The Predictability of Option Volume for Future Stock Price : Evidence from the KOSPI200 Option*

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Abstract

This paper investigates whether the option volume predicts the future stock prices in KOSPI200 option market. A put-call ratio is defined as our information variable and we used a variety of observations to test the predictability of this variable. We obtained daily data from January 2001 through March 2012 and intraday trading data from March 7 to April 18 2012. By analyzing daily observations we found that put-call ratio contains information for contemporaneous stock price but not for future stock price. We further analyzed the intraday trading data at higher frequencies as five-minute, ten-minute, fifteen-minute and thirty-minute. It showed evidence that information in option volume has predictive power for future stock prices in ten minutes, while there is no evidence on predictability in 15 minutes or longer. As a result, we conclude that there is informed trading in the KOSPI200 option market and the option volume contains information for future stock price movements.

Keyword: Predictability, Option, Put-call ratio, KOSPI200, Informed trading

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Ⅰ. Introduction

The derivative securities are designed on the base of the underlying assets. This give investors an opportunity that they choose a market where they trade. For example, investors who possess private information can trade in the stock market or in the options market. Due to the high liquidity and the downside protection, option is considered an ideal venue for informed trading. If informed traders prefer to trade in the option market rather than stock market, we would expect new information about the stock price to be reflected in option prices first and then in stock markets. After all, option markets lead the stock market and trading activity or price discovery in option can predict future stock prices.

In this paper, we investigated whether the information content of KOSPI200 option volume predicts the future KOSPI200 movements. A put-call ratio is defined as our information variable and we used a variety of observations to test the predictability of this variable.

There has been numerous studies on the price discovery role of option volume. The empirical evidence is some mixed. Pan and Poteshman(2006) show that the option volume can forecast the stock's future price. Anthony(1998) found that the option volume leads the stock volume as well. However, Cao, Chen, and Griffin(2005) argue that it is the stock volume that is informative about future stock returns rather than option volume during "normal" times. Vijh(1990) also drew a conclusion that the option volume has no information for the stock market. Chan, Chung, and Fong(2002) found that the net trade stock volume can predict the bid change both of stocks and options while the net trade option volume has no prediction on the bid change of stocks. Our study contributes to the literature by adding another evidence on the predictability of option volume for stock prices by investigating the Korean market.

KOSPI 200 index options market opened on July 7, 1997. After the Financial Crisis at the end of 1997, as people became more concerned about the derivatives, as well as foreign investors increasing, the trading volume began to grow rapidly. Leading by KOSPI 200 stock options contracts, the trading volume of Korean derivatives market has been the first place in the world and Korean derivatives market has became the biggest derivatives market of the world. Table 1 shows the top 15 of Equity Index Futures and Options Contracts in the world.

<Table 1>. top 15 of Equity Index Futures and Options Contracts in the world.

Rank	Contract	Jan-Jun 2010	Jan-Jun 2011	% Change
1	Kospi 200 Options, KRX	1,671,466,852	2,008,082,595	20.1%
2	S&P CNX Nifty Index Options, NSE India	221,430,570	404,017,571	82.5%
3	SPDR S&P 500 ETF Options	219,409,316	288,117,455	31.3%
4	E-mini S&P 500 Index Futures, CME	299,603,623	270,461,007	-9.7%
5	Euro Stoxx 50 Index Futures, Eurex	205,280,712	183,401,694	-10.7%
6	RTS Index Futures, RTS	109,825,863	153,328,205	39.6%
7	Euro Stoxx 50 Index Options, Eurex	152,096,740	152,150,133	0.0%
8	S&P 500 Index Options, CBOE	97,902,251	83,754,830	-14.5%
9	S&P CNX Nifty Index Futures, NSE India	79,554,314	77,636,696	-2.4%
10	iShares Russell 2000 ETF Options	64,876,523	75,352,463	16.1%
11	Taiex Options, Taifex	47,959,889	65,940,124	37.5%
12	Powershares QQQ ETF Options	69,092,398	62,785,085	-9.1%
13	Nikkei 225 Mini Futures, OSE	59,981,264	58,154,889	-3.0%
14	CBOE Volatility Index Options, CBOE	30,167,137	47,676,557	58.0%
15	Kospi 200 Futures, KRX	44,825,483	41,278,694	7.9%

