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Is Stock Split a Manipulation Tool? Evidence from the Korean Stock Market*

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Abstract

This paper studies the economic motivations for stock splits in the Korean stock market. Specifically, we investigate whether a stock split can be used not only as a tool to reveal information, but also as a manipulation tool, by dividing sample firms into two groups between the firms that split stocks with and without subsequent corporate events. We then examine each group's changes in short- and long-term abnormal returns and ownership around the time of the stock splits. We find that firms that split stocks both with and without subsequent corporate events show positive abnormal returns around the announcement date. However, we find evidence that long-term performance and insider ownership decline greatly after the announcement date only among the firms that split stocks and have subsequent corporate events. In particular, firms that are listed on the KOSDAQ and go through other corporate events after a stock split exhibit a strong and positive association between change in the insider ownership and long-term performance. This result implies that the decrease in insider ownership and its negative effect on long-term performance are more pronounced in firms that are listed for short periods and are more likely to experience information asymmetry. Overall, our results indicate that firms

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involved in other corporate events after a stock split are likely to utilize the stock split as a manipulation tool.

Keywords Stock split; Information hypothesis; Opportunism hypothesis; Insider ownership

JEL Classification: G3, G14

1. Introduction

Stock splits should not affect the value of a firm, as they simply entail an increase in the number of issued stocks and their proportional distribution to shareholders in the same ratio as before the split. However, empirical studies have demonstrated that positive abnormal returns have occurred on and after the public announcement of a stock split, and a variety of hypotheses have been formulated to explain such phenomena. One such hypothesis is the signaling hypothesis, which argues that a manager uses a stock split as a signal to declare positive insider information to outsiders. Another is the liquidity hypothesis, which argues that positive abnormal returns occur as a result of decreasing stock prices, making them more attractive to investors. Both the signaling hypothesis and the liquidity hypothesis are broadly supported, as empirical studies have indicated that stock split has a positive effect on stock prices and that small investors' transactions increase after the split.

However, some recent studies have argued that a manager may use a stock split as a manipulation tool to exploit other corporate events through the positive effects of the stock split. D'Mello *et al.* (2003) argued that a manager may execute a stock split before a seasoned equity offering (SEO) to maximize the latter's effect. Similarly, Guo *et al.* (2008) demonstrated that a manager of acquiring firms uses stock splits as a way to increase the value of shares before announcing stock exchange mergers and acquisitions. Thus, the opportunism hypothesis, which suggests that a manager can use stock split as a tool of manipulation through the positive effects of announcing a stock split, has also been formulated.

This paper studies the economic motivation underlying the splitting of stocks. Specifically, this paper investigates whether a stock split can be used not only as a tool to reveal information, but also as a manipulation tool, by examining the short- and long-term abnormal returns and ownership changes around the time of the stock splits in the Korean stock market. Emerging markets, such as that of Korea, exhibit a higher level of information asymmetry because of less strict announcement policies, the weaker monitoring role of institutional investors, and high ownership concentration. Additionally, the volatility of stock prices is higher because of the high participation of individual investors in the market. Under such conditions, investors may be more sensitive to stock split announcements,[1] and a manager is more likely to exploit stock splitting as an opportunity.

[1]Kim and Byun (2010) show that investment sentiment positively affects market response to stock split announcements in the Korean stock market, which is highly influenced by the trading of individual investors.

If a manager executes a stock split with opportunistic motivations, it is more likely that the stock split will be compounded with another corporate event. Adverse selection costs increase when a manager uses a stock split as a false signal in a stock split without subsequent corporate events, and thus it is difficult for a manager to use it as an opportunity.[2] However, if the gain from a stock split compounded with another corporate event is greater than the adverse selection cost, a manager may possibly use the stock split as a false signal. Therefore, depending on stock splits with or without subsequent corporate events, different predictions can be presented.

First, stock splits without subsequent corporate events are more likely to occur in order to send out a positive signal. If a stock split is executed to provide information, the announcement will bring on positive abnormal returns and the long-term performance afterwards will not decline. Additionally, if the stock split is a positive signal, insiders are less likely to sell their stock after the announcement and insider ownership will not change.

On the other hand, firms that execute stock splits followed by other corporate events may have more opportunistic motives than those who split stocks without subsequent corporate events. In particular, firms with higher information asymmetry and a more concentrated ownership structure are more likely to compound stock splits with other corporate events so as to bring in more capital through the issue of more stocks at increased prices. Furthermore, they are likely to empower more control of firms via the dispersal of the ownership structure to individual investors rather than institutional investors, the latter of which frequently implements monitoring of management.[3] Additionally, firms listed for less time, such as venture firms, may use stock splits effectively to retrieve the capital invested by insiders prior to the IPO.

If stocks are split because of such opportunistic motivations, the positive stock price reaction will be higher at the announcement date because the manager will provide positive information that elicits a greater positive stock reaction before the announcement date, and the optimistic information will create a positive effect alongside the stock split signal. However, because insiders will sell their shares due to higher stock prices and increased liquidity, insider ownership will be reduced and individual investors' ownership will increase. Such changes in ownership can

[2]The implied cost of shareholders increases in stock splits not only because of administrative, printing, and legal costs, but also because of transaction costs that are inversely related to share prices. Hence, false signals from a manager using stock splits can bring a reduction in share prices.

[3]According to Han and Suk (1998), the effects of a stock split announcement are larger when information asymmetry and insider ownership are higher within a firm. Mukherji *et al.* (1997) argue that firms can split stocks to disperse the shares of large shareholders to small individual investors, as stock splits can result in a reduction in institutional ownership and increase individual ownership, thereby rendering a company more vulnerable to monitoring by institutional investors and hostile takeovers.

result in a decrease in the firm's long-term performance as the market recognizes it as an agency cost in the long run. Hence, this study predicts that firms with higher information asymmetry and high ownership concentration elicit larger positive abnormal returns at the stock split announcement date, but long-term performance and insider ownership decrease and small investors' ownership increases.

Such opportunistic behaviors also occur in other corporate activities, in addition to stock splits. Empirical studies have demonstrated that a manager may use the increases in discretionary accrual, stock repurchases, and changes in dividend policy in order to maximize the effect of IPO, SEO, or stock-for-stock mergers (John and Williams, 1985; Ambarish *et al.*, 1987; Teoh *et al.*, 1998a,b; Shivakumar, 2000; Louis, 2004). However, when firms use discretionary accruals, dividends, and stock repurchases as a tool forsending signals, other issues such as wealth transfer, free cash flow problem, and taxation effects may arise simultaneously. Hence, it becomes difficult to determine whether the announcement effect is attributable to signaling motivation (Han and Suk, 1998). In contrast, a stock split is a relatively transparent signal without alternative motives, and thus can prove to be effective in sending out a signal when combined with other corporate events.

We select 281 firms with stock splits that are listed on the Korea Exchange at the KOSPI and KOSDAQ during the period between 1999 and 2009 for the sample in this study. The sample firms are divided into two groups, between the firms that split stocks without subsequent corporate events and those which split stocks with subsequent corporate events, such as seasoned equity offering (SEO), convertible bonds issues, and the issue of bonds with warrants within a year of the stock split announcement. Then, we examine each group's changes in the short- and long-term abnormal returns and ownership around the time of the stock splits. Based on these results, we investigate whether stock splits can be used as a signaling tool or as an opportunistic manipulation tool in the Korean stock market. The paper is organized as follows. Section 2 discusses the theoretical background. Section 3 presents the data and the descriptive analysis. Section 4 provides the empirical results. Finally, the summary and conclusions are provided in Section 5.

