



To Study the Effect of Investor Protection on Future Stock Price Crash Risk

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ARTICLE INFO

Article history:

Received 02 October 2019

Accepted 14 August 2020

Keywords:

Investor Protection

Future Stock Price Crash Risk

Corporate Governance

ABSTRACT

Managers are responsible for providing financial statements and they might try to make a good picture of their firm's conditions. Therefore, they try to delay the disclosure of bad news and release the good news as soon as possible. The tendency of managers toward hiding bad news increases the stock price crash risk. The protection of investor is one of the factors that can prevent from falling stock price, because it restricts the managers and majority shareholders in frauds and hiding bad news. Thus, the main purpose of the present research is to study the effect of investor protection on future stock price crash risk. In this research, 89 companies from listed companies in Tehran Stock Exchange during 2011-2017 were tested. The results obtained from the research's hypothesis test showed that protecting the rights of investors has a negative effect on the stock price crash risk. In fact it can be concluded that with the increase of the investor protection, the firms are obligated to disclose the high-quality accounting information and present more transparent financial reporting, as a result, the information asymmetry will be reduced and by creating a flow of information between the managers and the investors and thus failure to accumulate bad news in the company, the risk of the stock price crash will be also reduced.

1 Introduction

One of the most important external mechanisms of the corporate governance is to observe the rights of the shareholders as the main providers of the corporate resources. It seems that the key to a company's success depends on desirable response to its shareholders. The importance of observing the shareholders' rights as one of the external mechanisms of the corporate governance is to some extent that the issue has attracted many attentions in many of the corporate governance laws (i.e. Serbines Akseli law, Kadberri report, Hingz & Smite's reports in UK, Day Committee's reports in Canada, Kardoon report in Belgium) and they have offered suggestions for applying more control [1].

The legal protection of investors is a key factor in developing the financial markets. The markets that protect the investors, allocate more capital to markets with more investment opportunities and to innovation and research and development activities [2]. Franks et al. [3] also showed that in the countries in

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which there is more protection of investors, we see more developed financial markets which can control actively the large companies. In contrast in the countries with low investor protection, we see underdeveloped and inactive markets which are not able to control the large companies. Also, in the countries with more support of investors, the family controls are more concentrated in industries that have less investment opportunities and there are less mergers & acquisitions (M&A). On the other hand, in the countries with less investor protection, the families have more stable control over the private companies and it does not rely on the investment opportunities and the merging and acquisition activities [3]. The research on legal and financial areas show that the legal protection of investors is one of the main determinants in explaining the existing differences in development of the financial markets, the corporate ownership structures, the corporate valuation and the economic growth in different countries [4]. However, little attention has been paid to consequences of the relationship between the investor protection and the risk of falling stock price in the stock markets. So, the present research is trying to study the issue that will the corporates' stock returns fall when there is a desirable protection of the investor? If the corporate management doesn't disclose bad news and hide it for a long time, a gap (stock price bubble) will be created between the intrinsic value of the corporate stock and its determined value by investors (value of stock market). When a mass of accumulated bad news reaches the point of explosion, it enters the market immediately and results in bursting price bubbles and crashing stock prices [5]. The Stock price of crash risk, which is defined as an undesirable event, is a contagious phenomenon at the market level. In this sense, the decline in stock prices is not limited to a single stock, but all of the stock in the market, so identifying the factors influencing this phenomenon as well as its proper prediction can be a great help to Decision makers and investors [6].

Moreover, the accumulation and avoidance of disclosing bad news prevent from implementing the timely corrective actions or modifying lost projects by the shareholders and board of directors. Thus, the projects which have incurred a loss, continue their activities and their bad performance accumulated over time. When the information about such projects enters the market, the stock prices are strongly reduced [7]. In other words, the lack of information transparency increases the future stock price crash risk by enabling management to accumulate bad news [8]. Hutton et al. [9] believe that the reason for avoidance of delivering bad news to the market is for obtaining more rewards and maintaining position by the management. Zhang et al. [4] believe that the investor protection prevents from falling stock price, because it prevents the managers and shareholders from frauding and hiding bad news. The laws affecting the companies listed in Stock Exchange pay much attention to the rights of investors because the companies are obligated to disclose high-quality accounting information and present transparent financial reporting in order to reduce information asymmetry among the individuals inside and outside the organization. Thus, this increases the awareness of domestic investors to act appropriately and maintain their investments. Under the condition, the managers and majority shareholders are under pressure for presenting poor and costly performance and thus their rent-seeking behavior.

