationship between information quality and future stock return. In addition, two-stage cross-sectional regression analysis was conducted at the firm and the selected sample levels to test whether coefficient of accruals quality in China has been priced besides the existing factors in the Fama-French three-factor model or not. They revealed that diversification to confront financial restriction is effective on leverage restrictions and its impact on asset pricing to some extent. The argument is that the investors allocate a limited portion of their investment to risky assets. Rahel and Chen (2017) explored the relationship between information risk, stock return and capital asset pricing. Adequate quality of weaknesses is related to the recognized future stock. Moreover, evidences of quality commodity market pricing have been found beside the existing factors in the Fama model. Besides, the following analysis demonstrated that investors in non-public firms have higher value than the public firms. Lee et al. (2016) examined the effect of corporate governance on information efficiency of prices. The results of their research indicated that corporate governance increases information efficiency of prices. Safdar (2016) explored the effect of high information risk on accruals quality given high costs of equity in China. The analysis showed that the positive relationship between information risk and cost of equity is observable both for non-public and public firms. Likewise, the obtained results present some evidences to support the theories and show the role of information risk in pricing decisions of investors. Park and Soheen (2016) explored the role of expected return in capital asset pricing. Intuitional interpretation of inter-temporal capital asset pricing model of Campbell (1993) will be presented. In this model, long-term perspective of investors in the stock market is important and any revision in the perspective is converted into a pricing factor. The set of factors had been made of indirect predictions and prevented accurate prediction of VAR factor model and discuss about return predictability. Empirical results show that the innovation factor has been priced intensively among the assets and has a close relationship with mobility and liquidity factors. Zhang et al. (2013) tested the effect of information risk and transaction costs on primary and successive reactions of the market to the earnings news. They found that the initial reaction of the market is higher for each unit of unexpected earnings in firms with higher information risk (the effect of information content). Similarly, they showed that the information risk creates transaction costs; transaction costs restrict the market reaction and are led to further diversions (the effect of transaction costs). Ozoguz et al. (2013) investigated the relationship between firm investments' sensitivity to the stock price of peer firms by emphasizing the information content of stock price of peer firms and competition in the market. They used Tubin's Q model to measure investments' sensitivity to the stock price of peer firms and utilized market focus that is measured via Herfindahl-Hirschman index to measure competition in the market. The results of their survey revealed that increased competition in the market and rapid growth and more capital are effective on investments' sensitivity to the stock price of peer firms.

Ferreira, Miguel and Clara (2013) conducted a study entitled "the impact of an effective board of directors on information efficiency" and came to the conclusion that there is a direct relationship between effectiveness of the board of directors and information efficiency. This is because board of directors is regarded as the main element of corporate governance that has a major role beside the shareholders and CEO versus beneficiaries. If it is effective, information efficiency will be enhanced. Nett et al. (2012) carried out a study to analyze shareholders' sensitivity and the effect of market-related factors on shareholders' sensitivity.

They concluded that the factors related to the capital market have a significant effect on shareholders' sensitivity. Dong (2011) explored investment sensitivity of firms to inaccurate assessment using Tubin's Q ratio. The statistical population in this study was consisted of companies listed in London Stock Exchange during the time period 1991-2008. Also, the statistical sample included 2857 firms and the number of observations for analysis was equal to 19990 year-firm. The results showed a significant relationship between firms' investment and components of inaccurate assessment both at the level of firm and industry after controlling the variables, i.e. growth opportunities, financial leverage and cash flows. In their survey entitled "beta stability as a systematic risk index (in the capital asset pricing model), Allen and Bujang (2009) explored 50 companies listed in Bursa Malaysia. The time period of the study was from January 1994 to December 2001. The results illustrated that both Fama-French model and capital asset pricing model explain positive and negative increases in the stock price and sudden revenues but the results of these models are different to a considerable extent.

Disclosure quality of information and expected return and information efficiency

Investment is one of the primary needs for passing from an under-developed economy to a developed economy and degree of investment in any economic system determines the level of economic growth, market prosperity and finally improved public welfare (Sinaei & Davudi, 2009). Thus, it can be stated that information plays a basic role in the capital market performance and investors need the information that helps them perform a successful investment. Information is the central core of efficiency. In markets where the information on performance of firms is not accessible or is given to market participants gradually, investors will be faced with problem in choosing the best investment opportunities and finally it diverts the optimal process of equipment and allocation (Ghalibaf Asl & Nateghi, 2016). Similarly, bubble at the level of prices may occur in a market that suffers inefficiency, because the main reason for appearance of the price bubble and the distance between intrinsic price and market price is lack of complete information. A bubble can simply be defined as intensive and continuous increasing of price of an asset or set of assets that initial increase in prices is due to increasing price expectations and consequently, attraction of new purchasers. This price increase is often accompanied by a series of reverse expectations and severe reduction of prices that is often led to financial crises (Cheng & Lu, 2009; Smirnov et. al., 2021).