2. Theoretical Background

Empirical studies of the effects of stock splits have concluded that stock splits show positive abnormal returns at the announcement date and positive abnormal returns are observed in the long run after the stock split (Ikenberry *et al.*, 1996; Desai and Jain, 1997). Such abnormal phenomenon has been explained from various angles, most of which can be divided into the signaling hypothesis and the liquidity hypothesis. The signaling hypothesis assumes that a manager splits stocks to signal an optimistic future related to profits and dividend distributions of the firm (Grinblatt *et al.*, 1984; McNichols and Dravid, 1990; Ikenberry *et al.*, 1996). The liquidity hypothesis assumes that the stock split increases liquidity, as a stock split lowers share prices and makes the stock prices more attractive to small individual investors with limited capital,

engendering positive abnormal returns (Copland, 1979; Lakonishok and Lev, 1987; Lamoureux and Poon, 1987; Maloney and Mulherin, 1992; Mukherji *et al.*, 1997; Fernando *et al.*, 1999; Schultz, 2000). However, the signaling hypothesis and the liquidity hypothesis are not mutually exclusive, as the increase in liquidity can be perceived as an optimistic signal. Ikenberry *et al.* (1996) argue that the firm's positive long-term performance after a stock split is proof of this hypothesis.

For these reasons, we assume that a stock split without subsequent corporate events is used as both a signal and a tool to increase liquidity. We predict that such stock splits bring about positive abnormal returns around the announcement date, and the long-term performance afterwards will not decline. Additionally, we predict that insider ownership will not change if the stock split is executed in order to provide information.

In contrast, if the stock split is compounded with other corporate events such as SEO, IPO, and stock-for-stock merger, there is a greater possibility that the stock split is used not as a signal but rather as an opportunity to exploit private gains. This is more likely to occur when the information asymmetry is high and the ownership of the firm is concentrated among insiders. In this study, we examine whether stock splits can be used as an opportunity to manipulate by looking at firms that split stocks followed by the events related to increasing shares such as SEO, convertible bonds issues, and the issue of bonds with warrants.[4]

The motivations of a manager using a stock split compounded with other corporate events as a manipulation tool can be explained as follows: first, managers may use a stock split as a manipulation tool since stock splits are associated with positive abnormal stock returns and thus could be used to raise more capital in a subsequent corporate event. Myers and Majluf (1984) and Miller and Rock (1985) argued that firms planning to execute SEO issue new stocks to minimize adverse selection costs. Similarly, D'Mello *et al.* (2003) argued that a manager may split stocks in order to procure more funds before a SEO, despite there being no favorable information. They state that stock splits can offer a possibility of wealth transfer from new investors to existing shareholders as false signals through splitting stocks raise stock prices temporarily at the time of the SEO. Loderer and Mauer (1992) and Teoh *et al.* (1998a,b) also conduct studies into the opportunistic motivations behind stock splits by examining cases of change in discretionary accrual prior to the SEO. Guo *et al.* (2008) assume discretionary accruals to be a proxy for a manipulation

[4]Guo *et al.* (2008) argue that in the case of stock-exchange mergers and acquisitions, stock splits before the merger are used as a manipulation tool. There are only six firms that are merged after the stock split during our sample period. Thus, we exclude mergers in examining the opportunistic motives of firms splitting stock, and focus on firms that split stocks before the announcement of the SEO, convertible bonds issues, and the issue of bonds with warrants. Whereas the United States market employs public offerings for the SEO, most firms in Korea choose to give warrants to existing stockholders and allocation to third parties or public offering for forfeited stock. Thus, such differences in capital increases can affect the motives of opportunistic stock splits.

tool, and examine firms that split stocks prior to mergers. Their results demonstrate that long-term performance decreases in firms with larger discretionary accrual and further show how stock splits can be used as a manipulation tool to heighten the effects of other corporate events. If stock splits are used as not a true signaling tool but as a manipulation tool, a stock price may climb temporarily after the announcement, yet the long-term performance will be reduced as returns decline.

Second, managers may split stocks to retrieve capital invested, or to reduce takeover activities and institutional investors' monitoring activities by dispersing ownership to small individual investors. According to Han and Suk (1998), it is difficult to send out false signals through splitting stocks because adverse selection costs may occur. Furthermore, adverse selection costs are higher in firms with higher insider ownership, and abnormal returns are higher at the stock split announcement date in firms with higher insider ownership, as the reliability of the optimistic signal regarding the stock split is higher in such firms. Moreover, the study demonstrates that positive abnormal returns are higher in smaller firms with higher levels of information asymmetry. Lakonishok and Lev (1987), Shleifer and Vishny (1986), and Stulz (1988) offered the explanation that a manager may split stocks to form a wide and dispersed shareholder base. Baker and Gallagher (1980) and Mukherji *et al.* (1997) demonstrated that managers of firms in which the institutional investor rate is higher may split stocks to make the stock more attractive to private investors and hence disperse ownership and furthermore reduce the monitoring role. Firms with higher insider ownership are particularly likely to execute SEO after a stock split to take back investments through positive abnormal returns of stock split and increase ownership efficacy at the same time. Thus, by conducting a stock split and SEO together, a manager may sell unnecessary shares and disperse ownership to individual investors through increased stock prices and liquidity, and consequently maintain actual ownership of a firm with smaller shares. In such cases, the stock price reaction will be higher before the stock split announcement and positive abnormal returns will be higher at the time of the announcement. Additionally, the long-term performance and insider ownership will be reduced and individual investors' ownership will increase after the announcement.

3. Data and Descriptive Analysis

3.1. Sample Selection

The object of this study is to analyze the difference in economic motivations in stock splitting between firms that split stocks with and without subsequent corporate events through examining each group's changes in the short- and long-term abnormal returns and ownership around the time of stock splits. In order to do so, we select 531 firms that split stocks between January 1999 and December 2009 as our samples. However, from the initial samples, we exclude 250 firms that could cause errors in measuring the announcement effect and the long-term effect due to the confounding effect caused by other corporate events.

The specific criteria under which we select our samples for this study are as follows. First, we exclude 36 firms that executed an IPO 1 year or less before the stock split, and six firms that underwent M&A within a year before or after a stock split. Such firms may not provide sufficient stock return information during the estimation period to compute abnormal stock returns based on the market model. Also, they may cause errors in measuring the announcement effect, long-term performance, and ownership change purely stemming from stock splits since the effects from the IPO or M&A could be mixed. Second, we exclude 82 firms that were under supervisions within a year before or after the stock split, and 39 firms for which we could not acquire financial data and stock information due to being delisted. Third, corporate events that could increase or decrease a firm's shares are likely to provide information affecting a firm's stock return. Such information may be mixed with information from stock splits and cause errors in capturing the stock split announcement effect. Hence, we exclude firms with other events that could increase or decrease shares within 30 days before the stock split announcement from our sample. Specifically, we exclude 74 firms that underwent corporate events that could affect the announcement effect of the stock split, such as capital increase with and without consideration (35 firms), capital decrease (27 firms), convertible bonds issues and the issue of bonds with warrants (seven firms), and other corporate events (five firms). Lastly, we exclude 13 samples in the banking, insurance, and securities businesses to align the month of closing an account. This brings down the number of sample firms to 281.

Among the sample, 210 firms (126 KOSPI firms, 84 KOSDAQ firms) did not undergo subsequent corporate events within a year of the stock split, and 71 firms (23 KOSPI firms, 48 KOSDAQ firms) underwent other corporate events (e.g. seasoned equity offerings (SEO), convertible bond issues, and the issue of bonds with warrants).[5] Among the latter, 45 firms executed only SEO after the stock split, 10 firms issued convertible bonds and bonds with warrants, and 15 firms executed SEO and issued convertible bonds and bonds with warrants. Table 1 summarizes the criterion under which the samples were selected.

We obtain stock returns and financial data of sample firms from the Data Guide Pro provided by FnGuide. Ownership data of sample firms are compiled using information from the Data Analysis Retrieval and Transfer (DART) system of the Korea Financial Supervisory. Announcement information regarding stock splits, SEO, convertible bonds issues, and the issue of bonds with warrants is collected from the KRX database.

[5]The Korean stock market is divided into two categories: the KOSPI (Korea Composite Stock Price Index) and the KOSDAQ (Korea Securities Dealers Automate Quotation). Listing on the KOSDAQ is similar to listing on the NASDAQ. KOSDAQ opened in 1996 to make funds more readily available for midsize/small firms and venture firms. The listing requirement for KOSDAQ is more relaxed than that of KOSPI, and therefore more small/midsize firms and venture firms are listed on the former.