Moreover, using the external control, the companies are able to identify the misuse of resources and then punish those people in the company who try to hide the bad news. Thus, the protection of investor will reduce the likelihood of stock price crash risk [4]. Given the above points, the main goal of the present research is to study the effect of investor protection on the future stock price crash risk in the companies listed in Tehran Stock Exchange.

2 Theoretical Principles and Research Background

In the capital market, the stock price is believed to reflect the current information about that share, and

stock price changes do not have a specific and predictable pattern [10]. The changes in the corporate stock price come from its confidential information management. When the managers decide to disclose all information immediately, the stock returns will have a symmetric distribution, it means that the average positive returns about the good news are equal to the average negative returns about the bad news. But the managers are always willing to hide negative information and bad news from the investors and accumulate them in the company [11]. The stock price crash is a phenomenon in which the stock price experiences a sudden and negative fall. The corporate management due to its selfish or benevolent motives using accounting system, tries to overstate the corporate performance by delaying the release of bad news and accelerating the release of good news. This process results in the lack of transparency of financial information and the creation of bubbles in the corporate stock prices [12]. According to accounting researches, commercial unit managers are always able to postpone bad news distribution and store them as private information which is due to high costs of exposing the information or lack of management ability to keep performing other policy (such as change of commercial unit management) [13]. Habib et al. [14] classified factors affecting the stock price crash risk into five categories: 1) the risk of financial reporting and disclosing the corporate information; 2) motives and management characteristics, 3) capital market transactions, 4) the mechanisms of the corporate leadership system, 5) the mechanisms of informal institutions (private). Liao [15] also suggests that the stock price crash in the corporates shows an ambiguity about the corporates' information and operational environment, the weakness of the corporate leadership system and the high costs of representative system. One of the corporate governance mechanisms affecting the risk of stock price crash, is to observe the rights of the shareholders. Many research (La Porta et al.) has been performed on positive effect of the investor protection on the corporates' financial development.

The desirable legal protection of foreign investors increases their desire to buy more financial assets such as capital and debt. Because, rather than the intra-organizational individuals, they can earn most of the corporate profits. Instead, protecting the rights of foreign investors and reducing the individuals' abuses within the organization facilitates the process of the corporates' financial investment outside the organization and thus leading to developed financial markets [4]. Little research has been conducted on the issues of investor protection and the stock price crash risk. Jin & Myers [16] found that the lack of transparency in the corporate performance, causes to motivate the people within the organization to use more cash flow at appropriate times and to keep bad news at an inappropriate moment. However, when the accumulated losses affect the managers' ability, the release of bad news will lead to a fall in the stock price. In this regard, Benmelech et al. [17] believe that in a dynamic logical expectations model with information asymmetry, the stock-based reward encourages the managers to hide bad news about the future growth opportunities of the corporate. This in turn leads to an over-valuation and finally falling the corporate stock price. Froghi et al. [18] in their research studied the effect of lack of transparency in financial information on future stock prices crash risk. The results of their research showed that there is a direct relationship between the lack of transparency of financial information and the future stock price crash risk. Also the results showed that when there is an information asymmetry between the managers and the investors, the effect of the lack of transparency in financial information on future stock price crash risk becomes significant.

