The Effect of Managerial Ownership on Stock Price Crash Risk in Distribution and Service Industries*

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Abstract

Purpose: This study is to investigate the effect of managerial ownership level in distribution and service companies on the stock price crash. The managerial ownership level affects the firm's information disclosure policy. If managers conceal or withholds business-related unfavorable factors over a long period, the firm's stock price is likely to plummet. In a similar vein, management's equity affects information opacity, and information asymmetry affects stock price collapse. **Research design, data, and methodology**: A regression analysis is conducted using the data on companies listed on the Korea Composite Stock Price Index (KOSPI) between 2012–2017 to examine the effect of the managerial ownership level on stock price crash risks. **Results**: Logistic and regression results indicate that the stock price crash risk was reduced as managerial ownership levels are increased. The managerial ownership level has a significant negative coefficient on stock price crash risk, negative conditional return skewness of firm-specific weekly return distribution, and asymmetric volatility between positive and negative price-to-earnings ratios. **Conclusions**: As the ownership and management align, the likeliness of withholding business-related information is reduced. This study's results imply that the stock price crash risk reduces as the managerial ownership level increases because shareholder and manager interests coincide, thereby reducing information asymmetry.

Keywords: Managerial Ownership, Information Asymmetry, Stock Price Crash Risk, Distribution and Service Industries

JEL Classification Code: D52, G30, M41

1. Introduction

In November 2018, Yonhap News reported that the stock price of Walmart, a leading U.S. retailer, had been on the decline for four consecutive days. This report highlighted that the stock price crashed, although Walmart's

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adjusted earnings per share exceeded market expectations and that it raised its sales prospects. The report mentions that other retailers who reported good performances also experienced such stock price crashes. Additionally, on August 17, 2017, Asia Economic news also reported the unexpected stock price crashes of E-Mart and Lotte Shopping despite E-Mart reporting a good performance in the second-quarter and Lotte Shopping making a positive resolution for the issue of transformation into a holding company.

Why do stock prices fall despite the remarkable performances by distribution companies? As stock prices are calculated based on current and future cash flows, the current and future performances are correlated with the stock price. Hence, it is necessary to focus on the causes of stock price crashes rather than the factors that affect the calculation of the stock price.

However, a stock price crash refers to the phenomenon in which the stock price, which has been set high, sharply declines. As information opacity continues for a long period,

if the company's information is not properly reflected in the stock price, the stock price is bound to be positioned higher than its intrinsic value. The accumulated opaque information spreads to the market at the threshold, at which the stock price falls sharply (Jin & Myers, 2006).

This study investigates the effect of the managerial ownership level of distribution and service companies on stock price crashes. The size of managerial ownership induces two conflicting effects, namely, the incentive alignment effect and the entrenchment effect (Morck, Shieifer & Vishny, 1988). The incentive alignment effect is the theory that states that the incentive for managers to act in a direction consistent with the interests of external shareholders increases as the managerial ownership increases. The entrenchment effect is the theory that states that the managers with high levels of ownership pursue personal interests based on the strong control over companies. According to the convergence of interest hypothesis, the interests of managers and external shareholders coincide as the managerial ownership increases, implying that managers want to reduce the information asymmetry with external shareholders by actively disclosing information about the companies. However, according to the entrenchment hypothesis, managers engage in opportunistic behaviors for personal interests as the managerial ownership increase, implying that managers do not disclose business-related unfavorable factors externally.

The level of managerial ownership affects the firm's information disclosure policy. If a manager, an insider of the firm, conceals or withholds business-related unfavorable factors over a long period, the firm's stock price is likely to plummet. Hence, this study seeks to verify the effect of managerial ownership on the stock price crash phenomenon.

The remainder of this study is organized as follows. Section 2 reviews the theories associated with this study and sets up the research hypothesis. Section 3 selects a sample for validating the hypothesis after establishing the validation model. Section 4 presents the results of empirical analysis and describes the interpretations. Lastly, Section 5 summarizes the study and describes its contribution.