* Table 1 is top 15 of Equity Index Futures and Options Contracts according to FIA (Futures Industry Association): http://www.futuresindustry.org

Our empirical results are summarized as follows. By analyzing daily observations we found that option volume contains information for contemporaneous stock price but not for future stock price. We further analyzed the intraday trading data at higher frequencies as five-minute, ten-minute, fifteen-minute and thirty-minute. It showed evidence that information in option volume has predictive power for future stock prices in ten minutes, while there is no evidence pointing out that the information is able to forecast stock price movement after 15 minutes or longer. As a result, we conclude that there is informed trading in KOSPI 200 Index Option Market and the option volume contains information for future stock price movements.

The remainder of this article is organized as follows. In section 2, we present the existing empirical findings. We develop the empirical specification and explain the data in Section 3. We discuss the empirical results in section 4, and conclude the paper in section 5.

Ⅱ. Literature review

Researchers from many countries have done a number of studies on the price discovery role of options that are mainly about what kind of asset's price leads or lags another one's, what the time difference is between the lead one and the lag one, whether this kind of lead-lag relationship is one-way or two-way, and the empirical evidence is mixed.

Manaster and Rendleman(1982) analyzed the daily data of stock market and option market, then found that the option price leads the stock price about one day. In Bhattacharya's(1987), the data on each trading day of both markets was used and showed the similar result as Manaster and Rendleman's(1982) that the option price leads the stock price. Finucane(1991) took S&P100 Index and OEX Option(15 minutes data of at-the-money option) as objects and used the put-call parity to examine the relationship between the stock market and the option market. The error came from the put-call parity was regarded as arbitrage while it turned out the arbitrage was 15 minutes ahead of the S&P100 Index. Chakravarty, Gulen, and Mayhew(2004) also concluded that options market making contributions to having price discovery function on stock market. Sandeep Srivastava, Surendra S Yadav, P K Jain(2008) collected data from India Nifty option market to test non-price variables in the price discovery role of option and found that open interest is an important variable affecting the spot market, also the predictability based on the open interest is more significant than that is based on the trading volume statistically. According to Pan and Poteshman(2006), if the put-call ratio(put volume/total volume) is relatively small, the daily return of the stock will have the difference up to 0.4%, and the difference is more meaningful when there are a great many informed traders in the market or the leverage of the option is great. Thus we can see that there is information in the option volume of underlying stock which can forecast the stock's future price. Anthony(1998) found that the option volume leads the stock volume as well. Amin and Lee(1997) showed that a greater proportion of long(or short) positions often appear in the option market immediately prior to good(or bad) earning news' annoucement on the underlying stock. Black(1976) concluded that traders with private information prefer option trading because of the high leverage of option.

On the other hand, however, there are also some researches coming out that the stock market leads the option market. Stephan& Whaley(1990) had different views on Manaster and Rendleman's(1982) study for their using daily data and did not take into account the problem caused by the different trading time of two markets. Given that Stephan& Whaley used the data of every five minutes per day to tested two-way

relationship and concluded that the stock market leads the option market. Cao, Chen, and Griffin(2005) researched data at a daily frequency and found that it is the stock volume that is informative about future stock returns rather than option volume during "normal" times. Vijh(1990) also drew a conclusion that the option volume has no information for the stock market. Otherwise Chan, Chung, and Fong(2002) found that informed traders prefer trading in the stock market and the net trade stock volume can predict the bid change both of stocks and options while the net trade option volume has no prediction on the bid change of stocks. Besides Easley, O'Hara, and Srinivas(1998) investigated the price discovery role of derivatives trading in a multimarket in which informed traders, uninformed traders, and market makers these three all participate and found that it turn to be a "pooling equilibrium" in both options market and stock market when the leverage in option is large, when the liquidity in the stock market is low, or when a high proportion of informed traders exist in the market. They pointed out that if the markets are in a "pooling equilibrium", option trades provide information about future stock price movement, and informed traders whose expected profits are from trading stock verse option trade in both the stock and the option markets. They analyzed the data at a higher frequency as five-minute intervals and reported evidence that signed option volume contains information for contemporaneous stock price but there is less evidence showing that the option volume contains information for future stock prices.

