Use of Undisclosed Information in Korea's Stock Market: Statistical Analysis and Its Implications

Lee, Seokhoon*

Voices have been raised about the need for building trust in Korea's capital markets since the Hanmi Pharmaceutical insider trading scandal shocked the markets in 2016. This article examines the extent to which undisclosed information is being used in the capital markets through a statistical analysis. The analysis results show that the number of trades on nonpublic information before it is made public is smaller than we thought. Yet, small firms listed on the KOSDAQ market generated abnormal stock returns before the disclosure. Their statistical characteristics lead to suspicion of unfair trading practices on the basis of undisclosed information. This underscores the need for such small firms to enhance awareness of the illegality of the use of undisclosed information. Korea seems to be on the right track, considering the recent policy efforts, e.g., training for company executives and employees on preventing unfair trading practices, and discussions about the introduction of stiffer penalties. In particular, the preventive training and efforts should be geared more towards small-cap companies in the KOSDAQ market.

The financial authorities and Korea Exchange (KRX) recently co-hosted a forum aimed at preventing unfair stock trading on the basis of undisclosed information, which can be seen as part of Korea's ongoing efforts to devise policy solutions to the improper use of undisclosed information in the stock market. Such move appears to be driven by growing calls for building

* All opinions expressed in this paper represent the author's personal views and thus should not be interpreted as Korea Capital Market Institute's official position.

* Ph.D., Senior Research Fellow, Financial Services Industry Department, Tel: 82-2-3771-0639, E-mail: shlee@kcmi.re.kr

trust in the capital markets, following the insider trading on leaked information[1] about Hanmi Pharmaceutical's technology license deal in September 2016. Although the Hanmi incident was just one of detected unfair trade practices based on undisclosed information, it heightened concerns about improper transactions in the capital markets.

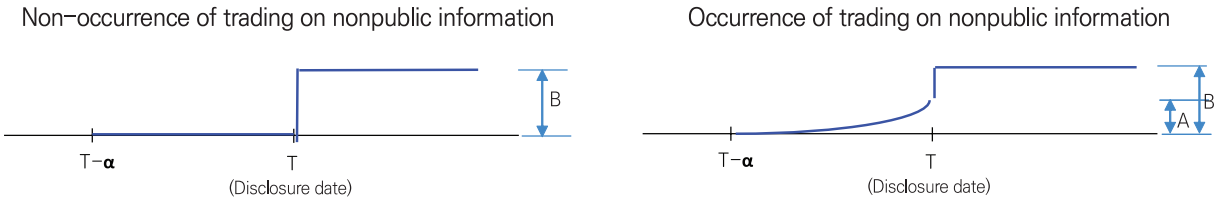
According to the documents submitted for the National Assembly's inspection of state affairs in November 2017, the use of undisclosed information represented the largest portion of unfair trades (230 out of 523 cases). This suggests that unfair trades on nonpublic information are not small in number, not to mention the Hanmi scandal which sent large ripple effects throughout the market. A statistical analysis on the use of undisclosed information does not directly track unfair trading practices, unlike the cases detected by KRX's Market Oversight Committee. Nonetheless, it would be a great help in deriving policy implications. Hence, this article conducts a statistical analysis on the use of undisclosed information to assess the extent to which nonpublic information is being used to trade in the Korean capital markets, based on abnormal returns and trading volumes in the pre-disclosure period.

Expected changes in the stock market resulting from the use of undisclosed information

Where nonpublic information is leaked by someone working inside a company before it is publicly disclosed but no transaction on the leaked information takes place, the leakage of undisclosed information has no impact on the stock market. Therefore, it is not an unfair trade. However, where the insider or any person who receives information from that insider buys or sells stocks in the company on the basis of the information leaked prior to public disclosure, this clearly constitutes an unfair trading. Therefore, the use of undisclosed information is closely related to transactions based on nonpublic information before it is publicly released. When the insider or the information recipient trades on the basis of undisclosed information, the stock return is greater or smaller than its normal return, and the trading volume is larger than normal. When nonpublic information is used, as shown in the figure below, abnormal stock return or trading volume is highly likely to be observed prior to the day of announcement. That is, abnormal return or trading volume in the pre-disclosure period can be a proxy for the extent to which undisclosed information is being used to trade in stocks.