2. Theoretical Background and Research Hypothesis

2.1. Managerial Ownership

The early studies on ownership structure support the convergence of interest hypothesis, which states that the interests of shareholders and managers converge and that the value of the firm increases as the managerial ownership

increases. Managers make decisions to increase shareholders' wealth because managers must bear the consequences of circumstances in which their shares are increased, and the value of the firm declines (Jensen & Meckling, 1976). Zajac and Westphal (1994) argue that the interests of shareholders and managers converge as the managers' ownership increases, leading to a reduction of agency cost and an increase in the firm's performance. Bilter (2005) analyzes the relationship between managers' efforts and wealth and found that managerial ownership increases with the value of the firm.

However, there exists the managerial entrenchment hypothesis, which states that managers pursue personal interests rather than maximizing the value of firms as the managerial ownership increases, thereby leading to a decline in the firm's value. Demsetz (1983) argues that managers prioritize personal interests rather than pursuing companies' interests because they would be empowered and free, to a certain degree, from threats such as hostile mergers and acquisitions (M&A) if the managerial ownership reaches above a certain level. Fama and Jesnsen (1983) argue that managers can be free from the pressure of governance mechanisms by increasing their ownership, thereby pursuing personal interests rather than making efforts to maximize shareholders' wealth and firms' values. Stulz (1988) notes that the increase in the shares owned by the manager strengthens their authority and weakens the monitoring over them, eventually leading managers to pursue personal interests.

2.2. Stock Price Crash Risk

Stock price crash risk has been defined in various ways by preceding literature. DeFond, Hung, Li, and Li (2015) define stock price crash as "the frequency at which extreme negative price-to-earnings ratio appears." Chen, Hong, and Stein (2001) identify the stock price crash risk by using the price-to-earnings ratio's negative skewness, the third moment of the price-to-earnings ratio. Hutton, Marcus, and Tehranian (2009) estimate the stock price crash risk as the price-to-earnings ratio's average standard deviation multiplied by 3.09—namely the stock price fluctuation that belongs to the bottom 0.1% distribution of the price-to-earnings ratio—and interpret it as the same as tail risk. The tail risk is a concept from the normal distribution of statistics, where the values are most likely to occur near the mean value because they are distributed in a symmetrical bell shape around the mean value. In other words, the stock price crash, a type of tail risk, is the risk that is hard to predict in the financial and economic market and is an important risk to be considered by market participants because, once it occurs, it has a significant impact on investment portfolios by inducing very low price-to-

earnings ratio.

Risk-averse investors repulse stocks with a high risk of crashing and require a high premium. As investors are more sensitive to risks associated with a fall than a rise in stock price, the stock price responses to negative information disclosure are asymmetrically distributed (Kothari, Leone, & Wasley, 2005). In the traditional capital asset pricing model (CAPM), it is assumed that price-to-earnings ratios are normally distributed. Thus, the risk can be dispersed through diversification. In reality, however, price-to-earnings ratios show negative skewness in the event of the stock price crash, making it difficult for investors to resolve risks through diversification (Ibragimov &Walden, 2007). In other words, as it is difficult for investors to disperse the stock price crash risk through diversification on their own, it is necessary to conduct a preliminary analysis of which companies experience stock price crashes.

Recent studies highlight the agency problem, between managers and shareholders, as the cause for stock price crashes (Hutton, Marcus, & Tehranian, 2009). While pursuing private interests, managers are incentivised to conceal or delay the disclosure of the company's information. If such a situation continues for a long period, the company's information would not be accurately reflected in the stock price, causing the stock price to be set high. Jin and Myers (2006) explain that stock price crashes occur when the accumulated unfavorable factors reach their limit and are poured into the market. This study intends to expand the preceding research by analyzing the effect of the distribution company's managerial equity on the stock price plunge.

2.3. Research Hypothesis

According to the disclosure theory, by providing business-related information to external investors, managers prevent the adverse selection problem between themselves and investors (Verrecchia, 2001). However, in reality, where information asymmetry exists between managers and external stakeholders, it is possible for managers not to fully disclose or delay the business-related information due to moral hazard, and if the information is negative (Healy & Palepu, 2001). Managers can conceal business-related negative information, and if such negative information is concealed over a long period, the stock price will be set higher than its expected value. When such concealed negative information goes beyond the critical point, it will dissipate to the market, and the stock price that was once highly valued will decline sharply (Jin & Myers, 2006).