There are various viewpoints about how institutional investors are effective on firms' performance. Under the active monitoring hypothesis, institutions probably manage their investment actively due to the volume of invested wealth. According to this attitude, institutional investors are skillful shareholders who have comparative advantage in information collection and processing. Totally, previous studies confirm this hypothesis. As a result of this argument, a positive relationship can be predicted between investment decisions and firm performance. Investors show sensitivity to decision-making in investment given the accessible information to the public. Due to this, the firm performance is questioned, as it depends on the volume of investors (Andria, 2017). Dow and Gorton (1997) maintained that stock prices are in the hands of many market activists as a result of information accumulation that some of them may have high information on the degree of published information in most active firms. Higher (lower) price of stock in stock markets shows positive (negative) additional information that motivated managers have about investment opportunities and previous decisions of managers. Valuation of this market is feedback of the financial market that shows investment decisions either for moving, postponing or omitting of a project or are intermittently led to underinvestment or overinvestment (Goldstein & Guembel, 2008). According to the results of Subrahmanyam and Titman's research (1999), the major purpose of managers is to achieve valuable information about the stock prices before decision-making to publish it in public. Foucault and Fersard (2012) proposed the hypothesis that learning process enhances efficiency of capital allocation of the firm. Moreover, they claimed that whatever investment sensitivity to the price is higher, it is led to better operational performance. The conducted studies about investment sensitivity to the price demonstrate similar and favorable results. For instance, Morck et al. (1990) found that the information about stock prices is not important for managers, because market valuation does not have more information than the internal valuation. Blanchard et al. (1993) point out that if stock prices cannot totally reflect fundamental principles, the role of market valuation in reflecting investment decisions will become restricted. They argue that transferring from old shareholders to the new ones is the managers' reaction to inaccurate pricing of market by issuance of new stock. The obtained revenues may be used to purchase risk-free financial assets and may not be utilized in physical investment in order to prevent reduction of the marginal product of capital. Information, how it is interpreted, and its speed of dissemination have a sensitive and major role in market efficiency. In an efficient market, the information that is spread in the market is effective on the price rapidly. Hence, in such market, the securities price is close to its intrinsic value (Lee et al., 2016). Blumfield and Fisher (2011) indicated that lack of agreement among the investors can increase cost of capital because of investors' lack of confidence in relevant beliefs in the market. Even if less cumulative disclosure is shown to the investors, cumulative disclosure, again, can reduce the cost of capital by omitting lack of agreement among the investors with regard to the errors of commission. Most empirical studies have shown that cost of capital is decreased by increasing of information about a firm. Singoi and Dissay (1971) have concluded that most probably, inadequate disclosure of information in the annual report enhances fluctuations in market price of securities, since investors adopt decision based on non-targeted indexes when there is not adequate information. Besides, they have stated that these fluctuations are effective on cost of capital and the management decision for investment is led to inadequate allocation of capital resources in economy. Some studies have explored firms with better corporate governance or higher voluntary disclosure that have more annual return and have concluded that cost of equity in these firms is so high.

Botosan and Plumplee (2002) have concluded that levels of annual report, timely disclosure, investor relations activities (accumulation in various types of disclosure that is led to information reduction) and cost of equity is decreased at the disclosure level of annual report but they are increased in timely disclosure (because of increased fluctuation of stock price). They did not find a relationship between cost of equity and level of investor relations activities. Gao (2010) has maintained that disclosure quality can