Table 1 Sample selection

Sample selection	KOSPI	KOSDAQ	No. sample
1. Firms that split stocks during the sample period (1999–2009)			531
2. Sample excluded			
Firms that split stocks within 1 year after IPO			36
Firms that are under supervisions after stock split			82
Firms missing stock information and financial data			39
Firms that announced other corporate events between 30 days before and on stock split announcement date: Capital increase with and without consideration (35), capital decrease (27), convertible bonds issues and the issue of bonds with warrants (7), and etc. (5)			74
Firms involved in M&A before stock split (3) and after stock split (3)			6
Firms in insurance industries			13
			250
3. Final sample			
1) Stock split without subsequent corporate events ($N = 210$)	126	84	
2) Stock split with subsequent corporate events ($N = 71$)			
Capital increase with consideration within 1 year after stock split	12	33	
Capital increase with consideration and issuing convertible bonds within 1 year after stock split	3	7	
Capital increase with consideration and issuing bonds with warrants within 1 year after stock split	1	4	
Issuing convertible bonds within 1 year after stock split	4	3	
Issuing bonds with warrants within 1 year after stock split	3	1	
Total	149	132	281

3.2. Descriptive Statistics

Descriptive statistics regarding the factors that can influence market reactions to a stock split are presented in Table 2. SIZE refers to the size of a firm determined by the log of the market value (in million Won) of shares 2 days prior to the split announcement, and STDVAR is the standard deviation of daily size-adjusted abnormal returns between 180 and 31 days prior to the announcement. Leakage, which captures the possibility of information leakage before the stock split announcement, is measured by cumulative abnormal returns between 30 and 5 days prior to the announcement (Brennan and Copeland, 1988; Szewczyk and Tsetsekos, 1993). This study predicts that firms with higher information asymmetry are more likely to use stock splits as a manipulation tool. It uses SIZE, STDVAR, and Leakage as proxy variables of information asymmetry.

Table 2 Descriptive statistics

This table reports the descriptive statistics of sample firms' characteristics. SIZE is the log of the market value (in million Won) of equity 2 days before the stock split announcement. STDVAR is the standard deviation (SD) of size-matching daily abnormal returns between 180 and 31 days before the stock split announcement. Leakage is the cumulative abnormal returns between 30 and 5 days before the stock split announcement. INDISER is the insider ownership, which is calculated by summing the ownerships of the largest shareholder and person having a special relationship with the firm at the end of the year before the split announcement. SMALL is the small investors' ownership at the end of the year before the split announcement. NST is the number of small investors at the end of the year before the announcement. PriorR is the abnormal returns between (−180, −30) prior to the split announcement date. ROA is the return on total assets in the year before the split. BM is the book-to-market equity value ratio of the year before the announcement. Split factor is the proportion of the stock split. MARKET is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and is 0 if a firm is listed on the KOSPI.

	N	Mean	SD	Minimum	1st Quartile	Median	3rd Quartile	Maximum
SIZE	281	10.250	1.157	8.000	9.400	10.240	10.910	13.000
STDVAR	281	0.039	0.014	0.017	0.029	0.036	0.049	0.074
Leakage	281	0.167	0.305	−0.318	−0.004	0.111	0.282	1.178
INSIDER (%)	281	0.417	0.178	0.115	0.285	0.401	0.528	0.797
SMALL (%)	281	0.326	0.155	0.074	0.207	0.316	0.403	0.742
NST	281	1.711	1.769	37	494	1.113	2.330	7.104
PriorR	281	0.099	0.477	−1.009	−0.186	0.101	0.391	1.269
ROA (%)	281	0.043	0.071	−0.166	0.014	0.043	0.085	0.183
BM	281	1.608	1.081	0.031	0.817	1.284	2.089	4.722
Split factor	281	8.140	4.035	2	5	10	10	50
MARKET	281	0.470	0.500	0	0	0	1	1

INDISER denotes insider ownership, which is calculated by summing the ownerships of the large shareholders and persons having a special relationship with the firm, as shown in the annual report published at the end of the year prior to the split announcement. SMALL refers to small investors' ownership at the end of the year prior to the split announcement, and NST is the number of small investors at the end of the year prior to the announcement. PriorR is the abnormal returns (between −180 and −30) prior to the split announcement date, and is used as a proxy of a firm's past performance. ROA is the return on total assets in the year prior to the split, and is an accounting measure of performance. BM is the book-to-market equity value ratio of the year before the announcement and this variable measures the firm's growth. As Elgers and Murray (1985) argue that a low-level stock split is motivated by the signal hypothesis and a high-level stock split is motivated by the liquidity hypothesis motivation, we select the split factor (Sfactor) as a variable to examine the difference between the two groups. Additionally, we use the dummy variable of MARKET, assigned a value of 1 if a firm is listed on the KOSDAQ and 0 if a firm is listed on the KOSPI.

3.3. Comparisons between Firms that Split Stocks With and Without Subsequent Corporate Events

The principal objective of this study is to determine whether there is a difference in stock split motivation between firms that split stocks with and without subsequent corporate events through an examination of such firms' abnormal returns and ownership changes. Table 3 shows the results with regard to whether the two groups of firms differ in characteristics in terms of their mean and median values.

Table 3 Comparison between firms that split stocks with and without subsequent corporate events

This table reports the mean and median values of sample firms' characteristics and their differences between firms that split stocks without subsequent corporate events (Group 1) and firms that split stocks with subsequent corporate events (Group 2). Panel A shows the difference between their mean values using a *t*-test. Panel B shows the difference between their median values using the Mann–Whitney test. SIZE is the log of the market value of equity 2 days before the stock split announcement. STDVAR is the standard deviation of the size-matching daily abnormal returns between 180 and 31 days before the stock split announcement. Leakage is the cumulative abnormal returns between 30 and 5 days before stock split announcement. INDISER is the insider ownership, which is calculated by summing the ownerships of the largest shareholder and persons having a special relationship with the firm at the end of the year before the split announcement. SMALL is the small investors' ownership at the end of the year before the split announcement. NST is the number of small investors at the end of the year before the announcement. PriorR is the abnormal returns (between −180 and −30) before the split announcement date. ROA is the return on total assets in the year before the split. BM is the book-to-market equity value ratio of the year before the announcement. Split factor is the proportion of the stock split. MARKET is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and is 0 if a firm is listed on the KOSPI. Based on the *t*-test, ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively. Based on the Mann Whitney test, +++, ++, and + indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

	Panel A: *T*-test			Panel B: Mann–Whitney test		
	(1) Group 1	(2) Group 2	Difference: (1)–(2)	(3) Group 1	(4) Group 2	Difference: (3)–(4)
Variable	Mean	Mean	*t*-value	Median	Median	Wilcoxon *z*-value
SIZE	10.443	9.669	5.089***	10.409	9.518	4.859^{+++}
STDVAR	0.037	0.046	−5.205***	0.034	0.045	-4.960^{+++}
Leakage	0.146	0.230	−2.008**	0.091	0.196	-1.789^{+}
INSIDER (%)	0.414	0.427	−0.545	0.407	0.396	−0.371
SMALL (%)	0.321	0.340	−0.911	0.319	0.302	−0.085
NST	1.880	1.210	2.794***	1.271	465	4.705^{+++}
PriorR	0.120	0.035	1.304	0.126	0.001	1.311
ROA (%)	0.050	0.023	2.800***	0.046	0.026	2.506^{++}
BM	1.709	1.309	2.729***	1.411	1.083	2.554^{++}
Split factor	7.712	9.423	−3.137***	10	10	-2.696^{+++}
MARKET	0.400	0.676	−4.136***	0	1	-4.022^{+++}

Panel A in Table 3 reports the mean differences of firm characteristics between firms that split stocks with and without subsequent corporate events via a *T*-test. Panel B reports the median differences between the two groups via a Mann–Whitney test. The results demonstrate that, when compared to firms that split stocks without subsequent corporate events, firms involved in other corporate events after stock splits are smaller in SIZE and larger in STDVAR and Leakage, indicating that information asymmetry is more profound in such firms. However, insider ownership and small investors' ownership do not exhibit notable statistical differences between the two groups. Firms that split stocks with subsequent corporate events evidence lower ROA, lower BM, and higher Sfactor than firms that split stocks without subsequent corporate events.