In Korea, there are also a great many studies about the relationship between the stock market and the option market. According to 김찬웅, 문규현(2001), the lead relationship is existing among the stock market, the future market and the option market, while the option market is more leading than the stock market, the future market is more leading than the stock market and the option market. Jangkoo Kang and Hyoungjin Park(2008) took the Korean KOSPI 200 index option market as sample and researched the information contained in the net buying pressure by analyzing the intraday data of KOSPI 200 index option. It is suggested that the net buying pressure can increase the mobility of call options but reduce that of put options, and investors will buy call options when they expect the basic product's price to rise. This kind of relationship between the net buying pressure and the mobility shows that the informed traders would like to trade in the option market first. 홍성희, 옥진호, 이용재(1998) studied the lead-lag relationship between the index options and the stock index and found a two-way lead relationship of both in 20-minute data of intraday. 옥기율, 장기애(2006) researched option volume classified by investor types and the result showed that there will be about 20 minutes leading relationship if the investors are from securities companies, while the more informed traders exist in the market, the lower leading relationship is showed between the stock returns and the options with high leverage.

김솔(2007) analyzed trading amounts instead of trading volume and concluded that there is interrelationship between the option market and the stock market. 이재하, 한덕희(2007) investigated the option trading data at one-minute intervals and reported that there is a two-way lead-relationship between the option volume and the stock volume but no lead-relationship between the option volume and the spot returns. 최병욱(2011) studied the signal following trading strategy and found that the information contained in option volume can forecast the future stock returns in two minutes.

Ⅲ. Data and research design

1. Data

In this article, we select the KOSPI 200 Index Option Market as object to investigate whether the information contained in the option volume is able to forecast future return movements in spot market. In order to test the predictive power of option volume for stock returns, a variety of data samples－the daily data and the intraday data at different trading frequencies－were analyzed in this paper. All of the data we used were obtained from the KRX(Korea Exchange). The daily data consist of daily records of trading volume activity in KOSPI 200 Index Option Market and returns of KOSPI 200 Index from the beginning of January 2001 through March 2012. We also analyzed intraday trading records of KOSPI 200 Index Options and returns of KOSPI 200 Index at different frequencies from March 7 to April 18, 2012. Each day, trading hours are partitioned into five-minute intervals, ten-minute intervals, fifteen-minute intervals and thirty-minute intervals separately. Since the stock market trades between 9:00 A.M. and 3:00 P.M., while the KOSPI 200 Option Market trades from 9:00 A.M. to 3:15 P.M., our study is confined to the stock market trading hours.

Table 2 is a basic descriptive statistics of the observation we used in this paper. Panel A of Table 2 summarizes the daily data from January 2001 through March 2012. In Penal A, KOSPI 200 Index is the daily records of KOSPI 200 index, and return is defined as the price of the current trading day minus that of the last trading day divided by the last trading day's price. Put volume and call volume are the daily trading volume in the KOSPI 200 Option Market. We define the put-call ratio as the put volume divided by the sum of the put and call volume on each trading day.

Panel B to Panel E are the intraday trading data which are partitioned into five-minute intervals, ten-minute intervals, fifteen-minute intervals and thirty-minute

intervals respectively. In each interval, the last observation for KOSPI 200 index and option volume is identified. If no price is observed within that five- minute span, the last price in the previous five minutes is recorded for this interval. The return is defined as the price of the current interval minus that of the previous interval divided by the previous interval's price. Similarly the put-call ratio is the ratio of put volume to the sum of the put and call volume in each interval. From Panel B to Panel E, returns are expressed in percentage.

2. Research design

According to Easley, O'Hara, and Srinivas(1998)'s, if the markets are in a "pooling equilibrium", the option volume will provide information about future price movements of underlying stock. Pan and Poteshman(2006) pointed out that if the put-call ratio(put volume/total volume) is relatively small, the daily return of the stock will have the difference up to 0.4%, it shows that there is information in the option volume of underlying stock which can forecast the stock's future price.