increase the investor's wealth through decreased cost of equity that is valid just under restricted conditions. Hermalin and Weisbach (2012) revealed that increased compulsory disclosure can explain increased reward and financial turnover rate of the CEO to some extent. This increase is separate from the optimal level that will decrease the firm value. Chinnel (2013) found that high (low) level of disclosure is led to over-investment (under-investment). Some researchers claim that financial accounting has proposed other dimensions for exploration of corporate governance. Sloan (2001) argues that financial accounting is the key element of the corporate governance process and highlights research opportunities about the role of financial accounting in governance mechanisms. Bushman and Smith (2001) found that governance research at an extensive level investigates the use of financial accounting information in corporate control mechanisms. In addition, some studies have explored the level of corporate governance and disclosure quality and have found that the level of corporate governance and disclosure quality are determined endogenously and firms which have better corporate governance have better disclosure quality too. Verrecchia (1990) has shown that higher quality information means low threshold level of disclosure and more probability of disclosure. Coor (2001) concentrates on voluntary disclosure and assumes that disclosure policies of firms are determined endogenously and by the same forces which form corporate governance structures and managerial motivations. Healy and Palepu (2001) have stated that financial reporting and disclosure are potential important tools for management to disclose the firm performance and corporate governance for foreign investors. Also, it is unlikely that disclosure changes are occurred due to random events and probably they are changed with the governance and economy. Francis et al. ((2008) have concluded that firms with good earnings quality have more costly voluntary disclosure than the firms with weak earnings quality and voluntary disclosure is related to low cost of capital. Some studies have also revealed that managerial activities are related to disclosure quality. Darnoff and Kim (2005) came to the conclusion that investment opportunities, foreign financing, and ownership structure are associated with governance quality and functions of disclosure; and those firms which have higher governance and high ranking of transparency have higher value in stock markets. Chen et al. (2008) found that family firms have less earnings forecasting and conference calls but they have more earnings warnings. Moreover, family ownership dominates non-family internal ownership and concentrated institutional ownership in explaining the possibility of voluntary disclosure. Bayer et al. (2010) have concluded that the information environment of the firm is developed endogenously and as a result of information asymmetry and agency problems among the investors, entrepreneurs and managers. Chen and Liu (2013) have found that firms with high level of corporate governance will allocate more managerial reward to disclosed information and there is a positive and significant relationship between information disclosure and corporate governance as well as between firm value and corporate governance.

Some studies have concluded that better corporate governance and disclosure quality are related to better efficiency of the stock price. For example, Verrecchia (1980) has acknowledged that the more accurate the disclosure, the more one can expect the investors to spend on information processing. In addition, prices will be adjusted to the information more rapidly by increased expenses of investors. Thus, speed of price adjustment toward information is increased correspondingly through increased accuracy with regard to the information (that is determined via consensus judgment among the investors). Besides, some studies have found that disclosure quality has a positive relationship with stock liquidity and notification of price. Healy and Palepu (1993) have concluded that disclosure strategies can present an important potential tool for the managers to impose their knowledge on foreign investors even if the capital markets are efficient. Walker (1995) investigated the relationship between disclosure policy and liquidity in equity markets and showed that the relative difference of bid-ask spread for the firms which are ranked third from the bottom of distribution category in disclosure ranking is relatively 50 percent more than the firms which are ranked third from above the distribution category. It means that a good disclosure policy can decrease information asymmetry and thus, increase liquidity in equity markets. Gelb and Zarowin (2002) explored the relationship between voluntary disclosure and information value of stock prices and found that more disclosure of information is related to stock prices which include more information about future earnings. In addition, some studies have investigated the relationship between disclosure quality and information asymmetry. Bosh and Louise (2005) have examined the economic consequences of compulsory change in OTCBB firms to adapt themselves with reporting conditions under Article 1934 of the Stock Exchange. They have concluded that the firms which have recently acted under the same article have shown more increase in their liquidity that means increased disclosure can decrease information asymmetry. Brown and Hillegiest (2007) argue that the negative relationship between disclosure quality and information asymmetry is primarily due to reduced possibility of information discovery by investors and transaction based on private information. Cullen et al. (2013) have used the price delay presented by Hu and Mosqovitz (2005) to explore the effect of quality of accounting information on stock price efficiency and have concluded that weak quality of information is related to adjustment, price delay and increased stock return in the future. Therefore, they have asserted that quality of accounting information has a role in timely discovery of stock price.

Research hypotheses

Generally speaking, when it is stated that the price of an asset is efficient, its price is close to fundamental value of that asset. Price contains information for a valuable market economy, since it helps efficient resource allocation. Several studies have been carried out about the effect of corporate governance on firm value and profitability. Gompers et al. (2003) showed that firms in which shareholders rights are stronger, their stock value, sales growth and earnings are higher too. Cremers and Nair (2005) found that firms in which financial turnover is high (low), their stock pricing is underestimated or (overestimated). Chang et al. (2010) showed that the corporate governance structure is led to higher liquidity of the stock market. Bomer and Kelly (2009) found that the stock with higher institutional ownership have higher price efficiency. Chang and Yu (2010) explored the effect of capital structure on information efficiency of prices and concluded that the capital structure can be designed in a way to enhance information efficiency of prices. Indeed, Ajinkya et al. (2005) and Karamanou and Vafeaz (2005) showed that abundance and accuracy of earnings

forecast are enhanced with effectiveness of the board of directors. Byard et al. (2006) found that stronger corporate governance enhances voluntary and compulsory disclosure quality of the information. This, in turn, will enhance accuracy of earnings forecast by analysts. This is because better disclosure and more transparency improve traders' ability for APT pricing error and accurate valuation of the stock and corporate governance enhances information efficiency of prices most probably. Bomer and Kelly (2009) showed that institutionalized investors increase information efficiency of prices. Chang et al. (2010) demonstrated that liquidity of the stock market is higher for the firms which have better governance structure. Also, previous studies have illustrated that institutionalized investors prefer firms which have better quality of governance (Chang & Zhang, 2011) and information efficiency of prices is increased with liquidity of the stock market (Groudia et al., 2008). Ferreira et al. (2011) found that firms whose stock price has information efficiency have a weaker governance structure. Price of an asset has information efficiency when market activists present accurate and complete information about the price. According to Gompers et al. (2003), firms with weaker governance structure have lower market value, because if shareholders rights are weak, there will be smaller liquidity flow for shareholders (Lee et al., 2016).