The studies on the stock price crash caused by concealing negative information can be approached from the perspective of the agency problem between managers and shareholders (Hutton, Marcus, & Tehranian, 2009). As managers own more shares, it is less likely that the agency problem between managers and shareholders will occur. In other words, since the interests between shareholders and managers coincide, it is less likely that managers make decisions against shareholders' intent and that managers hide business-related information from the outside world. Therefore, by owning more shares, managers develop a sense of ownership provide both quantitative and qualitative business-related information to the outside world to build a better corporate image and maintain reputation. However, if managers become interested in pursuing personal interests as their managerial ownership increases, they prefer to withhold or conceal information on unfavorable factors from the outside the company. Therefore, we arrive at the following research hypothesis as the form of the null hypothesis:

H1: The level of managerial ownership is not related to the stock price crash risk.

3. Research methodology

3.1. Estimation of Stock Price Crash Risk

This study seeks to verify the effect of managerial ownership on stock price crash risk. First, the stock price crash risk is estimated using the firm-specific weekly return net the market effect. The firm-specific weekly return is estimated using the regression equation (1) suggested by Chen, Hong and Stein (2001).

$$\gamma_{j,t} = \alpha_0 + \beta_1 \gamma_{m,t-2} + \beta_2 \gamma_{m,t-1} + \beta_3 \gamma_{m,t} + \beta_4 \gamma_{m,t+1} + \beta_5 \gamma_{m,t+2} + \epsilon_{i,t} \qquad (1)$$

The dependent variable $\gamma_{j,t}$ in the regression equation (1) refers to j firm's weekly return in t year and the independent variable $\gamma_{m,t}$ refers to the value-weighted market index in t years. The five weeks market returns from t-2 to t+2 periods are included in the regression equation to control for non-synchronous trading and simultaneously estimate only the changes in the firm-specific weekly returns. As the residuals i,t estimated in the regression equation (1) have a skewed distribution, we added 1 to the residuals as shown in equation (2) and considered the natural log to estimate the firm-specific weekly returns (Hutton, Marcus, & Tehranian, 2009; Kim, Li, & Zhang, 2011: Chae, Nakano, & Fujitani, 2020).

$$W_{j,t} = \ln(1 + e_{j,t}) \qquad (2)$$

Based on the estimated firm-specific weekly returns, this study measures the stock price crash risk in three ways, namely the stock price crash occurrence (CRASH), negative conditional return skewness (NSKEW), and down-to-up volatility (DUVOL).

First, the CRASH variable, the stock price crash occurrence, is the dummy variable that indicates whether the stock price crash occurred in an individual firm. If a firm's weekly returns reflect in the bottom 0.1% of its distribution in t years, that firm is considered to have experienced a stock price crash. The mean value of the bottom 0.1% of the distribution of the firm-specific weekly return is set as the cut-off. This is because it is extremely unlikely that the value will be in the bottom 0.1% of the distribution of the mean weekly returns (Hutton, Marcus & Tehranian, 2009; Kim, Li & Zhang, 2011). Specifically, if the firm-specific price-to-earnings ratio is smaller than the standard deviation of the t-years average price-to-earnings ratio multiplied by 3.09, the associated firm is considered to have experienced stock price crashes, and one is assigned to the CRASH variable.

Second, the NSKEW variable is a continuous variable that exhibits the degree of stock price crash risk. The higher the firm's stock price crash risk, the more left-skewed the weekly returns are distributed. Hence, stock price crash risk can be high if its skewness is greater. Thus, the variable NSKEW is defined as the negative skewness of firm-specific weekly price-to-earnings ratio, and we follow the research method mentioned by Chen, Hong and Stein (2001) to estimate the returns using the equation (3),

$$NSKEW = -\left[n(n-1)^{\frac{3}{2}}\sum W^3{}_{j,t}\right]\Big/\left[(n-1)(n-2)\{\sum W^2{}_{j,t}\}^{\frac{3}{2}}\right]$$
(3)

where, n is the number of observations of the t-year's weekly returns, and W is the firm-specific weekly returns. We take negative value for convenience, considering the interpretation that the risk of a stock price crash increases as the value of skewness increases.