The investor protection reduces the individuals' motives to hide bad news within the organization and allows foreign investors to act appropriately in order to maintain their investments and this in turn prevents from falling stock prices. Firstly, for a more desirable protection of foreign investors, the companies try to disclose the high-quality financial accounting information and seeks more transparency [4]. In other words, the lack of information transparency increases the risk of future stock price crash

by allowing the management to accumulate bad news [8]. Therefore, the companies that provide more protection for their investors will have a lower risk of collapse. Secondly, the investor protection will increase the costs of expropriation of foreign investors by the managers and majority shareholders. There are many types of expropriation. For example, Boltun et al. in a multiple-time representative model, showed that the majority shareholders motivate managers to adopt a short-term approach to increase the stock price and exploit foreign investors [4]. Kim et al. [19] argued that in a condition in which the company avoid paying tax, the managers have more opportunities and abilities to keep and accumulate negative information within the company due to the ambiguity and complexity of the information environment and the corporate's financial reporting structure. In such condition, the stock price crash risk will be increased. In fact, the avoidance of paying tax is a suitable tool in the hands of managers for rent-seeking and hiding the bad news.

The internal managers, while trying to protect the majority shareholders' interests, seek to manage interests and hide the corporate performance from the foreign investors and finally transfer assets to other their own affiliated companies [4]. Hutton et al. [9] believe that in the condition of lack of complete transparency in financial reporting in which a condition is provided for profit management, this opportunity is provided for the managers to keep their job position by hiding negative information within the company. When the accumulated negative information reaches its peak, keeping them for a long-term become impossible and costly. Thus they will totally introduce the market and leading to the stock price crash. Different ways to hide the corporate performance such as income smoothing, investment motives and tax avoidance finally lead to the stock price crash. The protection of the foreign investors' interests will reduce the power of intra-organizational individuals for personal exploitation of the corporate profits and finally leading to the reduced crash risk. Thirdly, the investor protection using the external control reduces the stock price crash risk. In one hand, the external control determines the deviations of resources and punishes those people within the organization who have attempted to hide their fraud.

For example, Newman et al. have focused on the role of auditing in protection of investors. Diak and Zingales found that there is a significant relationship between reducing personal interests of individuals within organization and implementing laws more precisely, high level of information disclosure to the media, more tax compliance and high competition in the market. It seems that the information disclosure to the media and the tax compliance are the most important factors.

On the other hand, the effective control mechanisms such as skilled auditors, high institutional ownership and high standards to be accepted in the Stock Market also help considerably to discover the managers' opportunism and reduce the degree of hiding bad news and thus the risk of stock price crash [4]. In a research, Callen & Fang [20] studied the relationship between the institutional investors and the risk of falling stock price. The research tests two opposing points of view from the institutional investors: monitoring versus expropriation. The results of the research show that there is strong evidence on reverse relationship between the institutional ownership and the future stock price crash risk. Deyanati et al. [21] studied the impact of the institutional investors on reducing the stock price crash risk in the companies listed in Tehran Stock Exchange. The results of their research showed that the existence of the institutional investors, reduces the management motivation and ability to hide or delay the release of the corporate's bad news. In addition to other benefits such as reducing the profit management interests and increasing the information transparency, this will prevent the formation of bubbles in the corporates' stock, that is a major factor in falling stock price.

3 Research Method and Hypothesis

In regard to achieve the goals and according to the theoretical principles and the research background presented in the previous sections, the research hypothesis is made as follow:

" There is a significant relationship between the investor protection and the stock price crash risk."

The present research is an applied research in terms of the purpose and it is considered as a retrospective study with a quasi-experimental design in terms of the data collection which has been tested using the multivariate regression and econometric models. The statistical population included companies listed in Tehran Stock Exchange during the years of 2011-2017. The sample selected for the research included companies having these conditions:

1. The companies whose date of admission in the Stock Exchange was before 2012 and by the end of 2017.
2. Their fiscal year ends by the end of March.
3. During the aforementioned years, they did not change the activity or the fiscal year.
4. They are not a member of investment firms and financial intermediaries (investment companies were not included in the statistical population due to the difference in the nature of activity with other companies).

After applying the above restrictions, a total of 89 companies were selected. The data of the present research were derived from the CDs of Visual and Statistical Archives of Tehran Stock Exchange, the Website of Tehran Stock Exchange and other related websites and also from the Rahavard Novin software. The final analysis of the collected data was performed using the econometric software, Eviews and Stata.