Overall, firms that split stocks with subsequent corporate events exhibit higher information asymmetry levels and lower past performance, growth, and liquidity as compared to firms that split stocks without subsequent corporate events. Such differences between the two groups may affect the motivations behind stock splits, and thus may induce a difference in market reactions and changes in ownership. Therefore, we divide the sample firms into two groups between the firms that split stocks with and without subsequent corporate events, and examine each group's changes in short- and long-term abnormal returns and ownership in order to analyze the motivations behind splitting stocks in the Korean stock market.

4. Empirical Results

4.1. Announcement Effect of Stock Split and Long-term Performance

Table 4 shows the announcement effects of stock splits and long-term performance for the sample firms divided into two groups between firms that split stocks with and without subsequent corporate events. Panel A identifies the mean and median of the 3-day cumulative abnormal returns around the announcement date. The abnormal returns are calculated using both the market model and the size-matching model.[6]

[6]CAR1 and CAR2 are cumulative abnormal stock returns based on time-series approach and cross-sectional approach, respectively. In particular,

$$CAR1(t_1, t_2) = \sum_{t1}^{t2} AR1_t, \text{ where } AR1_t = \frac{1}{n}\sum_{i=1}^{n}(R_{it} - \hat{\alpha_1} - \hat{\beta_1}R_{mt})$$

$$CAR2(t_1, t_2) = \sum_{t1}^{t2} AR2_t, \text{ where } AR2_t = \frac{1}{n}\sum_{i=1}^{n}(R_{it} - R_{pt})$$

R_{it}: Return on stock i at time $t\hat{\alpha_1}, \hat{\beta_1}$: An intercept and a slope in the market model by using each firm's stock return and equally-weighted market return based on the estimation window period from 210 days prior to the announcement to 31 days prior to the announcement, respectively R_{mt}: Equally-weighted market return at time t. R_{pt}: Return on size-matching portfolio by size according to the market value of equity at the end of the year before the announcement at time t.

Table 4 Announcement effect of stock split and long-term performance

This table reports the mean and median values of sample firms' cumulative abnormal returns (CARs), buy-and-hold abnormal return (BHAR), and cumulative (size) adjusted abnormal return (CAAR) along with their differences between firms that split stocks without subsequent corporate events (Group 1) and firms that split stocks with subsequent corporate events (Group 2) around and after the stock split. Panel A shows the differences between Group 1 and 2 based on 3-day CAR1(−1,+1) and 41-day CAR1(−20,+20) using the market model, and based on 3-day CAR2 (−1,+1) and 41-day CAR2 (−20,+20) using (size) matching portfolio method, respectively. Panel B shows the difference between the two groups based on a 12-month BHAR(12M) and CAAR(12M). Based on the *t*-test, ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively. Based on the Wilcoxon *z*-test, +++, ++, and + indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

	Variable	Stock split (total)	(1) Group 1	(2) Group 2	Difference: (1)–(2)
Panel A: Stock split announcement effect					
CAR1 (−1, +1)	Mean (*t*-value)	0.075 (9.868)***	0.063 (7.876)***	0.109 (6.115)***	(−2.670)***
	Median (*z*-value)	0.061 (8.540)$^{+++}$	0.053 (6.900)$^{+++}$	0.103 (5.031)$^{+++}$	(−2.564)$^{++}$
CAR1 (−20, +20)	Mean (*t*-value)	0.132 (4.915)***	0.107 (4.533)***	0.220 (2.680)***	(−1.938)*
	Median (*z*-value)	0.100 (5.528)$^{+++}$	0.084 (4.377)$^{+++}$	0.177 (3.318)$^{+++}$	(−2.465)$^{++}$
CAR2 (−1, +1)	Mean (*t*-value)	0.074 (12.511)***	0.067 (10.362)***	0.095 (7.130)***	(−2.053)**
	Median (*z*-value)	0.067 (10.413)$^{+++}$	0.061 (8.816)$^{+++}$	0.094 (5.564)$^{+++}$	(−2.153)$^{++}$
CAR2 (−20, +20)	Mean (*t*-value)	0.165 (7.768)***	0.131 (6.911)***	0.266 (4.323)***	(−2.792)***
	Median (*z*-value)	0.106 (7.496)$^{+++}$	0.099 (6.526)$^{+++}$	0.143 (3.873)$^{+++}$	(−2.386)$^{++}$
Panel B: Long-term effect after stock split					
BHAR (12M)	Mean (*t*-value)	−0.309 (−5.306)***	−0.100 (−2.036)**	−0.926 (−5.854)***	(6.630)***
	Median (*z*-value)	−0.156 (−4.924)$^{+++}$	−0.083 (−2.279)$^{++}$	−0.532 (−5.066)$^{+++}$	(5.153)$^{+++}$
CAAR (12M)	Mean (*t*-value)	−0.007 (−0.223)	0.082 (2.834)***	−0.269 (−3.622)***	(5.332)***
	Median (*z*-value)	0.030 (0.804)	0.089 (3.342)$^{+++}$	−0.296 (−3.157)$^{+++}$	(4.346)$^{+++}$

CAR1 (−1, +1) is the cumulative abnormal returns during the 3 days around the announcement date calculated using the market model. We set the estimation window period from 210 days prior to the announcement to 31 days prior to the announcement and calculate the abnormal returns based on each firm's stock return and equally-weighted market return using the market model.[7]

CAR2 (−1, +1) is the 3-day abnormal returns around the announcement date based on the size-matching model by forming five portfolios by size according to the market value of equity at the end of the year before the announcement. Then, we calculate the difference between each firm's stock return and that of the size-matching portfolio for CAR2. We find that firms that split stocks both with and without subsequent corporate events evidence positive abnormal returns around the announcement date. We also find that larger abnormal returns are observed in firms that are involved in other corporate events after the stock split. In addition, our findings are consistent even when considering CAR1 (−20, +20) and CAR2 (−20, +20).

Panel B of Table 4 reports the mean and median values of each group's long-term performance after the stock split announcement. To measure the long-term performance, the 12-month BHAR are calculated on the basis of the equally-weighted market-adjusted return after the stock split, and cumulative size-adjusted abnormal returns (CAAR) are calculated on the basis of daily size-adjusted abnormal returns between 21 and 270 days after the split announcement.[8]

In the case of BHAR, the mean long-term performance of firms that split stocks without subsequent corporate events evidence a tendency to decrease by 10% (median of 8.3%). In contrast, the mean BHAR of firms that split stocks with subsequent

[7]The value weighted market index returns are heavily influenced by returns on large firms in the Korean market because a few large firms take up a significant amount of the entire stock market. However, as most firms that have split stocks in the Korean market are small to mid-sized firms, calculating abnormal returns using the value weighted market index returns can be influenced by the size effect. Hence, we use the equally weighted market returns in calculating short- and long-term abnormal returns (CAR1 and buy-and-hold abnormal returns [BHAR]) in order to mitigate the size effect in applying the market model and the BHAR.