1) Media reports said a sweeping investigation was conducted to include unfair trades involving analysts as well as the employees of Hanmi Pharmaceutical which leaked undisclosed information and sold the company's stocks.

Non-occurrence vs. occurrence of trading on undisclosed information: abnormal return and trading volume



This article employs the event study methodology using the market model and the average trading-adjusted model to examine abnormal returns and trading volumes prior to the date of information disclosure. The sample for the analysis consists of disclosures of corporate information on business contracts (i.e., contracts for the sale of goods or the supply of services) from February 2009 to December 2016. The disclosures of business contracts are statistically significant with average abnormal return of 0.91% for the KOSPI and 1.28% for the KOSDAQ on the date of disclosure during the analysis period, which means that these disclosures were perceived as very positive information by the market. The sample includes 2,533 disclosures in the KOSPI market and 3,615 disclosures in the KOSDAQ market. From a statistical point of view, the sufficient sample size ensures the validity of the results.

When the effect of disclosure on stock returns is large and obvious, the insider or the information recipient is more likely to generate abnormal returns from trading on undisclosed information. For that reason, the use of nonpublic information can be easily found in disclosures with larger impact on returns. Thus, disclosures are divided into two groups: disclosures with high abnormal returns on the date of disclosure, and disclosures with average abnormal returns on the date of disclosure. The former is assumed to be the case in which the standard deviation of abnormal returns on the disclosure date is greater than 1 ($AR_{jt=disclosure\ date} > SD[R_j]$), and the latter the one in which the standard deviation of abnormal returns is within the range of 0.25-1 ($SD[R_j] > AR_{jt=disclosure\ date} > 0.25 * SD[R_j]$).

Findings on stock market changes prior to disclosure

The figures below display cumulative abnormal returns within five trading days before and after the disclosure. Here, the cumulative abnormal return is the sum of daily abnormal returns. For the analysis, stocks are grouped into mid-and large-cap stocks, and small-cap stocks for the KOSPI market and the KOSDAQ market, respectively. Stocks with market capitalization of KRW 250 billion or larger

are classified as mid-and large-cap stocks, and stocks with market cap below KRW 250 billion as small-cap stocks. As illustrated in the figures below, the average abnormal return is 1.37%-1.91% for the disclosure group with average abnormal returns on the disclosure date, and 4.61%-7.86% for the group with high abnormal returns. But the cumulative abnormal return during five trading days prior to the disclosure is near zero (0) for both groups, which indicates the extent of undisclosed information being used is not large before the disclosure.

Figure. Cumulative abnormal returns before and after disclosure

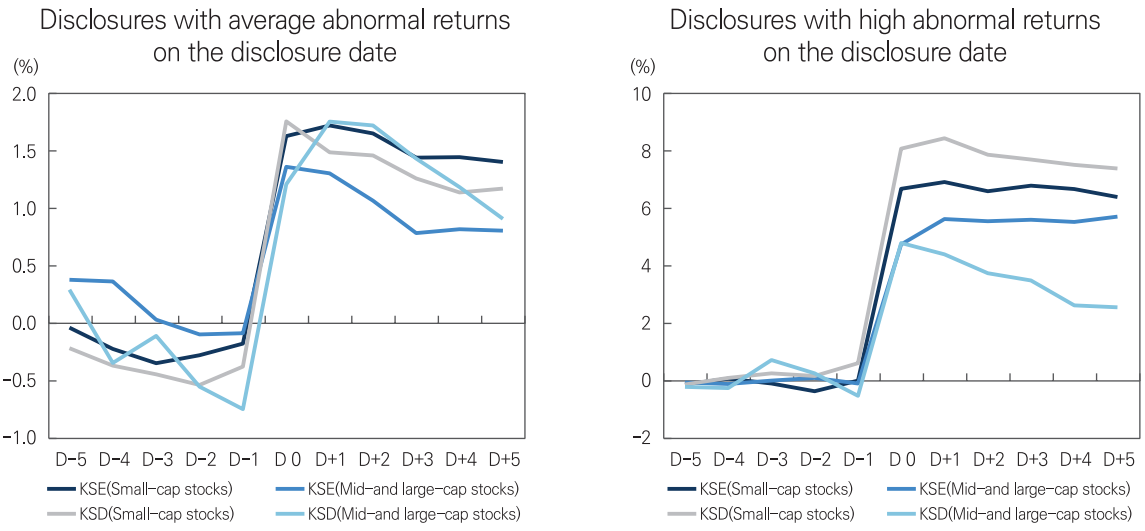


Table. Comparison of abnormal returns and trading volumes at disclosure dates (0, +1) and pre-disclosure dates (-3, -1)