3.1 Research Variable

3.1.1 Dependent Variable: Protection of Investors

The past research which have been measured the investor protection index, were focused more on differences in the legal systems among the countries [4]. However, the active companies in a country may decide to protect their investors' interests in different ways. On the other hand, in order to measure the rights of investors, some research carried out by Newman et al. [22]; Persakis & Iatridisa [23] and Klapper & Inessa [21], the index such as accounting information index, internal control effectiveness, shareholders' voting right, ownership concentration and the corporate governance index were used. Then following the research of Zhang et al.[4] that used this five indexes of the analytic hierarchy process (AHP), the following equation is used to measure the investor protection:

$$IP_{it}=0.24AI_{it}+0.25IC_{it}+0.16VS_{it}+0.12CO_{it}+0.21GO_{it} \quad (1)$$

In the above equation, each of the index is calculated as follow:

Accounting Information (AI): In this research, in order to measure accounting information, the earnings quality index was applied using the optional accrual items according to model of Francis et al. [25] (in fact, Developed Model of Dechow & Dichev). It is obtained as follows:

$$\text{Accruals}_{it} = \beta_0 + \beta_1 \text{CFO}_{it-1} + \beta_2 \text{CFO}_{it} + \beta_3 \text{CFO}_{it+1} + \beta_4 \Delta \text{REV}_{it} + \beta_5 \text{PPE}_{it} + \varepsilon_{it} \quad (2)$$

where,

accruals_{it} is the total accruals of working capital (current) of the company i in the year t divided by the total assets; **CFO_{it-1}** is the operating cash flows of the company i in the year t-1 divided by the total assets; **CFO_{it}** is the operating cash flows of the company i in the year t divided by the total assets; **CFO_{it+1}** is the operating cash flows of the company i in the year t+1 divided by the total assets; **Δ REV_{it}** is the changes in sales of the company i in the year t and t-1; **PPE_{it}** is the total fixed assets (property, plant and equipment) of the company i in the year t divided by the total assets; **ε_{it}** is the regression remainder.

In order to calculate the accruals, we first obtain the total current accruals (**Accruals_{it}**) in the year t and for the company i, using the below equation (Dechow et al. [26])

$$\text{Accruals}_{it} = (\Delta \text{CA}_{it} - \Delta \text{Cash}_{it}) - (\Delta \text{CL}_{it} - \Delta \text{STDEBT}_{it}) \quad (3)$$

where,

ΔCA_{it} is a change in the total current assets of the company i in the year t and t-1; **ΔCL_{it}** is a change in the total current debts of the company i in the year t and t-1; **ΔCash_{it}** is a change in cash and cash equivalents of the company i in the year t and t-1; **ΔSTDEBT_{it}** is current maturities of long term debts of the company i in the year t and t-1. All the variables in equation (2) can be standardized by dividing them by the total assets. The regression equation (2) should be estimated annually for the companies. Moreover, the annual cross-sectional estimations are obtained as company-year from ε in this equation. According to model of Francis et al., [25], the earnings quality index that is referred to as the remainder component (**ε=AI**) for a company is equal to standard deviation in the obtained errors (ε) in equation (2) between the years of t-2 to t which is calculated as follows and is considered as a suitable index for estimating earnings quality in the research [22]:

$$\text{AI} = \sigma = \sqrt{\frac{\sum_{n=t-2}^t (\varepsilon_{j,n} - \bar{\varepsilon})^2}{2}} \quad (4)$$

where, σ is the standard deviation of errors obtained from the remainder of regression ε.

Internal Control Effectiveness (IC): In this research, similar to Hajiha et al. [27] and Chen et al. [28], the significant weakness of the internal controls that is obtained from the reports of independent auditors is used. According to the checklist of the internal controls governing on financial reporting approved by the Security Exchange Organization, since 2012, the corporate's auditor has been obligated to evaluate the corporate internal controls and disclose the cases which show failure to observe or failure to implement internal controls properly in his audit reports. Accordingly, if a company doesn't have any internal control weakness, it has an effective internal control, so it is given 1, otherwise 0.