[8]This study attempts to understand whether a stock split is a true signal or false signal through examining if positive effects of stock splits stay long term or decline. However, Ikenberry *et al.* (1996) argue that abnormal returns occur after stock split announcements because investors do not entirely read the signals of stock split at the time of announcement. Hence, we exclude the first 20 days after the split announcement (so that the effect of the announcement could be sufficiently reflected in the market) in measuring the long-term performance. In CAAR(12M) we measure the long-term performance of 12 months between 21 days after the split announcement and 270 days after the announcement, and in BHAR(12M) we calculate monthly returns starting from the first trade date of the month immediately following the split announcement. We do not present the results, but the long-term performance measured starting immediately after the stock split announcement (0–250 days) does not show significant disparities.

corporate events tends to decrease by 92.6% (median of 53.2%). This result shows a sizable difference between the two groups in terms of their long-term performances. In the case of CAAR, the mean long-term performance of firms that split stocks without subsequent corporate events tends to increase by 8.2% (median of 8.9%), whereas the mean performance of firms that split stocks with subsequent corporate events tends to decrease by 26.9% (median of 29.6%), thus also evidencing a substantial difference between the two groups.[9]

In sum, firms that split stocks without subsequent corporate events evidence positive abnormal returns around the split announcement and the long-term performance does not decrease greatly, thereby supporting the information hypothesis. On the other hand, firms that split stocks with subsequent corporate events exhibit larger positive abnormal returns than the other group of firms, yet, the long-term performance decreases significantly, thereby rejecting the information hypothesis. Thus, these results indicate that a stock split related to other corporate events cannot be viewed as an optimistic signal by the manager and can be regarded as an opportunistic event. In the following analysis we further investigate whether such a stock split can be used as a manipulation tool.

4.2. Information Effect of Stock Issue after a Stock Split

In this paper, seasoned equity offerings (SEO), convertible bond issues, and the issue of bonds with warrants are selected as subsequent corporate events after a stock split. Most studies that have examined the announcement effects of SEO or convertible bonds issues have pointed to the negative effects of such events. According to the information hypothesis that explains the negative effects of SEO, the issue of new stocks affects stock prices negatively because managers only issue new stocks when the market value is higher than the intrinsic value (Ross, 1977; Myers and Majluf, 1984; Miller and Rock, 1985). Other explanations include the price pressure hypothesis by Scholes (1972), which argues that the increase in the number of stocks following the SEO brings about a reduction in stock prices. The leverage hypothesis argues that issuing new stocks through SEO reduces financial leverage and the tax benefits of debt, and therefore negatively affects stock prices (Modigliani and Miller, 1963). In contrast, the investment hypothesis, propounded by McConnell and Muscarella (1985), indicates that the SEO occurs only when the investment opportunity can overcome the price of the SEO, and therefore, the SEO positively affects stock prices. Similarly, in the case of convertible bonds, the leverage hypothesis and the information hypothesis posit that negative effects occur after the issue

[9]Further, we divide the firms that split stocks with subsequent corporate events into two groups according to the market classification (as KOSPI and KOSDAQ) and measure the long-term performance. Though undocumented, we find that the long-term performance measured by BHAR and CAAR exhibit negative figures in both KOSPI and KOSDAQ. However, only for the firms listed on the KOSDAQ, BHAR and CAAR are statistically significant with −13.5% and −30.7%, respectively.

announcement (Dann and Mikkelson, 1984; Eckbo, 1986; Mikkelson and Paratch, 1986).

Previous empirical studies have generally viewed the announcement effect of issuing SEO or convertible bonds negatively. However, in the case of SEO or convertible bonds following a stock split, investors may view the SEO positively by viewing stock splits as an optimistic signal, and therefore the investment hypothesis may be valid. In this view, D'Mello *et al.* (2003) point out the possibility of firms using stock splits prior to SEOs to increase the effects of SEOs and bring in more investments.

If a firm split stocks under the signaling motivations, the long-term performance after the split will not decline. However, if the split occurred under opportunistic motivations, the long-term performance will decline after the split. Hence, we assume in this study that stock splits without subsequent corporate events will occur under the signaling motivations and thus long-term performances will not decline after the splits. Yet, stock splits with subsequent corporate events will occur under opportunistic motivations and thus long-term performances will decline after the split. As seen in Table 4, firms that undergo subsequent corporate events with stock splits (Group 2) showed notably declined long-term performances after the split, thus demonstrating the probability of stock splits being used as a false signal. However, it is necessary to verify whether such declines in long-term performances were due to the stock splits or due to the confounding effects of other corporate events. Therefore, we analyze the confounding effects by examining the abnormal stock returns before and after the announcement of seasoned equity offerings (SEO), convertible bond issues, and the issue of bonds with warrants.

In order to do so, we set up the following hypothesis in this study: if cumulative abnormal stock returns before or after the announcement date of subsequent corporate events after a stock split are statistically and significantly negative, then the decline in the long-term performance of such firms is due to confounding effects. On the contrary, if the subsequent corporate events after a stock split do not show negative cumulative abnormal stock returns before or after the announcement date, the decline in the long-term is due to the stock split.

Table 5 shows the cumulative abnormal returns around the announcement of SEO, convertible bonds issues, and the issue of bonds with warrants executed after a stock split. In Panel A, we consider the combined sample of SEO, convertible bonds issues, and the issue of bonds with warrants. Based on the overall effects of these announcements, we find that the mean and median of cumulative abnormal returns around the announcement date are statistically positive. In Panel B, we analyze only the effects of the SEO, and the results demonstrate that the mean and median CARs are significantly positive. Panel C documents the CARs of convertible bonds and bonds with warrants around the announcement date, which are positive, but are not statistically significant.

The results of existing studies show that SEO or convertible bonds issues may negatively affect stock prices. As seen in Table 5, however, if the SEO or the issue

Table 5 Announcement effect of SEO, convertible bonds issues, and the issue of bonds with warrants after stock splits

This table reports the size-adjusted cumulative abnormal returns (CAR2) based on size matching portfolio method for firms that split stock with subsequent corporate events: seasoned equity offering (SEO), convertible bonds issues, and the issue of bonds with warrants. CAR2 (−20, +20) and CAR2 (−5, +5) are 41 and 11 day CAR2s around the announcement date for corporate events. Panel A shows the CAR2 based on the overall sample that split stocks followed by SEO, convertible bonds issues, or the issue of bonds with warrants. Panel B shows the CAR2 based on a subsample that split stocks followed by the SEO. Panel C shows the CAR2 based on a subsample that split stocks followed by convertible bonds issues or the issue of bonds with warrants. Based on the *t*-test, ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively. Based on the Wilcoxon *z*-test, +++, ++, and + indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

		T-test		Wilcoxon sign rank test	
CAR2	*N*	Mean	*t*-value	Median	*z*-value
Panel A: CAR2 for overall sample (SEO, convertible bonds issues, and the issue of bonds with warrants)					
CAR2 (−20, +20)	108	0.122	2.52**	0.068	2.49^{++}
CAR2 (−5, +5)	108	0.072	2.67***	0.017	2.04^{++}
Panel B: CAR1 for subsample (SEO)					
CAR2 (−20, +20)	76	0.149	2.53**	0.073	2.25^{++}
CAR2 (−5, +5)	76	0.075	2.18**	0.017	1.71^{+}
Panel C: CAR1 for subsample (convertible bonds issues and the issue of bonds with warrants)					
CAR2 (−20, +20)	32	0.058	0.68	0.039	1.09
CAR2 (−5, +5)	32	0.064	1.59	0.018	1.31

of convertible bonds follows a stock split announcement, a positive stock reaction may ensue. If the manager has sent out a true signal via a stock split, its effects, combined with the effects of the SEO afterwards, will ameliorate the long-term performance. However, as seen in Table 4, the long-term performance is drastically reduced when corporate events are conducted after a stock split, indirectly demonstrating that stock splits with subsequent corporate events are not used as signals. Such results indicate that managers use stock splits as a manipulation tool in order to maximize the effects of SEO and convertible bonds issues.

4.3. Changes in Insider and Small Investors' Ownership after a Stock Split Announcement

As seen in previous sections, the information hypothesis is supported in the cases of stock splits without subsequent corporate events; however, results also demonstrate

that stock splits with subsequent corporate events are executed with opportunistic motives as well. This paper further analyzes whether stock splits with or without subsequent corporate events carry different motivations, by examining the changes in insider ownership and small investor's ownership prior to and after a stock split.