Hypothesis 1: Disclosure quality is effective on expected return.

Hypothesis 2: Disclosure quality is effective on information efficiency of prices.

Research variables

Independent variable: disclosure quality

The score of companies listed in Tehran Stock Exchange by the Securities and Exchange Organization has been used. Tehran Stock Exchange has reported the scores related to companies' disclosure since 2003. Ranking has been performed based on the criteria of relevance and reliability of disclosed reports by firms (Mashayekhi & Farhadi, 2013).

Dependent variable: expected return

The first index: return using CAPM model. To calculate expected return, CAPM method is utilized according to Samadi et al.'s research (2007) that is the calculation of normal stock return and then the stock market return. Return is measured as below: the following relation is used to calculate the stock return for firm *i* in the fiscal year *t* (Gergory et al., 2009):

$$Re_{it} = \frac{p_t(1 + \alpha + \beta) - (p_{t-1} + c\alpha) + D}{p_{t-1} - c\alpha} \times 100$$

Model (1)

where:

Re: stock return

D: dividend per share in a year

A: capital growth from savings

B: capital growth from demands and cash contribution

P_t: share price at the end of period *t*

P_{t-1}: share price at the end of period *t-1*

C: nominal value of stock

The stock market return that is the average stock market return is indeed the balanced average for the return of all existing stock in the stock market according to the below relation:

$$R_{mt} = \frac{\sum_{i=1}^{N} R_{it} X_{it}}{\sum_{i=1}^{N} X_{it}}$$

In the above relation, R_{mt} is the stock market return and X_{it} is total number of the stock for firm *i* as its volume of stock return.

In order to calculate systematic risk of each firm, the following linear regression equation is used. Likewise, the related β has been calculated for the firms under study.

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it}$$

In the above relation, R_{mt} for the stock market return is

$$\beta_i = \frac{Cov(R_i . R_m)}{\sigma_m^2} = \frac{\rho . \sigma_i \sigma_m}{\sigma_m^2} = \rho \frac{\sigma_i}{\sigma_m}$$

In the above relation, R_i and R_m are monthly return of the firm and monthly return of the market, respectively and σ_i and σ_m are average monthly return of firms and average monthly return of the market. To calculate expected return, average return of the market is as the below relation:

$$R_m = \frac{\sum_{i=1}^{T} R_{mt}}{T}$$

Also, with the help of CAPM model and SML curve, the expected return rate has been computed.

$$SLM: K_i = K_{RF} + (R_m - K_{RF})\beta_i$$

where

K_{RF}: risk-free return rate

β_i: systematic risk for firm *i*

R_m: monthly return of the market

The second index: abnormal stock return based on the Fama-French three-factor model

It is computed using the average abnormal stock return based on the earnings announcement date during a year. Abnormal stock return is defined as the difference between real return and predicted return that is determined by means of the Fama-French model. To measure this variable, the Fama-French regression model (1993) is used following Mansour Hassan and Habib's research (2017) as below. It is noteworthy that this model is estimated for each year-firm and the model residue indicates abnormal return:

$$R_t\text{-}RF_t = \beta 0 + \beta 1(RM_{i,t} - Rf_{i,t}) + \beta 2\ SMB_{i,t} + \beta 3 HML_{i,t} + \varepsilon_{it}$$

RF_t: is the risk-free return rate that participation bonds′ rate has been considered and can be extracted through the Central Bank website.

$RM_{i,t}$: is mean of the stock market index

SMB and HML are obtained via formation of portfolios as below:

First, all sample firms are divided into two equal parts based on market value. Firms with high market value are referred to as big firms and those with low market value are referred to as small firms. In the next step, all sample firms are ranked based on the ratio of book value to market value, independent of the previous step. Then, the ranked firms are divided into three classes based on 30 percent of firms that are at the highest rank, 30 percent of firms that are at the lowest rank, and 40 percent of firms that are in the middle: firms with high market value ratio, firms with average market value ratio and firms with low market value ratio.