The Existence of Shareholders with Voting Right (VS): According to research by Matoufi and Pour

Dadashi [29], a controlling shareholder is a shareholder who owns at least 50% of the voting shares of the company.

In order to measure this variable, the double index, 0 and 1, is used, so that if there is a controlling shareholder in a company, 1 is given to the company, otherwise 0.

Concentration of Ownership (CO): In order to measure this variable, following the research of Sa-farzadeh [30] and Hamidian and Taghizadeh [31], first the mean free-float stock ratio of the sample companies is calculated for each year. Based on equation (5), the ratio of float stock is calculated:

$$\text{Float stock} = \frac{\text{Total shares of a company} - \text{the number of shares which are not available for trading}}{\text{Total number of shares}} \quad (5)$$

Then, the mean float stock ratio is calculated. If the ratio of free float stock of a company is higher than the mean, 0 is given to the company, otherwise 1.

Corporate Governance (GO): In order to calculate the corporate governance index according to Valizade Larijani et al. [32] two scales, 0 and 1, are used. Thus, if the percentage of the non-executive directors is above 50% (institutional shareholders' percentage), 1 is given, otherwise 0; if a company is under the control of family groups, 1 is given, otherwise 0. Total numbers assigned to the above variables show the rank of the corporate governance.

3.1.2 Dependent Variable: Stock Price Crash Risk

According to Hutton's research [9] we consider the monthly price crash in a fiscal year for a company in which the company experiences a monthly return (3/2) equal to a standard deviation below the mean monthly returns for a company and for the total fiscal year (3/2 of the standard deviation is selected because in the previous research of Hutton and Zhang, this value has been used). In this research, in order to measure the future stock price crash risk following the models of Chen et al [33]; Beradshaw et al [34]; Kim et al. [19]; Callen and Fang [20] and Andreou et al. [35] two index, the negligence of stock returns (NCSKEW) and Down to Up volatility (DUVOL) will be used. Accordingly, using the equation (6), the corporates' specific monthly returns will be calculated.

$$w_{jt} = \text{Ln}(1 + \varepsilon_{jt}) \quad (6)$$

w_{jt} specific monthly returns of company j in month t

ε_{jt} the residual return of the corporate stock j in month t

To calculate the model's residual return, equation (7) can be used:

$$r_{j,t} = \alpha_0 + \beta_1 r_{m,t-2} + \beta_2 r_{m,t-1} + \beta_3 r_{m,t} + \beta_4 r_{m,t+1} + \beta_5 r_{m,t+2} + \varepsilon_{jt} \quad (7)$$

$r_{j,t}$ the stock return of the company j in the month t during the fiscal year

$r_{m,t}$ The stock market return in the month t

In order to calculate the monthly return of the market, the index of the beginning of the month is deducted from the index at the end of the month and its yield is divided by the index of the early month. Then using the corporate's specific monthly return, the negligence of stock returns and the DUVOL will

be calculated:

Negligence of Stock Returns: Chen et al. [33] believe that the signs of the stock price crash are revealed nearly a year ago and one of the signs is the negligence of stock returns. Therefore, those companies which have experienced the negligence of the stock returns in the past year are more likely to face the stock price crash in the future year. Hung and Estein [36]. Also suggest that the negligence of the stock returns given the mentioned models, is calculated as below equation:

$$NCSKEW_{it} = -\left(\frac{n(n-1)^{\frac{3}{2}} \sum w_{jt}^3}{(n-1)(n-2)(\sum w_{jt}^2)^{\frac{3}{2}}}\right) \quad (8)$$

$NCSKEW_{it}$ the negligence of the monthly stock returns of the company j in the fiscal year t
 W_{it} the specific monthly returns of the company j in the month t
 n the number of months in which their returns are calculated.