If a manager executes a stock split followed by other corporate events in order to send out an optimistic signal, the insider ownership will not decrease after the split. However, if the stock split has opportunistic motivations, we predict that the insider ownership will decrease because managers will use the corporate events compounded with stock splits as an opportunity. The reasons as to why corporate events can affect insider ownership after a stock split followed by other corporate events are as follows.

First, the increased stock prices after a stock split also increase the price of newly issued stocks, consequently bringing in more capital. In the Korean stock market, the issue price of a new stock is calculated by applying some discount (up to 30%) to the theoretical ex-rights price (TERP) or the market price. Hence, the positive effects of a stock split can heighten the market price and increase capital inflows when new stocks are issued. Similarly, heightened stock prices after a stock split can increase the values of convertible options and warrants as the prices of convertible bonds and bonds with warrants are calculated as the sum of the bond price and the value of convertible options or warrants. If the manager uses a stock split as a manipulation tool, insiders will not purchase new stocks at an overpriced value or sell overvalued stocks, thereby causing the insider ownership to decrease.

Second, decreased stock prices after a stock split can increase the trading activity of small investors and their ownership, while decreasing the ratio of institutional investors or foreign investors and thus decreasing their monitoring roles. Additionally, such reduced prices may cause a decrease in the rate of outside large investors and consequently, put the firm at a lower risk of hostile takeovers. Hence, a stock split with subsequent corporate events can increase marketability by increasing small investors' ownership and dispersing the ownership of outside large investors. This leads to strengthening the control of insiders in firms. In such cases, the inside large shareholders may sell their shares to retrieve their investments at a level that does not affect their control power, and therefore insider ownership decreases after the split.

If a stock split is a true signal, insiders will assess the raised stock prices due to a stock split as undervalued prices having met a correct market price. Hence, changes in ownership will occur among outside stock holders due to the lowered stock prices but not among insiders, because the latter has less motivation to sell stocks if they believe that the stocks have reached their correct market price. Thus, firms without corporate events after stock splits will not see significant changes in insider ownership. In contrast, large insiders may use the positive effects of stock splits as a false signal in order to collect more investments or capital through overvalued stock prices. In such cases, insiders may compound other corporate events with stock splits to increase liquidity so that stock prices will further rise and

insiders can sell their stocks. When stock splits are used to control market prices as such, insiders have a greater motivation to sell overpriced stocks and only keep enough to maintain control of the firm, dispersing the ownership of outside large investors. Therefore, firms with subsequent corporate events after a stock split are more likely to have lower insider ownership after the split.

Table 6 shows the changes in insider ownership and small investors' ownership in firms after they undergo a stock split with and without subsequent corporate events, respectively. The changes in insider ownership and small investors' ownership are calculated by subtracting the ownership at the end of the year before the split announcement from the ownership at the end of the year after the split. Panel A shows the mean and median of changes in insider ownership and their statistical significance in the group of firms that splits stocks with and without subsequent corporate events. In firms that split stocks without subsequent corporate events, we find that the mean (−0.5%) and median (0%) values of changes in insider ownership are not statistically significant. In contrast, in firms that split stocks with subsequent corporate events, the mean (−10.7%) and median (−8.8%) values of changes in insider ownership are statistically significant. This implies a profound reduction in insider ownership after the split when firms are involved in other corporate events afterwards. Panel B shows the changes in small investors' ownership.

Table 6 Changes in insider ownership and small investors' ownership after stock split

This table reports the changes in insider ownership and small investors' ownership after stock split, and compares their mean and median differences between firms that split stocks without subsequent corporate events (Group 1) and firms that split stocks with subsequent corporate events (Group 2). Δ INSIDER is the change in insider ownership from the end of year before the stock split ($t-1$) to the end of year after the stock split ($t+1$). ΔSMALL is the change in small investors' ownership from the end of year before the stock split ($t-1$) to the end of year after the stock split ($t+1$). Based on the t-test, ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively. Based on the Wilcoxon z-test, +++, ++, and + indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

Variable		Stock split (total)	(1) Group 1	(2) Group 2	Difference: (1)–(2)
Panel A: The change in insider ownership					
ΔINSIDER	Mean (t-value)	−0.031 (−3.856)***	−0.005 (−0.646)	−0.107 (−6.066)***	(5.801)***
	Median (z-value)	−0.001 (−3.857)$^{+++}$	0.000 (−0.724)	−0.088 (−5.377)$^{+++}$	(5.698)$^{++}$
Panel B: The change in small investors' ownership					
ΔSMALL	Mean (t-value)	0.077 (7.303)***	0.055 (5.506)***	0.139 (5.013)***	(−3.554)***
	Median (z-value)	0.060 (6.971)$^{+++}$	0.042 (5.086)$^{+++}$	0.151 (4.676)$^{+++}$	(−3.575)$^{+++}$

In firms that split stocks without subsequent corporate events, we find the mean (5.5%) and median (4.2%) values of changes in small investors' ownership. However, there is a greater increase in firms that split stocks with subsequent corporate events, as the results demonstrate the mean (13.9%) and median (15.1%) values of changes in small investors' ownership.

In sum, there are no changes in insider ownership and small increases in small investors' ownership after a firm splits stocks without being involved in other subsequent corporate events. In contrast, firms that split stocks with subsequent corporate events evidence a large reduction in insider ownership and a profound increase in small investors' ownership, implying that the ownership structure is dispersed to small investors. Such results demonstrate that managers of firms with higher information asymmetry can use a stock split to disperse ownership to individual investors, weaken the monitoring of outside large investors, and increase their control. The results also support the hypothesis that inside large shareholders may use the positive effects of a stock split and SEO in order to retrieve investments at a scope that does not affect their control. Although undocumented, we find that firms listed on the KOSDAQ, the information asymmetry of which tends to be higher than those listed on the KOSPI, evidence more profound reductions in insider ownership and greater increases in small investors' ownership relative to the firms listed on the KOSPI.[10] Inside large shareholders of firms listed on the KOSDAQ who invested prior to the IPO may have a stronger motivation to retrieve their investments, as such firms tend to have been listed for less time and include more venture firms. Therefore, it is more likely that firms that split stocks with subsequent corporate events and are listed on the KOSDAQ use stock splits as an opportunistic tool.

4.4. Relationship between Insider Ownership and the Short- and Long-term Performances of Stock Split

4.4.1. Testable Model

In previous analyses, we observe that there is a difference in abnormal returns and changes in ownership structure between firms with and without subsequent corporate events after a stock split. As an additional analysis, this paper examines the

[10]When we examine the firms that split stock with the following corporate events according to market type, samples from the KOSDAQ market show a decrease in insider ownership with a mean of 11.3% (median of 10.3%), and an increase in small investors' ownership with a mean of 15.5% (median of 17.8%) after the split. In contrast, firms listed on the KOSPI show a decrease in insider ownership with a mean of 4.0% (median of 2.6%), and an increase in small investors' ownership with a mean of 4.2% (median of 2.6%) after the split. The KOSDAQ market has less strict announcement policies, fewer institutional investors who actively monitor the management, and more individual investors' irrational investments than the KOSPI market; thus information asymmetry is higher in the KOSDAQ market. Therefore, a manager is more likely to use a stock split for opportunistic motivations in the KOSDAQ market.

relationship between insider ownership and the short- and long-term market reaction to stock splits via a multivariate regression analysis. Han and Suk (1998) argue that firms with a higher level of insider ownership are less likely to send out false signals through splitting stocks because of the high adverse selection costs of a split. Therefore, the market recognizes a stock split as a trustworthy optimistic signal when a firm with higher insider ownership splits stocks, and thus higher abnormal returns occur around the announcement date. Han and Suk (1998) also argue that such a positive relationship between insider ownership and abnormal returns is more profound in firms with higher levels of information asymmetry.[11]