In our test, we want to investigate whether the information contained in option volume can predict future stock return movements in Korea Market. Our empirical specification is designed to address the fundamental question of how information contained in option volume gets incorporated into stock price. We focus our investigation on the information about future stock price movements which is generated during the option trading process. Our main regression Equation is as follows:

$$Return_{t+\gamma} = \alpha + \beta Put - Call\,Ratio_t + \epsilon_{t+\gamma}\ , \qquad \gamma = 1,2,\ .... \qquad (1)$$

We assume that the "signal" in option volume which has predictability for future stock returns can be showed by put-call ratio. We regard the KOSPI 200 index as spot market and let $Return_t$ be the date t daily return of KOSPI 200 index. In Equation (1), $Return_t$ is calculated as date t KOSPI 200 index minus date t-1 KOSPI 200 index divided by date t KOSPI 200 index. On the other hand, we take $put-call\,ratio_t$ as a set of date t information variables extracted from the trading of options in KOPSI 200 index option market. We assume that the information contained in option trades, which is summarized by $put-call\,ratio_t$, is able to predict γ-day ahead KOSPI 200 index returns. While if the information variable $put-call\,ratio_t$ does not have predictive power as we assumed, then it turn to be for all γ, $\beta = 0$.

We define the independent variable put-call ratio as

$$Put-Call\ Ratio_t = \frac{P_t}{P_t + C_t} \qquad (2)$$

P_t = the number of put option contracts on date t

C_t = the number of call option contracts on date t

The independent variable we used is based on the put-call ratio established by Pan and Poteshman(2006). In the option market, if an informed trader have positive private information on the spot market, the trader will buy call options ,which adds to C_t and it will depress the put-call ratio defined in Equation (2) when keeping all else fixed. On the contrary, if traders with negative private information on spot market acts on his information by buying put options, which will add to P_t and make the put-call ratio increase. If the information contained in the option volume indeed has predictability for future stock returns, then the β coefficient in Equation (1) is expected to be negative and significant.

In view of the interval of daily data is relatively longer so that the predictive power of the information in option volume may be not obvious enough, we do further researches by using intraday data at higher frequencies as five-minute intervals, ten-minute intervals, fifteen-minute intervals, thirty-minute intervals separately in order to test the predictability of option volume. The analysis of intraday observations are also based on Equation (1) and Equation (2).

<Table 2> Basic descriptive statistics

Panel A summarizes the daily data from January 2001 through March 2012, and 2,790 observations in all. Panel B to Panel E are intraday observations which are partitioned into five-minute intervals, ten-minute intervals, fifteen-minute intervals and thirty-minute intervals. In these panels, KOSPI 200 Index is the last price observation in each interval. Return is defined as the price of the current interval minus that of the previous interval divided by the previous interval's price. Similarly put-call ratio is the ratio of put volume to total volume in each interval. All of the observations we used were obtained from the Korea Exchange.

Panel A: Daily data (2,790 observations)

	KOSPI 200 Index	Return	Put Volume	Call Volume	Put-Call Ratio
Mean	163.0179	0.0007	4,975,089	5,517,775	0.4727
Median	169.36	0.0012	4,305,701	4,875,726	0.4747
Minimum	58.03	-0.1196	179,912	184,160	0.1894
Maximum	295.35	0.1223	21,175,944	21,476,213	0.7898
S.D.	64.8196	0.0169	2912101.37	3109854.15	0.0662

Panel B: Intraday trading data at five-minute intervals (2,160 observations)

	KOSPI 200 Index	Return(%)	Put Volume	Call Volume	Put-Call Ratio
Mean	267.1376	0.0009	52,440	55,351	0.4958
Median	267.30	0.0006	36,851	36,883	0.4973
Minimum	258.88	-1.5104	4,863	5,151	0.2363
Maximum	272.63	1.5191	461,353	482,110	0.7416
S.D.	2.8006	0.1134	51,129	57,652	0.0983

Panel C: Intraday trading data at ten-minute intervals (1,080 observations)

	KOSPI 200 Index	Return(%)	Put Volume	Call Volume	Put-Call Ratio
Mean	267.1373	0.0018	47,877	50,728	0.4968
Median	267.2940	0.0016	37,042	35,684	0.4961
Minimum	259.28	-1.1832	4,863	6,580	0.2680
Maximum	272.54	1.3713	206,549	256,514	0.7036
S.D.	2.7992	0.1552	38,177	46,201	0.0982

Panel D: Intraday trading data at fifteen-minute intervals (720 observations)