Book value to market value

Size	Low	Moderate	High
Small	S/H	S/M	S/L
Big	B/H	B/M	B/L

S/L= monthly return of small firms with low ratio of book value to market value.

S/M= monthly return of small firms with moderate ratio of book value to market value.

S/H= monthly return of small firms with high ratio of book value to market value.

B/L= monthly return of big firms with low ratio of book value to market value.

B/H= monthly return of big firms with moderate ratio of book value to market value.

B/M= monthly return of big firms with low ratio of book value to market value.

The first control variable is the size factor (SMB) that is computed via the below model.

SMB=(S/L+S/M+S/H) /3 - (B/L+B/M+B/H) /3

Ratio of book value to market value (HML) is the second control variable that is computed through the following relation:

HML=(S/H+B/H)/2 - (S/L+B/L) /2

(Rmt-Rft) is obtained by deduction of risk-free return rate from monthly return of the market portfolio. Monthly return of the market portfolio is computed via the average monthly return in six portfolios.

If the obtained number is less than the reflected information, it indicates high return of the stock price (Pierce, 2010).

Efficiency

The first index: monthly return variance

In this study, variance ratio for each year is utilized to calculate the value of information efficiency of prices according to Perotti and Windisch (2012). To do this, the below steps have been used respectively and for each 5 years, a value is calculated for information efficiency of prices:

IE = VR (n,m) -1 × (-1)

IE= information efficiency

VR (n,m)= *m* is the long-term or twelve-month period and *n* is the short-term or six-month period. And ratio of variance of monthly returns for *n* months to variance of monthly returns for *m* months indicates the variance ratio for each year. Similarly, the stock return is calculated via the difference between closing price and initial price. If the obtained number is positive, it shows strong efficiency and if it is negative, it shows weak efficiency.

The second index: stock price bubble

To calculate information efficiency, the price bubble is used according to Samadi et al.'s research (2007) which is the basic model for calculating intrinsic value of future discounted cash flow model based on the below equation; i.e. future discounted cash flows with fixed growth.

$$V_i = \frac{D_0(1+g)}{K_i - g}$$

In the above relations, β_i is systematic risk for firm *i*, and *g* is the dividend growth rate.

Note: to calculate the dividend growth rate, the below relation is utilized.

$$EPS_t = EPS_0(1+g)^t$$

$$g = \left(\frac{EPS_t}{EPS_0}\right)^{\frac{1}{t}} - 1$$

K_i: expected return rate of stock *i*

K_{RF}: risk-free return rate

V: intrinsic value of stock

σ_i: standard deviation of stock return *i*

σ_m: standard deviation of stock market return

ρ: correlation coefficient and

SML: the security market line

The following regression equation is used to explore the relationship between intrinsic value and securities price (P_i).

$$P_i = \alpha + bV_i + \omega_i$$

If b is a significant coefficient and is close to 1, it is approved that there is no price bubble (Samadi et al., 2007).

Control variables

Firm size (Size): it is computed via natural logarithm of firm assets (Cheng et al., 2017).

$$SIZE = LnTA$$

Financial leverage (LEV): it is computed through division of total debts by total assets (Mashayekhi & Farhadi, 2013).

$$\frac{TD}{TA} = LEV$$

TD: sum of debts

TA: sum of assets

Price volatility (pvolt): price volatility based on Diether et al.'s study (2002). Stock price fluctuation is computed by the difference between the highest and lowest price per share in year divided by the highest price per share. According to Kashanipur et al. (2013), it is effective on the stock return.

Firm risk (BETA): it is the value of systematic or beta risk.

$$BETA = \frac{COV(r_{it}, r_{mt})}{\sigma(r_{mt})^2}$$

$COV(r_{it}, r_{mt})$: Covariance between stock return of the firm and market. r_{it}: stock return of the firm, $r_{mt:}$ stock return of the market

$\sigma(r_{mt})^2$: Variance of market return (Philippon & Richard, 2010)

Firm growth (BTM): growth of firm *i* in year *t* that is equal to the ratio of market value to book value of the firm (Rahmani & Bokhradi Nasab, 2016)

$$BVMV = \frac{BV}{MV}$$

Statistical population and sample size

The statistical population included all companies listed in Tehran Stock Exchange. Sampling was carried out randomly using systematic sampling. The following conditions were taken into account for choosing of the sample:

1- Companies must be listed in the stock exchange before 2012 and must have prepared and presented their financial statements for the time period 2012-2019 to the Securities and Exchange Organization. Also, the data and information related to the variables should be accessible.

2- Fiscal year of companies should be end of Esfand (21st March) and they should not have trading blackout.

3- Their trading symbol should always be represented in the stock exchange during the years 2012-2019 and their fiscal year should end on 29th of Esfand (20 March) (continuous and sustainable activity in the capital market).