The third measure of the stock price crash risk, DUVOL, is measured as the asymmetric volatility between positive and negative price-to-earnings ratios, as shown in equation (4). The DUVOL variable was estimated by dividing the sample into the "down" weeks, where individual firm's stock and j's firm-specific weekly returns are lower than the annual average price-to-earnings ratio, and the "up" weeks, where the returns are higher than the annual average price-to-earnings ratio. Additionally, we divide the standard deviation of the sample where firm-specific weekly returns are lower than the annual average price-to-earnings ratio by the standard deviation of the sample where firm-specific weekly returns are higher than the annual average price-to-earnings ratio, and we take the log of the resulting values.

$$DUVOL = \log\left\{(n_u - 1)\sum_{Down} W^2{}_{j,t}\Big/(n_d - 1)\sum_{Up} W^2{}_{j,t}\right\}$$ (4)

3.2. Estimation of Managerial Ownership

The current Commercial Act divides directors into executive directors, outside directors, and other non-executive directors (Article 382 paragraph 3). Executive directors are those who are engaged in regular businesses. They regularly commute to work and hold positions related to management practices, such as president and vice-president. Their business cards mainly use titles such as president, vice president, and executive director. For reference, the CEO must be an executive director, and if there is only one director, the individual must be an executive director as they represent the company. These individuals cannot be an outside director or non-executive director.

Directors who are not executive directors (i.e., board members) all become non-executive directors. Further, the Commercial Act classifies the non-executive directors as outside directors if they meet independence requirements from the major shareholders or board members. Otherwise, they are classified as non-executive directors.

This study collected the data on managerial ownership from TS2000, the database provided by the Korea Listed Companies Association. According to this data, the positions and titles of managers in the distribution and service sectors vary widely. Thus, this study estimates managerial ownership by collecting the titles associated with executive directors in each company and adding up the shares owned for each position.

3.3. Research Model

In this study, we validate the effect of managerial ownership on stock price crash risk by using logistic and linear regression models in which CRASH, NSKEW, and DUVOL—variables that measure stock price crash risk—are included as the dependent variables, and managerial ownership is included as an independent variable. In addition, control variables, introduced in Chen, Hong and Stein (2001) and Hutton, Marcus and Tehranian (2009), that affect stock price crash risk is included in the model.

$$
\begin{aligned}
CRASH_{i,t}&, NSKEW_{i,t}, DUVOL_{i,t}\\
&= \gamma_0 + \gamma_1 CEOSHARE_{i,t-1} + \gamma_2 SIZE_{i,t-1}\\
&\quad + \gamma_3 LEV_{i,t-1} + \gamma_4 MB_{i,t-1} + \gamma_5 ROA_{i,t-1}\\
&\quad + \gamma_6 SIGMA_{i,t-1} + \gamma_7 RET_{i,t-1}\\
&\quad + \gamma_8 ABSDA_{i,t-1}\\
&\quad + \sum YEAR + \sum IND + \epsilon_{i,t}
\end{aligned}
$$
(5)

The variable of interest for testing the hypothesis of this study is CEOSHARE, which indicates managerial ownership. If the coefficient γ_1 is significantly negative; it is noted that the stock price crash risk decreases as the level of managerial ownership increases. Hutton, Marcus and Tehranian (2009) report that the risk of stock price crash increases as the quality of financial reporting decreases. Hence, this study includes the absolute value of discretionary accruals (ABSDA), estimated from the performance-adjusted model in Kothari, Leone and Wasley (2005). More specifically, ABSDA is estimated through equation (6). There are two types of earnings adjustment, an upward adjustment and a downward adjustment. Therefore, the absolute value was used to determine the size of the earnings adjustment.

$$TA_{i,t}/A_{i,t-1} = \beta_0 + \beta_1 (1 / A_{i,t-1}) + \beta_2 [(\Delta S_{i,t} - \Delta AR_{i,t}) / A_{i,t-1}] + \beta_3 PPE_{i,t} / A_{i,t-1} + \beta_4 ROA_{i,t} + \varepsilon_{i,t} \quad (6)$$

$TA_{i,t}$ = Net income - cash flow from operating activities;

$A_{i,t-1}$ = Total assets;