Therefore, we predict that firms with higher levels of information asymmetry and insider ownership will show greater announcement effects when executing a stock split followed by other corporate events. Additionally, we predict that long-term performance will decrease in firms in which insider ownership decreases greatly after a stock split due to the agency costs in the market. In particular, we predict that the effects of changes in insider ownership on long-term performance will be more profound in firms that are listed on the KOSDAQ among those that execute a stock split followed by other corporate events. This is because venture firms listed on the KOSDAQ have been listed for less time, and inside large shareholders of such firms are more likely to want to use the stock split as an opportunity to retrieve investments. To prove such hypotheses, we set up the following multivariate regression models:

$$\begin{aligned}\mathrm{CAR}(-1,1) = {} & \beta_0 + \beta_1 \mathrm{INSIDER} \times \mathrm{LargeFirm} + \beta_2 \mathrm{INSIDER} \times \mathrm{SmallFirm} + \beta_3 \mathrm{SIZE} \\ & + \beta_4 \mathrm{STDVAR} + \beta_5 \mathrm{SplitFactor} + \beta_6 \mathrm{Market} + \varepsilon \end{aligned} \tag{1}$$

$$\begin{aligned}\mathrm{LTAR}(12\mathrm{M}) = {} & \beta_0 + \beta_1 \Delta\mathrm{INSIDER} \times \mathrm{D1} + \beta_2 \Delta\mathrm{INSIDER} \times \mathrm{D2} + \beta_3 \Delta\mathrm{INSIDER} \times \mathrm{D3} \\ & + \beta_4 \Delta\mathrm{INSIDER} \times \mathrm{D4} + \beta_5 \Delta\mathrm{SMALL} + \beta_6 \mathrm{SIZE} + \beta_7 \mathrm{STDVAR} \\ & + \beta_8 \mathrm{SplitFactor} + \varepsilon \end{aligned} \tag{2}$$

The regression model (1) tests whether insider ownership affects short-term abnormal returns, depending on the levels of information asymmetry within a firm. In accordance with the results reported by Han and Suk (1998), we employ firm size as a proxy for levels of information asymmetry, and classify them into large and small firms by the median firm value of the whole sample. The dependent variables, CAR1 and CAR2, are the 3-day cumulative abnormal returns around the announcement date based on the market model and size-matching model,

[11]Han and Suk (1998) choose firm size as a proxy for information asymmetry level, divide the sample firms into three groups according to firm size, and analyze whether insider ownership affects abnormal returns in each group. They document that smaller firms evidence a more profound positive relationship between insider ownership and abnormal returns.

respectively. We select the insider ownership (INSIDER) at the end of the year before the announcement as an explanatory variable and include firm size (SIZE), standard deviation of daily size-adjusted abnormal returns (STDVAR), level of stock split (Split Factor), and market dummy (Market D) as control variables (Szewczyk and Tsetsekos, 1993; Han and Suk, 1998; Guo *et al.*, 2008).

The regression model (2) assesses whether changes in insider ownership after a stock split affect long-term performances after the split. We assume that insider ownership will decrease after a stock split if the stock split is executed for opportunistic motives, and that such a decrease will negatively stimulate long-term performance. Additionally, we also predict that such a relationship between changes in insider ownership and long-term performance is stronger in cases in which the firm splits stocks with subsequent corporate events and is listed on the KOSDAQ. In such cases, it is more likely for inside large shareholders to use a stock split as an opportunity to retrieve their investments.

In order to analyze such relationships, we classify whole samples into four subcategories according to stock split types and market types using dummy variables. D1 is the dummy variable, and is 1 if a firm is listed on the KOSPI and splits stocks without subsequent corporate events, and is 0, otherwise. D2 is the dummy variable, and is 1 if a firm is listed on the KOSPI and splits stocks with subsequent corporate events, and is 0, otherwise. D3 is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and splits stocks without subsequent corporate events, and is 0, otherwise. D4 is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and splits stocks with subsequent corporate events, and is 0, otherwise. LTAR is the long-term performance for 12 months after the stock split as measured by BHAR and CAAR, which are discussed above. The change in insider ownership (ΔINSIDER) from the end of year before the stock split to the end of year after the stock split is the key explanatory variable. As control variables, we employ the change in small investors' ownership (ΔSMALL), firm size (SIZE), standard deviation of abnormal returns prior to a split announcement date (STDVAR), and the level of stock split (Split Factor). Table 7 shows the correlations among the variables used in models (1) and (2).

4.4.2. Results of the Multivariate Regression Analysis

Table 8 provides the estimation results of the regression model (1) and shows the effect of the levels of insider ownership on the abnormal returns around the date of the stock split announcement. We compare the results between the firms that split stocks without subsequent corporate events (Group 1) and the firms that split stocks with subsequent corporate events (Group 2). Specifically, we consider CAR1 and CAR2 as the dependent variables in Panels A and B, respectively. We do not find a significant relationship with insider ownership in either panel, based on Group 1. However, based on Group 2 we find a significant relationship between the abnormal returns and insider ownership within small firms, while no such significant relationship exists within large firms. This result implies that firms with higher

Table 7 Correlations across key variables

This table reports the correlations across key variables in this study. CAR1 (−1, +1) and CAR2 (−1, +1) are 3-day cumulative abnormal returns by the market model and (size) matching portfolio method around the stock split announcement date, respectively. CAAR is the cumulative (size) adjusted abnormal returns between 21 and 270 days after stock split. BHAR is the equally weighted 12-month buy-and-hold abnormal returns after the stock split. INSIDER is the insider ownership, which is calculated by summing the ownerships of the largest shareholder and person having a special relationship with the firm at the end of the year before the split announcement. Δ INSIDER is the change in insider ownership from the end of year before the stock split ($t - 1$) to the end of year after the stock split ($t + 1$). ΔSMALL is the change in small investors' ownership from the end of year before the stock split ($t - 1$) to the end of year after the stock split ($t + 1$). SIZE is the log of the market value of equity 2 days before the stock split announcement. STDVAR is the standard deviation of size-matching daily abnormal returns between 180 and 31 days prior to the stock split announcement. Split factor is the proportion of the stock split. MARKET is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and is 0 if a firm is listed on the KOSPI. Based on the Pearson test, ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

Variable	CAR2 (−1, +1)	CAAR	BHAR	INSIDER	ΔINSIDER	ΔSMALL	SIZE	STDVAR	Split factor	MARKET
CAR1 (−1, +1)	0.778***	−0.097	−0.125**	0.050	−0.121**	0.108*	−0.238***	0.229***	0.176***	0.044
CAR2 (−1, +1)		−0.121**	−0.122**	0.083	−0.093	0.087	−0.300***	0.239**	0.143**	0.053
CAAR			0.745***	−0.177**	0.186***	−0.172***	−0.030	−0.242***	−0.231***	−0.233***
BHAR				−0.187***	0.275***	−0.246***	0.246***	−0.357***	−0.285***	−0.377***
INSIDER					−0.403***	0.072	−0.135**	0.153**	0.055	0.244***
ΔINSIDER						−0.451***	0.255***	−0.311***	−0.125**	−0.209***
ΔSMALL							−0.240***	0.278***	0.145**	0.217***
SIZE								−0.393***	−0.141**	−0.418***
STDVAR									0.213***	0.384***
Split factor										0.104*

Table 8 Relationship between insider ownership and announcement effect of stock splits

Ordinary least square (*OLS*) models are used to explain the market reaction to stock splits based on firm characteristics and compare between firms that split stocks without subsequent corporate events (Group 1) and firms that split stocks with subsequent corporate events (Group 2). CAR1 (−1, +1) and CAR2 (−1, +1) are 3-day cumulative abnormal returns by the market model and (size) matching portfolio method around the stock split announcement date, respectively. INSIDER is the insider ownership, which is calculated by summing the ownerships of the largest shareholder and persons having a special relationship with the firm at the end of the year prior to the split announcement. Large Firm is the dummy variable, and is 1 if a firm is considered large and is 0, otherwise. Small Firm is the dummy variable, and is 1 if a firm is considered small and is 0, otherwise. SIZE is the log of the market value of equity 2 days before the stock split announcement. STDVAR is the standard deviation of size-matching daily abnormal returns between 180 and 31 days before the stock split announcement. Split factor is the proportion of the stock split. MARKET is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and is 0 if a firm is listed on the KOSPI. *t*-values are provided in parentheses. ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