	KOSPI 200 Index	Return(%)	Put Volume	Call Volume	Put-Call Ratio
Mean	267.1270	0.00215	46,858	50,519	0.4804
Median	267.3060	0.0022	35,500	38,390	0.4878
Minimum	259.28	-1.2523	4,863	5,151	0.2363
Maximum	272.63	1.3083	224,427	199,059	0.7023
S.D.	2.7987	0.1842	41,297	42,241	0.0981

Panel E: Intraday trading data at thirty-minute intervals (360 observations)

	KOSPI 200 Index	Return(%)	Put Volume	Call Volume	Put-Call Ratio
Mean	267.1319	0.0043	41,112	45,526	0.4778
Median	267.3250	-0.0011	34,188	36,439	0.4845
Minimum	259.28	-1.3634	4,863	6,765	0.2898
Maximum	272.54	1.2671	123,615	191,504	0.6845
S.D.	2.7924	0.2541	29,609	35,949	0.0904

Ⅳ. Empirical Results

The main goal of this article is to test whether there is informed trading in the KOSPI 200 Index Option Market and the information contained in trading volume is able to predict the future stock price movements in the KOSPI 200 spot market. We choose put-call ratio(put volume/total volume) as information variable. We think that when informed investors have positive information on future stock prices, they would buy more call options which makes call volume increase while the put-call ratio declines. On the contrary, the put-call ratio will rise as a result of put option volume's increase on condition that investors have negative information on future stock prices. If the information in option volume did have predictability for future stock price, it will be negative correlation between put-call ratio and stock return. Thus the β coefficient is expected to be negative and meaningful. Two kinds of observations are examined including daily trading data from January 2001 to March 2012 and intraday trading data from March 7 to April 18, 2012. All the observations are obtained from the KRX.

As described in Equation (1), we regress the KOSPI 200 index return on the put-call ratio from day+0 to day+6. The result of daily trading data are presented in Table 3. We find a slope coefficient of -0.06118 with a t-statistics of -13.00 which is significant at 0.05 on day+0. Table 3 also shows slope coefficients which are about -0.005 and -0.001 on t+1 day and t+3 day respectively, but not be significant. Although β coefficient appears to be negative and significant on date t, it does not show negative and significant slope coefficients during t+1 day to t+6 day. As a result, we find evidence that option volume contains information for contemporaneous stock returns, but no evidence shows that it contains information for predicting future stock prices by analyzing daily trading data of KOSPI 200 Index Option Market and the spot market.

<Table 3> The predictability of option volume for future stock returns based on daily observations.

This table reports the results of regressions from 2001 through 2012. The dependent variable is the index return on day+0, day+1, ..., day+6. The independent variable is the put-call ratio calculated as the put volume divided by the sum of the put and call volume. **, * means that a value is significant at 1% and 5% level respectively.

	return			
+n day	Mean	S.D.	coefficients	t-statistics
0	0.000659	0.016936	-0.06118*	-13.00*
1	0.000650	0.016937	-0.00505	-1.04
2	0.000655	0.016885	0.000384	0.08
3	0.000624	0.016866	-0.000983	-0.20
4	0.000611	0.016865	0.00893	1.85
5	0.000607	0.016868	0.00252	0.52
6	0.000600	0.016946	0.000661	0.14

In order to do further study on the predictive power in option trading volume for future stock prices movements, we also analyzed intraday trading data at higher frequencies as five-minute intervals, ten-minute intervals, fifteen-minute intervals and thirty-minute intervals. The return in KOSPI 200 spot market is defined as price of the current interval minus that of the previous interval divided by price of the previous intervals. Table 4 shows the result of intraday trading data at five-minute intervals. It can be easily read from the table that we get negative slope coefficients from t+1 to t+3, but none of them is signigicant except for the slope coefficient at t+2. At t+2, we find a slope coefficient of -0.02266 with a t-statistics of -2.30 which is significant at 0.05 level. This means that if the put-call ratio changed at t, the stock price will appear corresponding movements ten minutes later. For example, when informed investors have positive information for future stock prices, the volume of call options will increase and depress the put-call ratio, then the stock prices turn out to be rising after ten minutes. By analyzing intraday trading data at five-minute intervals, we find evidence that the information contained in the option trading volume have predictive power for future stock prices movements in ten minutes.

<Table 4> The predictability of option volume for future stock returns based on observations at five-minute intervals.