$\Delta S_{i,t}$ = Changes in sales;

$\Delta AR_{i,t}$ = Changes in accounts receivable;

$PPE_{i,t}$ = Tangible assets – land - construction in progress;

$ROA_{i,t}$ = Net income/total assets;

ε = Residuals; and

i,t = firm, year

Table 1: Variable Definitions

Variable	Definition
CRASH	=1 if a firm–year that experiences one or more firm-specific weekly returns falling 3.09 standard deviations below the mean firm-specific weekly returns over the fiscal year, with 3.09 chosen to generate frequencies of 0.1% in the normal distribution, and 0 otherwise.
NSKEW	= negative skewness of firm-specific weekly returns over the fiscal year
DUVOL	= the log of the ratio of down-week to up-week standard deviation
CEOSHARE	= the log of the average working experience of internal control personnel in months
SIZE	= the logarithm of market value
LEV	= the ratio of the total debt to total assets
MB	= the ratio of the book value to market value of equity
ROA	= the ratio of the net income to total assets
SIGMA	= the standard deviation of firm-specific weekly return
RET	= the average firm-specific weekly return multiplied by 100
ABSDA	= the absolute value of discretionary accruals estimated through equation (6)
i,t	= firm, year

Additionally, the SIZE variable, a natural log of aggregate market value, is added to the model to control the effect of aggregate market value on the stock price crash risk. The LEV variable, the ratio of the total debt to total assets, and the MB variable, the ratio of the book value to the market value of equity, are included, and the ROA variable, the ratio of the net income to total assets, is added to the model to control firm's performance. Also, the standard deviation of firm-specific weekly return SIGMA and the average firm-specific weekly return RET are added as controls. To verify the future stock price crash risk that depends on the current level of managerial ownership, all independent variables, including the variable of interest CEOSHARE, are set as the estimates in the prior term rather than the current term in the model. Lastly, to control the effect that arises from the difference in years and industries, the year dummy and industry dummy are included in the validation model.

3.4. Sample Selection

This study conducted a regression analysis on companies listed on the Korea Composite Stock Price Index (KOSPI) market from 2012 to 2017 to examine the effect of the managerial ownership level on the stock price crash risk.

The financial and stock price data for the analysis are extracted from Kis-Value, and the data for managerial ownership are collected from TS2000, a database from the Korea Listed Companies Association. Companies whose settlement month is not December or belong to the financial industry are excluded, and all variables—excluding dummy variables—are winsorized at 1% and 99% to control the effect of extreme values on the results.

4. Empirical Analysis

4.1. Descriptive Statistics

Descriptive statistics on the variables used in the study are illustrated in Table 2. The final sample from sample selection includes 659 firm-years, and the mean value of managerial ownership CEOSHARE, the main independent variable of the study, is 0.092. The minimum and maximum values are 0.000 and 0.576, respectively, indicating a large deviation of shares owned by the managers in distribution and service companies. For the dummy variable CRASH, which indicates whether a stock price crash occurred, the mean value is 0.094, confirming that 9% of distribution companies experienced stock price crashes. For the conditional skewness variable NSKEW, which indicates the stock price crash risk, and the asymmetric volatility variable DUVOL, the mean values are -0.334 and 0.158, respectively.

Table 2: Descriptive Statistics(n=659)

Variable	Mean	Standard Deviatin	Minimum	Median	Maximum
CEOSHAE	0.092	0.141	0.000	0.003	0.576
CRASH	0.094	0.292	0.000	0.000	1.000
NSKEW	0.334	0.809	-4.992	-0.249	4.172
DUVOL	0.158	0.362	-1.537	-0.148	1.285
SIZE	26.43	1.756	23.551	26.201	30.810
LEV	0.409	0.224	0.036	0.408	0.932
MB	1.592	1.501	0.218	1.072	7.472
ROA	0.014	0.089	-0.361	0.023	0.233
SIGMA	0.052	0.027	0.015	0.044	0.149
RET	0.169	0.202	-1.117	-0.098	-0.011
ABSDA	0.057	0.079	0.000	0.038	0.816

Variable definitions: refer to Table 1.