	KOSPI				KOSDAQ			
	Mid-and large-cap stocks		Small-cap stocks		Mid-and large-cap stocks		Small-cap stocks	
	(0, +1)	(-3, -1)	(0, +1)	(-3, -1)	(0, +1)	(-3, -1)	(0, +1)	(-3, -1)
	Disclosures with average abnormal returns on the disclosure date							
Abnormal return	1.37***	-0.50***	1.91***	0.08	2.08***	-0.60***	1.90***	0.01
Abnormal trading volume	0.07	-0.11	0.70***	-0.30***	0.44***	-0.14	0.84***	-0.12
	Disclosures with high abnormal returns on the disclosure date							
Abnormal return	5.62***	-0.09	6.98***	0.02	4.61***	-0.42	7.86***	0.52***
Abnormal trading volume	1.25***	0.34***	2.18***	0.22	1.52***	0.53	2.34***	0.44***

Note: *** indicates statistical significance at the 1% level, and ** indicates statistical significance at the 5% level.

The table above shows abnormal returns and trading volumes on the disclosure dates (0, +1) and within three trading days before the disclosure (-3, -1). The finding is that most abnormal returns and trading volumes three days prior to the disclosure are not statistically significant, suggesting that trading on undisclosed information is not prevalent. Take an example of mid- and large-cap KOSPI stocks with average abnormal returns on the date of disclosure. Their abnormal return on the disclosure date is 1.37%, which is statistically significant. On the other hand the, abnormal return within three days before the disclosure (-3, -1) is –0.50%, which is not statistically significant. If the insider or the information recipient buys or sells stocks based on nonpublic information the, abnormal return should be positive, but the analysis reveals a negative abnormal return. The similar statistical characteristic can be found in most disclosure groups, including the KOSPI disclosures with high abnormal returns on the disclosure date, and the KOSDAQ disclosures with average abnormal returns on the disclosure date. In other words, most of the disclosure groups do not show any statistical characteristics that allow me to infer the possibility of undisclosed information being used.

Unlike other disclosure groups, the disclosures on small-cap stocks with high abnormal returns on the disclosure date exhibit statistical properties, which indicate the possible use of nonpublic information. For this group, abnormal return and trading volume within three days before the disclosure (-3, -1) are 0.52% and 0.44%, respectively, both of which are statistically significant. These results support the hypothesis that the probability of undisclosed information being used prior to its disclosure would be high when the disclosure of that information has large effects on the stock market. Also, the results suggest that small-cap firms may lack internal controls over information leaks.

The statistical analysis results described above require cautious interpretation. First, trading on the basis of nonpublic information may be difficult to detect because it occurs secretly. In such case, the use of undisclosed information may not affect stock returns or trading volume prior to the disclosure, which would not be captured by the statistical analysis. Second, abnormal returns or trading volumes resulting from the use of undisclosed information may be statistically insignificant if changes in stock returns or trading volumes are affected substantially by factors other than disclosed information.

Summary and implications

The analysis results in this article reveal that the leakage of nonpublic information before it is made public is not prevalent in the Korean stock market, and that trading on undisclosed information before its disclosure occurs less frequently than expected. Nonetheless, small-cap KOSDAQ-registered companies that recorded high abnormal returns on the disclosure date show statistical characteristics leading to suspicion of unfair stock trades on the basis of nonpublic information. The Hanmi insider trading scandal was just one of reported unfair trades but it caused investors to increase their mistrust of the stock market. This underscores the need for the small firms to enhance awareness of the illegality of the use of nonpublic information. Korea seems to be on the right track, considering the recent policy efforts, e.g., training for company executives and employees on preventing unfair trading practices, and discussions about the introduction of stiffer penalties. The findings also imply that the preventive training and efforts should be geared more towards small-cap companies in the KOSDAQ market.