4- They should not be banks and financial institutions (investment, financial intermediary, holding companies, banks and leasing companies), because nature of management, activities and financial reporting is different in these companies.

5- They should not be among companies with cancellation of admission (they are companies that have been omitted in the list of stock companies because of reasons such as little capital and low volume of transactions, announcement of liquidation, not observing the information disclosure requirements and low percentage of transaction days, not offering the audited annual financial statements, not observing the admission criteria including not observing minimum capital and negative sum of operational cash flows, not observing the Article 36 of instruction of accepting securities in Tehran Stock Exchange, and so on. The Securities and Exchange Organization represents the companies and reasons of cancellation of admission each year in the following website: tse.ir). Having implemented the limitations in the previous section, the sample is as the below table.

Table 1. Sample selection and extraction of the statistical sample

Companies listed in the Stock Exchange based on the disclosure report of companies listed in Tehran Stock Exchange in 2012		302
Is deducted: companies which have trading blackout	61	
Is deducted: companies whose fiscal year is not 29th of Esfand (20 March)	56	
Is deducted: lack of access to data	27	
Is deducted: investment companies, banks and insurance companies	48	
Final sample		110

Descriptive statistic

Before testing the research hypotheses, the variables are explored summarily in Table 2. This table contains indexes to describe the research variables. The indexes are central indexes, dispersion indexes and distribution indexes.

Table 2. Statistical description of data

Name of variable	Observations	Mean	Standard deviation	Variance	Skewness	Kurtosis	Minimum	Maximum
Expected return (criterion of CAPM model)	880	0.122	0.282	0.079	-0.074	2.940	-0.863	0.856
Expected return (criterion of the Fama-French model)	880	0.000	0.242	0.058	-0.242	4.516	-0.933	0.898
Information efficiency of prices (annual return variance)	880	0.113	0.099	0.009	1.623	6.301	0.001	0.642
Information efficiency of prices (stock price bubble)	880	0.507	0.500	0.250	-0.031	1.001	0	1
Disclosure quality	880	0.540	0.335	0.112	-0.483	1.825	0	1
Financial leverage	880	0.613	0.258	0.066	3.250	39.853	0.065	4.002
Firm size	880	14.348	1.545	2.387	0.926	3.740	10.952	19.374
Price volatility	880	0.029	0.020	0.000	7.443	80.959	0.000	0.256
Firm risk	880	0.766	0.962	0.927	0.577	4.884	-2.405	5.484
Firm growth	880	1.842	0.940	0.884	1.949	8.034	0.567	7.410

The most basic central index is mean that shows the equilibrium point and center of gravity and is a good index for showing data centrality. For instance, the mean value for firm size is equal to 14.348 that indicates most data is centralized around this point. Dispersion parameters determine dispersion of criterions from each other or their degree of dispersion with regard to the mean. Standard deviation is one of the most important dispersion parameters. This parameter is equal to 1.545 for firm size and 0.020 for price volatility that show these two variables have the highest and the lowest standard deviation, respectively. Minimum and maximum show which variable has the lowest value and which variable has the highest value. For example, firm risk (-2.405) has the lowest number and firm size (19.374) has the highest number. Skewness shows symmetry or asymmetry of the distribution function. For a totally symmetric distribution, skewness is equal to zero and for a non-symmetric distribution with kurtosis toward higher values, skewness is positive and for a non-symmetric distribution with kurtosis toward smaller values, skewness is negative. Among the research variables in general descriptive statistics, disclosure quality has the lowest amount of skewness. Thus, it is closer to normal distribution than other variables. Kurtosis shows the height of a distribution. In other words, kurtosis is a criterion for height of the curve at the maximum point. Positive kurtosis means that the peak of intended distribution is higher than normal distribution and negative kurtosis shows that the peak is lower than normal distribution. Disclosure quality has the lowest value of kurtosis; therefore, it is closer to normal distribution.

Testing of hypotheses

Testing of hypothesis 1: A) disclosure quality is effective on expected return (CAPM model).

Table 3. Final estimation of the regression model for hypothesis 1 (CAPM model)

Variables	Coefficients	Standard deviation	Z statistic	Significance level
Disclosure quality	-0.007	0.027	-0.28	0.007
Financial leverage	-0.003	0.040	-0.10	0.080
Firm size	-0.003	0.005	-0.57	0.005
Price volatility	0.191	0.401	-0.48	0.008
Firm risk	0.006	0.009	0.71	0.001
Firm growth	0.000	0.010	0.04	0.073
Intercept	0.178	0.093	1.92	0.002
Other information statistics				
Coefficient of determination	25 percent			
Adjusted coefficient of determination	26 percent			
Wald statistic and its significance level	0.92 (0.000)			