4.2. Correlation analysis

Table 3 shows the correlation between the variables used in the study. The managerial ownership variable CEOSHARE, the main variable of interest, has a significant negative correlation with the stock price crash occurrence, CRASH, conditional skewness NSKEW, and DUVOL at 10%, 1%, and 1% significance levels, respectively. Meanwhile, the three types of measurement of stock price crash risk—CRASH, NSKEW, and DUVOL— are positively correlated with each other at the 1% significance level.

However, as it is difficult to verify the hypothesis systematically using the bivariate correlations alone, the regression analysis, including other factors affecting the stock price crash as controls, is conducted as explained in the following sections.

4.3. Regression Analysis (1)

Table 4 shows the results of the logistic regression analysis that verifies the relationship between managerial ownership and stock price crash risk. The results indicate that the regression coefficient γ_1 , which shows the relationship between the level of managerial ownership CEOSHARE and the dummy of stock price crash occurrence, CRASH, is -2.186 and is negatively significant at the 10% level. This implies that it is less likely that the stock price will crash if managers own more shares. In other words, the managerial ownership reduces the incentive for managers to conceal information by aligning the interests of shareholders and themselves, thereby alleviating possible stock price anomalies.

The profitability variable ROA has a negative significant relationship with the stock price crash

occurrence CRASH. This result aligns with results from prior literature that the firms with excellent performance and profitability are less likely to experience stock price crashes.

4.4. Regression Analysis (2)

Table 5 shows the results of linear regression analysis that verify the relationship between managerial ownership and stock price crash risk. The results indicate that the regression coefficient γ_1 , which shows the relationship between the level of managerial ownership CEOSHARE and conditional skewness NSKEW, is -0.562 and is negatively significant at the 5% level. This implies that the weekly return distribution is less skewed as the managerial ownership increases. In other words, the sense of ownership that arises from the increase in managerial ownership has a positive effect in mitigating the information asymmetry between the inside and outside of a company, thereby leading to a decline in the risk of a stock price crash.

Meanwhile, among the control variables, the natural log of aggregate market value SIZE has a statistically significant positive relationship with the stock price crash risk measured using the conditional skewness NSKEW.

4.5. Regression Analysis (3)

Table 6 shows the results of regression analysis examining whether the stock price crash risk measured using down-to-up volatility DUVOL occurs discriminatively as the managerial ownership increases. The results indicate that the regression coefficient γ_1 , which shows the relationship between the level of managerial ownership CEOSHARE and volatility DUVOL, is -0.213 and is negatively significant at the 5% level. This confirms that the asymmetric volatility between positive price-to-earnings ratio and the negative price-to-earnings ratio is mitigated as the managerial ownership increases. Since the information disclosure due to managers' personal interests is controlled as the level of managerial ownership increases, the resulting risk of stock price crash is reduced.

Meanwhile, in the regression analysis where volatility is set as the dependent variable, the log of aggregate market value SIZE has a statistically significant positive relationship with the stock price crash risk estimated using volatility DUVOL.

The results of the analyses support the convergence of interest hypothesis, which states that the interests of managers and shareholders coincide as the managerial ownership increases. The results confirm that the stock price crash occurrence, CRASH, weekly return's conditional skewness, NSKEW, and volatility, DUVOL are mitigated as the managerial ownership increases due to a decline in information asymmetry.

Table 3: Pearson's correlation(n=659)

	CRASH	NSKEW	DUVOL	SIZE	LEV	MB	ROA	SIGMA	RET	ABSDA
CEO SHARE	-0.074	-0.136	-0.118	-0.158	-0.279	0.024	0.063	0.033	-0.021	-0.017
	(0.0563)	(0.0005)	(0.0023)	(<.0001)	(<.0001)	(0.5441)	(0.1068)	(0.3939)	(0.5959)	(0.6555)
CRASH		0.403	0.399	-0.076	0.069	0.020	-0.182	0.115	-0.135	0.100
		(<.0001)	(<.0001)	(0.0516)	(0.0762)	(0.6138)	(<.0001)	(0.003)	(0.0005)	(0.0099)
NSKEW			0.946	0.250	0.045	0.152	0.026	-0.020	0.017	0.035
			(<.0001)	(<.0001)	(0.2455)	(<.0001)	(0.5082)	(0.6127)	(0.6604)	(0.3698)
DUVOL				0.217	0.044	0.140	0.000	0.018	-0.025	0.035
				(<.0001)	(0.2563)	(0.0003)	(0.9959)	(0.6436)	(0.5186)	(0.3728)
SIZE					0.059	0.417	0.314	-0.329	0.317	-0.035
					(0.1276)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.368)
LEV						-0.033	-0.147	0.145	-0.133	0.102
						(0.3934)	(0.0002)	(0.0002)	(0.0006)	(0.0086)
MB							0.086	0.096	-0.052	0.121
							(0.0274)	(0.0139)	(0.1784)	(0.0019)
SIGMA								-0.295	0.271	-0.083
								(<.0001)	(<.0001)	(0.0338)
RET									-0.965	0.223
									(<.0001)	(<.0001)
ABSDA										-0.214
										(<.0001)