Down to Up Volatility (DUVOL): Chen et al. [33] also suggest that down to up volatility (DUVOL) controls the asymmetric volatility of the returns. Also the higher ratio of this index corresponds to the distribution with more skewed to the left. In order to calculate this variable, we use the models of Chen et al. [33] Kim et al [19]; Callen and Fang [20] as the below equation:

$$DUVOL_{jt} = -\log\left(\frac{(n_u-1) \sum_{DOWN} W_{jt}^2}{(n_d-1) \sum_{UP} W_{jt}^2}\right) \quad (9)$$

n_d : The number of Down to up months during the fiscal year t .

3.1.3 Control Variables

In this research, according to the research of Chen et al. [33] five control variables are used:

DTURN: to measure this variable, the below equation is used:

$$\text{Stock Turnover} = \frac{\text{the mean number of shares are traded per month}}{\text{The mean number of outstanding shares}} \quad (10)$$

SIGMA: This variable is obtained from the standard deviation of the monthly stock returns of a company in a fiscal year.

Size: natural logarithm of the total assets of the company

(M/B): The ratio of market value to book value. This ratio is obtained by multiplying the stock market price and the number of common stock held by shareholders over the total equity capital.

LEV: Leverage: The ratio of total debt to total assets

3.2 Research Model

In order to test research hypothesis, the regression equation (11) is used:

$$\text{Crash Risk}_{it} = a + \gamma \text{IP}_{it} + \beta \text{X}_{it-1} + \varepsilon_{it} \quad (11)$$

Crash Risk _{it}	The stock price crash risk of the company i in time t
IP _{it}	The investors protection of the company i in time t
X _{it-1}	Total control variables of the company i in time t
ε _{it}	Residual from regression

4 Research Findings

4.1 Descriptive Statistics

In order to evaluate general characteristics of the variables, in addition to estimate the models and their exact analysis, we need to become familiar with the descriptive statistics related to the variables. Table 1 shows the descriptive statistics of the tested variables including some main indexes and distributions for a sample consisting of 784 firm-year observations in 2011-2017.

Table 1: Descriptive Statistics of the Research Variables

variable	observa- tions	mean	Median	mini- mum	maximum	Standard deviation
Earnings quality	534	0.208	0.194	0.008	3.846	0.514
Float stock	534	0.303	0.287	0.046	0.503	0.129
Negligence of stock returns	534	-0.596	-0.572	-3.460	3.129	1.080
DUVOL	534	-0.211	-0.223	-3.873	2.435	0.698
Corporate Governance	534	1.719	2.000	0.000	3.000	0.831
Market value to book value	534	2.016	1.740	-1.762	14.353	1.773
Firm size	534	13.955	13.763	10.104	19.106	1.525
Leverage	534	0.590	0.614	0.012	0.996	0.197
Average of turnover	534	0.134	0.088	0.007	0.373	0.917
Standard deviation of the weekly returns	534	0.127	0.113	0.002	0.692	0.076

Note: the higher values of the mean than the median shows the presence of large points in the data because the mean affected by the values. In these cases, data distribution is skewed to the right.

As shown in Table 1, according to the descriptive statistics, it should be noted that the means of the negligence of the stock return and the down to up volatility (DUVOL) are respectively equal to -0.548 and -0.488 which are considered as the criteria of the stock price crash risk. Since the mean and the median of both criteria are close together, it should be noted that, the distribution around the mean is low for these variables.

In addition, the mean descriptive statistics of free float stock is equal to 0.303 showing that 30% of the shares of the studied companies cannot be traded. Moreover, the mean descriptive statistics of the market value to book value ratio is equal to 2.119 which indicates that the mean market value of the stock

for the studied companies is two times their book value. On the other hand, the descriptive statistics of the leverage is equal to 0.714 that indicates that 71.4% of the total assets of the companies studied has been estimated from the place of debts. Also the mean stock turnover is equal to 0.134 which indicates that 4.13 % of the active stock in capital market is from the place of monthly transactions in the capital market. Table 2 shows the frequency statistics of observations of firms on a firm-year basis in one of the mentioned groups:

Table 2: The Frequency of the Corporates' Observations]from The Two-Valued Variables

criteria	Internal control effectiveness		The existence of controlling shareholders		Corporate Governance	
	frequency	Percentage of total sample	Frequency	Percentage of total sample	frequency	Percentage of total sample
0	146	%27.34	132	%24.71	428	80.14%
1	388	%72.66	402	%75.29	117	21.91%
total	534	%100	534	%100	534	100%

As shown in Table 2, from a total of 534 observations (firm-year), 66.72 % equal to 388 observations are the firms with the effective internal control. But the audit reports have not mentioned the main weaknesses and 27.34% of them have the weaknesses in their internal controls.