	Panel A: CAR1 (−1, +1)		Panel B: CAR2 (−1, +1)	
Variable	Group 1	Group 2	Group 1	Group 2
Intercept	0.241 (2.568)**	0.342 (1.658)*	0.244 (2.069)**	0.255 (0.920)
INSIDER × LargeFirm	−0.014 (−0.350)	0.136 (1.289)	−0.040 (−0.782)	0.167 (1.183)
INSIDER × SmallFirm	−0.006 (−0.141)	0.155 (1.969)**	−0.054 (−0.996)	0.179 (1.699)*
SIZE	−0.021 (−2.493)**	−0.033 (−1.762)*	−0.020 (−1.941)**	−0.029 (−1.157)
STDVAR	1.300 (2.503)**	0.651 (0.659)	1.696 (2.597)***	0.900 (0.679)
Split factor	0.001 (0.526)	0.002 (0.899)	0.000 (−0.037)	0.006 (1.857)
MARKET	−0.026 (−1.842)*	−0.063 (−1.688)	−0.033 (−1.873)*	−0.054 (−1.083)
N	210	71	210	71
Adj. R^2	0.087	0.107	0.052	0.101
F-stat	4.336	2.391	2.906	2.311

levels of insider ownership are more likely to use stock splits for opportunistic motives, particularly when the firms have a high level of information asymmetry.

Table 9 provides the estimation results of the regression model (2) and shows the relationship between the changes of insider ownership after the split and the long-term performance of stock splits. BHAR and CAAR are considered the dependent variables that capture the firm's long-term performance. We find a significantly positive relationship between the changes of insider ownership and the long-term performance only for firms that are listed on the KOSDAQ and split stocks with subsequent corporate events (D4). This indicates that such firms tend to underperform if their insider ownerships decrease after the split. Additionally, we find a marginally negative relationship between the changes of insider ownership and the long-term performance for firms that are listed on the KOSPI and split stocks without subsequent corporate events (D1), while no such significant relationship exists

Table 9 Relationship between change in insider ownership and long-term performance after stock splits

Ordinary least square (*OLS*) models are used to explain a firm's long-term performance after stock splits. BHAR is the equally weighted 12-month buy-and-hold abnormal returns after stock split. CAAR is the cumulative (size) adjusted abnormal returns between 21 and 270 days after the stock split. Δ INSIDER is the change in insider ownership from the end of year before the stock split ($t - 1$) to the end of year after the stock split ($t + 1$). D1 is the dummy variable, and is 1 if a firm is listed on the KOSPI and split stocks without subsequent corporate events and is 0, otherwise. D2 is the dummy variable, 1 if a firm is listed on the KOSPI and split stocks with subsequent corporate events and is 0, otherwise. D3 is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and split stocks without subsequent corporate events and is 0, otherwise. D4 is the dummy variable, and is 1 if a firm is listed on the KOSDAQ and split stocks with subsequent corporate events and is 0, otherwise. ΔSMALL is the change in small investors' ownership from the end of year before the stock split ($t - 1$) to the end of year after the stock split ($t + 1$). SIZE is the log of the market value of equity 2 days before the stock split announcement. STDVAR is the standard deviation of size-matching daily abnormal returns between 180 and 31 days before the stock split announcement. Split factor is the proportion of the stock split. *t*-values are provided in parentheses. ***, **, and * indicate significances at the 1%, 5%, and 10% two-tailed levels for whether estimates differ from zero, respectively.

Variable	(1) BHAR	(2) CAAR
Intercept	0.264 (0.454)	1.479 (4.704)***
ΔINSIDER × D1	−1.312 (−1.629)	−0.774 (−1.783)*
ΔINSIDER × D2	−3.408 (−1.470)	−0.429 (−0.343)
ΔINSIDER × D3	0.788 (1.190)	0.048 (0.136)
ΔINSIDER × D4	2.755 (4.168)***	1.570 (4.406)***
ΔSMALL	−0.487 (−1.473)	−0.256 (−1.435)
SIZE	0.041 (0.847)	−0.097 (−3.701)***
STDVAR	−15.377 (−3.762)***	−7.787 (−3.533)***
Split factor	−0.036(−2.728)***	−0.015 (−2.141)***
N	281	281
Adj. R^2	0.244	0.175
F-stat	12.312	8.418

for other cases. These results indicate that, particularly for firms that are listed on the KOSDAQ and split stocks with subsequent corporate events, the opportunistic behavior is manifested with lower insider ownership after the split, and thus the market reacts negatively to this change in the long run.

In sum, the regression results confirm the hypothesis that firms with higher levels of information asymmetry and insider ownership will show greater positive announcement effects when executing a stock split followed by other corporate events, and that such firms' long-term performance will decrease greatly as their insider ownership decreases after the split. In particular, we find a strong positive relationship between firms' long-term performance and changes in their insider ownership within the firms that are listed on the KOSDAQ and split stocks with subsequent corporate events. Hence, our findings imply that such firms are more likely to exploit the stock split as an opportunity to retrieve investments.

5. Summary and Conclusions

This paper studies the economic motivation for stock splits in the Korean stock market. Specifically, we investigate whether a stock split can be used not only as a tool to reveal information but also as a manipulation tool. This is conducted by dividing the sample firms into two groups between the firms that split stocks with and without subsequent corporate events and then examining each group's changes in the short- and long-term abnormal returns and ownership around the time of the stock splits. We predict that if splitting stocks is an optimistic signal sent out by the manager, abnormal returns will increase around the announcement date, and long-term performance and insider ownership will not decrease. However, if the manager sends out false signals in order to use the stock split to further other corporate events, positive abnormal returns will be observed at the announcement, but the long-term performance and insider ownership will decrease after the split.

Our empirical evidence is as follows. First, firms that split stocks without subsequent corporate events exhibit positive abnormal returns on the announcement date, while their long-term performance and insider ownership do not decrease. Hence, this finding supports the information hypothesis. Second, firms involved in additional corporate events after a stock split also evidence positive abnormal returns on the announcement date. However, their long-term performance and insider ownership decline profoundly after the announcement date. This result implies that stock splits with subsequent corporate events are likely to be driven by the management's opportunistic motivation. Third, whereas previous empirical studies generally view the announcement effect of SEO or convertible bonds issues negatively, our results show positive effects on SEO, convertible bonds issues, and the issue of bonds with warrants after a stock split. This result indicates that managers can use stock splits as a manipulation tool in order to maximize the effects of the SEO and the issue of convertible bonds. Fourth, firms that split stocks with the following corporate events show a profound reduction in insider ownership and a great increase in small investors' ownership, implying that the ownership structure is dispersed to small investors. This result indicates that managers of firms with higher information asymmetry can use a stock split to disperse ownership to individual investors, weaken the monitoring of outside large investors, and increase their control. The result also supports the hypothesis that inside large shareholders may use the positive effects of stock splits and SEO to retrieve investments in a scope that does not affect their control. Finally, we conduct the regression analyses to further determine whether insider ownership is associated with the short- and long-term market reaction to stock splits. We find a significant relationship between abnormal returns and insider ownership within small firms, whereas no such significant relationship exists within large firms. This result suggests that firms with higher levels of insider ownership are more likely to use stock splits for opportunistic motives, particularly in the case in which firms have a high level of information asymmetry. Also, firms that are listed on the KOSDAQ and go through other

corporate events after a stock split exhibit a positive association between changes in insider ownership and long-term performance. This implies that the decrease in insider ownership and its negative effect on long-term performance are more pronounced in firms that are listed for short periods and are more likely to experience information asymmetry. Overall, our results suggest that the use of stock split as a manipulation tool by combining it with other corporate events can be more prevalent in markets like Korea, where information asymmetry is greater and firms' have been listed for less time.

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