Variable definitions: refer to <Table 1>. Values in parentheses are p-values.

Table 4: Effect of CEO share on Crash Risk

Dependent Variable: Crash Risk Dummy Variable		
variables	coefficient	z-value
Intercept	1.623	0.3228
CEOSHARE	-2.186	3.01*
SIZE	-0.132	1.69
LEV	0.473	0.59
MB	0.112	1.26
ROA	-3.455	6.60**
SIGMA	-31.351	2.57
RET	-4.572	3.91**
ABSDA	1.742	1.36
Year dummy	Included	
Likelihood Ratio	33.940***	
Pseudo Adjusted R^2	0.08	
N	659	

***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.
Variable definitions: refer to Table 1.

Table 5: Effect of CEO share on Negative Conditional Return Skewness

Dependent Variable: Negative conditional return skewness		
variables	coefficient	t-value
Intercept	-3.123	-5.06***
CEOSHARE	-0.562	-2.45**
SIZE	0.108	4.89***
LEV	-0.015	-0.11
MB	0.026	1.10
ROA	-0.251	-0.67
SIGMA	1.071	0.23
RET	-0.053	-0.09
ABSDA	0.293	0.73
Year dummy	Included	
F-value	5.03***	
Adjusted R^2	0.08	
N	659	

***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.
Variable definitions: refer to Table 1.

Table 6: Effect of CEO share on Crash Risk on Down-to-Up Volatility

Dependent Variable: Down-to-Up Volatility		
variables	coefficient	t-value
Intercept	-1.285	-4.65***
CEOSHARE	-0.213	-2.07**
SIZE	0.044	4.54***
LEV	-0.005	-0.09
MB	0.010	1.03
ROA	-0.171	-1.02
SIGMA	-0.269	-0.13
RET	-0.183	-0.69
ABSDA	0.090	0.50
Year dummy	Included	
F-value	4.99***	
Adjusted R^2	0.07	
N	659	

***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.
Variable definitions: refer to Table 1.

5. Conclusion

As the managerial ownership increases, it is less likely that there will be an agency problem because the interests of shareholders and managers coincide. As ownership and management coincide, managers make business-related decisions with the sense of ownership and are less likely to delay the disclosure of business-related information. Managers, with a relatively higher level of ownership, prefer to disclose both quantitatively and qualitatively remarkable information to the market to build a better corporate image and to maintain their reputation for the long term.

This study verifies the effect of managerial ownership on stock price crashes by considering the distribution and service companies that have experienced such crashes despite their good performance. Logistic and regression analyses using the companies listed on the KOSPI market from 2012 to 2017 confirm that the stock price crash risk decreases as the managerial ownership increases. More specifically, the managerial ownership has a significant negative coefficient on the stock price crash occurrence, firm-specific weekly return distribution's negative skewness, asymmetric volatility between positive price-to-earnings ratio, and negative price-to-earnings ratio. The results confirm that the interests of shareholders and managers coincide as the managerial ownership increases, leading to a lower agency cost and reduction in asymmetric information between inside and outside of the company.

The limitation of this study is that it has not verified the family-owned businesses. However, the results of this study arouse the importance of the role of managerial ownership in regulatory agencies and capital market participants. Specifically, it implies that securing the managerial ownership in distribution and service companies plays an important role in maintaining their companies' stability in the stock market.

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