Also it was found that 75.29 % of the total firms studied by the shareholders have the rights to vote whereby participate in selecting board of directors and other affairs along with reducing representative costs. But 24.71 % of the firms, in terms of the share nature and their number, don't have any rights to vote.

Table 3: Regression Assumption Tests

Model	Test	Statistic J-F B	Significance level	Situation
Research model	Breusch-Codfrey test	11.156	0.000	Acceptance of H ₀ showing serial autocorrelation
	Breusch-Pagan-Godfry test	3.104	0.066	Rejection of H ₀ showing the absence of variance heterogeneity
	Jark-Bra test	68.554	0.001	Acceptance of H ₀ showing the abnormal distribution of error terms

4.2 Regression Assumptions

One of the assumptions of the regression equation is the constant error variance that is known as the assumption of variance homogeneity. One of the tests for recognizing variance heterogeneity is the Breusch- Pagan test that is about being constant and being variable of error term variance. Another test

of the regression assumption is the serial autocorrelation test between the error terms which has been considered in this research. For this purpose, the Breusch- Godfrey serial autocorrelation test is usually used. Moreover, another test of the regression assumption is the Error Term Normality test. One of the tests that measures the error term normality is the Jark-Bra test. Regarding the nature of the assumption and the research variables, the regression assumption test is used for research model.

4.3 To Evaluate the Model by The Combined Data Method

The data of the present research is in the form of combined data. In the combined data, first, the F-Limer test is used to determine whether the data is of combined or panel type. Then the Husman test is used to determine constant or random effects of the research variables (distinguishing between the constant and randomized nature of the difference of cross-sectional units). According to the results that is shown in Table 4, the significance level of the F-Limer statistic is less than 0.05 and the review of the Husman test's results showed that in the regression models of the research, because the significance level is more than 5%, therefore the random effects model is used to estimate the model. It should be noted that given that the reviewed models have a serial autocorrelation and on the other hand since the random effects model is used to test the regression models, so there is no problem for testing hypotheses because in the random effects method, the generalized least squares method (EGLS) is used.

Table 4: The Results of the Combined Data Effects Test (Panel)

hypotheses	Test	Statistic $F / ^2\chi$	Degree of freedom	Significance level	Test result	Selected model
Research model	Constant effects (F- Limer)	1.774	(66.717)	0.000	Rejection of H_0	Panel
	Random effects (Husman)	7.552	5	0.118	Acceptance of H_0	Random

Also, in order to ensure that there is no collinearity problem between the explanatory variables, the collinearity test was studied using the variance inflation factor (VIF). So considering that the statistic's values for explanatory variables are less than 10, there is no collinearity between them.

According to statistical analysis (see Table 5), it should be stated that the estimated coefficient of the first and second index of the stock price crash risk, i.e. NCSKEW and DUVOL, shows that the protection of the investors' rights has a negative impact on NCSKEW and DUVOL in an error level of 1% and 5% respectively. This in turn shows the negative effect of investors protection on the corporates' stock price crash risk. In addition, the estimated coefficient of control variables, the estimated coefficient and the t-statistic of the monthly turnover (DTURN) and the firm size (Size) have a negative and significant effect on both index of the stock price crash risk. Also, the estimated coefficient of control variables and the estimated coefficient and the t-statistic of the SIGMA and the leverage (LEV) have a positive and significant effect on both index of the stock price crash risk.

6 Results and Suggestions

Since the investors rank the possibility of more losses as a primary source of the investment risk, this implies that the stock market crash is the first factor for the investors' concern. Therefore, the evidence related to prediction of the stock price crash is of vital importance. Thus the main purpose of the present research is to study the relationship between the investor protection and the stock price crash risk. The

results obtained from the hypothesis test showed that the protection of the investors' rights has a negative effect on the stock price crash risk.