According to the results in Table 3, it is observed that disclosure quality has negative coefficient and its significance level is less than 5%. Hence, it can be stated that disclosure quality is not effective on expected return (CAPM model) and hypothesis one is not accepted at the confidence level 95%. Significance level of control variables, i.e. firm size, price volatility, and firm risk is less than 5%. Thus, they are related to the dependent variable (expected return (CAPM model)). Significance level of financial leverage and firm growth is greater than 5%; hence, they do not have relation with the dependent variable (expected return (CAPM model)). The converted coefficient of determination is equal to 26 percent that shows the existing control and independent variables have been able to explain 26 percent of changes of the dependent variable. Wald statistic is equal to 0.92 and its significance level is less than 5%. Therefore, it can be stated that the model has suitable goodness.

Testing of hypothesis 1: B) disclosure quality is effective on expected return (the Fama-French model).

Table 4. Final estimation of the regression model for hypothesis 1(the Fama-French model)

Variables	Coefficients	Standard deviation	Z statistic	Significance level
Disclosure quality	0.044	0.021	2.07	0.039
Financial leverage	-0.001	0.036	-0.03	0.978
Firm size	-0.001	0.005	-0.32	0.752
Price volatility	0.055	0.201	-0.28	0.783
Firm risk	0.013	0.006	1.99	0.046
Firm growth	0.000	0.008	0.09	0.928
Intercept	-0.012	0.085	-0.14	0.887
Other information statistics				
Coefficient of determination	19 percent			
Adjusted coefficient of determination	20 percent			
Wald statistic and its significance level	8.47 (0.005)			

According to the results in Table 4, it is observed that disclosure quality has positive coefficient and its significance level is than 5%. Hence, it can be stated that disclosure quality is not effective on expected return (the Fama-French model) and hypothesis one is not accepted at the confidence level 95%. Significance level of control variables, i.e. financial leverage, firm size, price volatility, firm risk and firm growth is greater than 5%. Thus, they are not related to the dependent variable (expected return (the Fama-French model)). The adjusted coefficient of determination is equal to 20 percent that shows the existing control and independent variables

have been able to explain 20 percent of changes of the dependent variable. Wald statistic is equal to 8.47 and its significance level is less than 5%. Therefore, it can be stated that the model has suitable goodness.

Testing of hypothesis 2: B) disclosure quality is effective on information efficiency of prices (variance of monthly return).

Table 5. Final estimation of the regression model for hypothesis 2(variance of monthly return)]

Variables	Coefficients	Standard deviation	Z statistic	Significance level
Disclosure quality	0.002	0.008	0.25	0.805
Financial leverage	-0.009	0.011	-0.84	0.400
Firm size	-0.000	0.002	-0.26	0.796
Price volatility	-0.109	0.087	-1.25	0.212
Firm risk	-0.003	0.002	-1.44	0.150
Firm growth	0.002	0.003	0.68	0.498
Intercept	0.128	0.035	3.61	0.000
Other information statistics				
Coefficient of determination	22 percent			
Adjusted coefficient of determination	23 percent			
Wald statistic and its significance level	4.90 (0.006)			

According to the results in Table 5, it is observed that disclosure quality has positive coefficient and its significance level is greater than 5%. Hence, it can be stated that disclosure quality is not effective on information efficiency of prices (variance of monthly return) and hypothesis two is not accepted at the confidence level 95%%. Significance level of control variables, i.e. financial leverage, firm size, price fluctuation, firm risk, and firm growth is greater than 5%. Thus, they are not related to the dependent variable (information efficiency of prices (variance of monthly return)). The adjusted coefficient of determination is equal to 23 percent that shows the existing control and independent variables have been able to explain 23 percent of changes of the dependent variable. Wald statistic is equal to 4.90 and its significance level is less than 5%. Therefore, it can be stated that the model has suitable goodness.

Testing of hypothesis 2: B) disclosure quality is effective on information efficiency of prices (stock price bubble).

Table 6. Final estimation of the regression model for hypothesis 2 (stock price bubble)

Variables	Coefficients	Standard deviation	Z statistic	Significance level
Disclosure quality	-0.005	0.045	-0.13	0.899
Financial leverage	0.009	0.073	0.14	0.892
Firm size	0.005	0.014	0.36	0.722
Price volatility	0.656	0.718	0.91	0.361
Firm risk	0.026	0.014	1.79	0.073
Firm growth	-0.003	0.018	-0.19	0.846
Intercept	0.397	0.214	1.86	0.064
Other information statistics				
Coefficient of determination	22 percent			
Adjusted coefficient of determination	23 percent			
Wald statistic and its significance level	4.97 (0.007)			

According to the results in Table 6, it is observed that disclosure quality has negative coefficient and its significance level is greater than 5%. Hence, it can be stated that disclosure quality is not effective on information efficiency of prices (stock price bubble) and hypothesis two is not accepted at the confidence level 95%. Significance level of control variables, i.e. financial leverage, firm size, price volatility, firm risk, and firm growth is greater than 5%. Thus, they are not related to the dependent variable (information efficiency of prices (stock price bubble)). The adjusted coefficient of determination is equal to 23 percent that shows the existing control and independent variables have been able to explain 23 percent of changes of the dependent variable. Wald statistic is equal to 4.97 and its significance level is less than 5%. Therefore, it can be stated that the model has suitable goodness.