Table 5: Results of Testing Research Hypothes

Variables	Negative coefficient of skewness				Down to up volatility				VIF
	NCSKEW				DUVOL				
	Regression coefficient	standard deviation	t-statistic	p value	Regression coefficient	standard deviation	t-statistic	p value	
Intercept	-16.656	1.806	-9.219	0.000	-12.718	1.571	-8.093	0.000	-
Investors protection(IP)	-0.221*	0.042	-5.149	0.000	-0.091**	0.030	-2.969	0.002	1.063
The average monthly turnover (DTURN)	-0.089*	0.019	-4.463	0.000	-0.080**	0.022	-3.598	0.000	1.388
Standard deviation of weekly return (SIGMA)	0.073**	0.025	2.873	0.005	0.079**	0.026	2.963	0.003	1.356
Firm size (Size)	-0.101*	0.026	-3.993	0.000	-0.087*	0.042	-2.068	0.042	1.074
Return on equity (ROE)	0.041	0.038	1.057	0.452	0.039	0.040	0.965	0.452	1.112
Market value to book value ratio (MTB)	-0.083**	0.034	-2.399	0.025	-0.101*	0.022	-4.501	0.000	1.212
Leverage (LEV)	0.094*	0.030	3.091	0.000	0.077**	0.022	3.372	0.000	1.089
Coefficient of determination			0.654		Coefficient of determination			0.533	
Modified coefficient of determination			0.615		Modified coefficient of determination			0.506	
F-statistic			24.27*		F-statistic			21.64*	
Durbin-Watson			1.84		Durbin-Watson			1.71	
Note: * shows the statistical significance in an error level of 0%. ** shows the statistical significance in an error level of 1%.									

The results of the research are consistent with the results of the research by Zhang et al. [4]. In fact, it can be found that with the increase of the investor protection, the companies are obligated to disclose high-quality accounting information and present transparent financial reports in order to reduce the information asymmetry among the individuals inside and outside the organization. As a result, more attention is paid to non-financial dimensions. Thus with the increase of the disclosure quality because of forming a stream of information between the managers and the investors and as a result, the lack of accumulation of the bad news in the company, the risk of the stock price crash will be reduced. It can be concluded that the transparency and the quality of information disclosure are the main functions of accounting and the core components of the corporate governance. The higher the transparency of information, the better information about the firm the stakeholders will have. This, in turn, will reduce the

problems of representative and decrease the level of information asymmetry between the corporate's managers and the stakeholders. In the absence of complete transparency in financial reporting, the managers are encouraged to hide part of the corporate losses in order to keep their personal interests. This process, that is, non-disclosure of the real losses, continues until the presence of manager in the company but after he leaves the company, a large amounts of hidden losses enter the market and leads to a fall in the stock price. On the other hand, the investors' protection causes that the company have more interests to use the high-quality audit.

The results are consistent with the research of Hamidian and Taghizadeh [31]. So, by observing the rights of shareholders, the control of managers' activities is increased and because of forming a flow of information, the investors can easily evaluate the corporate performance. Thus the chance of managers for hiding bad news and keep them in the company and thus the risk of the stock price crash will be reduced. According to the results, it is suggested that the Stock Exchange adopts the regulations to encourage companies listed in the Stock Exchange to engage in investors protection activities. Moreover, given the role of investor protection as one of the mechanisms of the corporate governance in reducing the representative conflicts, it is recommended that the corporates' shareholders make their efforts to establish the corporate governance mechanisms in the firm in order to provide an appropriate situation for creating a stream of information in Tehran Stock exchange.

Also it is recommended that in order to determine the corporates' real value, clarify the information and understand better their performance, the Stock Exchange adopts the rules and regulations to encourage the listed companies to disclose financial statements and reduce the conflicts between the managers and the investors. For this reason, particular attention should be paid to a strong audit committee in the firms, because the presence of a strong audit committee protects the interests of investors and reduces the stock price crash risk.

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