ANALYSIS OF THE RESULTS

Quality of financial reporting and enhanced disclosure can be regarded as informing tools which are effective on price changes and as a result, stock exchange fluctuation. Desirable disclosure of accounting information will decrease information symmetry and cost of capital and in this way, it plays a major role in the capital market efficiency. If the disclosure level of accounting information is increased at the level of annual reporting, shareholders will evaluate the existing information in operating cash inflow and outflow better and more accurately that are helpful for prediction of future earnings. Therefore, they can achieve more stable predictions about stock return; this will decrease stock return fluctuation. Hence, it is expected that stock return fluctuation is decreased by increased disclosure quality. Studies that have recently been conducted about transparency and disclosure quality in Iran indicate a relationship between disclosure of accounting information and its economic effects on the expected return. Related and reliable financial reports are important subjects in the financial and accounting field. Firms can achieve better value by offering high quality financial reports and attract the attention of analysts and investors. High quality financial reports help evaluate managers' performance and accurate investment decisions.

Content of accounting earnings shows usefulness of the reported information for investors and has been developed as a factor to encourage the managers for prediction of future earnings and disclosure of information. Thus, content of accounting earnings means that investors react to what extent to the earnings news and if the investors' reaction toward earnings reports is more intensive (they show more reaction), the earnings will contain more information. It is expected that firms with higher disclosure quality have higher information content, because disclosure quality enhances validity of information and investors show more reaction toward valid information. The present study intended to evaluate the effect of disclosure quality on information content of earnings. Firms which provide a higher level of voluntary disclosure decrease the information gap between the informed and uninformed investors. This will assure all investors that stock transactions are fulfilled with a "fair" price and as a result, stock liquidity will be improved. Hence, Leuz and Verrecchia (2000) stated that firms with higher level of voluntary disclosure have lower bid-ask spreads in the capital market; therefore, they have higher stock liquidity. According to Tuna et al. (2006), disclosure quality is timely effectiveness of accounting information on market indexes like price and stock return. Similarly, they believe that one of the features of disclosure quality is confirmation of previous predictions. Disclosure of accounting information has several desirable consequences. Various studies have demonstrated that higher disclosure and transparency will have more benefits for the firms, the most important of them are lower cost of capital and decreased information asymmetry among inter-organizational and extra-organizational users and increased value of the firm (Kuthari et al., 2009). Disclosure of information is one of the tools of financial transparency that increased quality of it will enhance stock liquidity and create value for shareholders and the society (Hasan et al., 2009; Clarson et al., 2013; Elzahar et al., 2015). Disclosure of firm information is vital for efficient performance of the capital market. Demand for financial disclosure is due to information asymmetry and agency conflict among the managers and external investors. Accounting literature has presented two theoretical bases for the relationship between increased disclosure quality and favorable economic consequences (reduction of cost of capital and increased value of the firm). In the first theory, increased disclosure will increase liquidity of the capital market, decrease transaction costs and enhance the demand for securities. All these effects will decrease cost of capital. In the second theory, increased disclosure quality reduces the estimation risk for distribution of returns by investors. If the estimation risk is not diversifiable, they will ask for surplus risk.

It is suggested to the firms to be sensitive to reporting and always try to enhance the quality of reports, since if the level of disclosure of information in annual reporting of companies listed in the stock exchange is improved, investors will be able to understand the employed managerial assumptions for recording accruals at the level of financial statements. It is suggested to the Securities and Exchange Organization to adopt rules in order to protect the rights of investors which will oblige the firms to offer high quality reports. This is because firms which have high disclosure will have higher reporting transparency than the firms which are at a lower level in terms of disclosure. Through this, the stock price will have (positive or negative) return toward the presented reports. It is suggested to the Securities and Exchange Organization to pay attention to improved quality of disclosure of information by the firms, since in this way, the information is presented well in the capital market. Moreover, it must be clear for the investors and this will improve information efficiency of prices. Likewise, with regard to investment decisions, it is suggested to the investors to show less tendency toward the firms which have low disclosure quality. The reason is that it is one kind of punishment for the firms to improve high quality reports.

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