This table reports the results of regressions by using intraday trading data at five-minute intervals from March 7 through April 18, 2012. The dependent variable is the index return at t+1, t+2, ..., t+6. The independent variable is the put-call ratio calculated as the put volume divided by the sum of the put and call volume. Returns are expressed in percentage. **, * means that a value is significant at 1% and 5% level respectively.

	return(%)			
+n	Mean	S.D.	coefficients	t-statistics
1	0.000366	0.07580	-0.00769	-0.76
2	0.000033	0.073583	-0.02266*	-2.30*
3	0.000150	0.071388	-0.00618	-0.65
4	-0.000178	0.070633	0.00478	0.51
5	0.001075	0.105104	0.01881	1.34
6	0.001639	0.105528	0.00927	0.66

For the sake of verifying the accuracy of the result we obtained by analyzing intraday trading data at five-minute intervals, we collected intraday trading data at ten-minute intervals. The observations were also analyzed as the same way and the result is summarized in Table 5. According to Table 5, we get a significant slope coefficient at t+1. The value of the slope coefficient at t+1 is about -0.057 with a t-statistics of -2.85. And from t+1 to t+6, we find no slope coefficient is both negative and significant. The result of intraday trading data at ten-minute intervals also shows the evidence that there is informed trading in option market, and the informational content of option volume has ability in forecasting future stock prices movements in ten minutes as well.

We also regressed the intraday trading data at fifteen-minute intervals, thirty-minute intervals and presented the results in Table 6 and Table 7 respectively. As reported in Table 6, we get slope coefficients with negative values at t+1, t+2, t+4, t+5, t+6, but all of these slope coefficients turn out to be not significant at 0.05 level.

In Table 7, as similar as the result we obtained by analyzing the intraday trading observations at fifteen-minute intervals, we find slope coefficients with negative values from t+1 to t+5 but none of them turn out to be significant when examining the

intraday trading observations at thirty-minute intervals.

These results seem to suggest that, the information contained in option volume has predictability for future stock prices movements in ten minutes but there is no evidence showing that it has predictive power for future stock prices movements after 15 minutes or even longer.

<Table 5> The predictability of option volume for future stock returns based on observations at ten-minute intervals.

This table reports the results of regressions by using intraday trading data at ten-minute intervals from March 7 through April 18, 2012. The dependent variable is the index return at t+1, t+2, ..., t+6. The independent variable is the put-call ratio calculated as the put volume divided by the sum of the put and call volume. Returns are expressed in percentage. **, * means that a value is significant at 1% and 5% level respectively.

	return(%)			
+n	Mean	S.D.	coefficients	t-statistics
1	0.000067	0.105497	-0.05683**	-2.85**
2	0.001903	0.149401	0.01285	0.45
3	0.003852	0.150121	0.03606	1.27
4	0.002588	0.148660	-0.01077	-0.38
5	0.002166	0.150061	-0.02463	-0.87
6	0.002443	0.149841	-0.00566	-0.20

<Table 6> The predictability of option volume for future stock returns based on observations at fifteen-minute intervals .

This table reports the results of regressions by using intraday trading data at fifteen-minute intervals from March 7 through April 18, 2012. The dependent variable is the index return at t+1, t+2, ..., t+6. The independent variable is the put-call ratio calculated as the put volume divided by the sum of the put and call volume. Returns are expressed in percentage. **, * means that a value is significant at 1% and 5% level respectively.

	return(%)			
+n	Mean	S.D.	coefficients	t-statistics
1	0.003582	0.179189	-0.02839	-0.69
2	0.003836	0.179149	-0.02171	-0.53
3	0.003540	0.179134	0.01620	0.39
4	0.003933	0.178963	-0.00575	-0.14
5	0.003063	0.178496	-0.07859	-1.92
6	0.003039	0.178485	0.04139	1.01

<Table 7> The predictability of option volume for future stock returns based on observations at thirty-minute intervals.

This table reports the results of regressions by using intraday trading data at thirty-minute intervals from March 7 through April 18, 2012. The dependent variable is the index return at t+1, t+2, ..., t+6. The independent variable is the put-call ratio calculated as the put volume divided by the sum of the put and call volume. Returns are expressed in percentage. **, * means that a value is significant at 1% and 5% level respectively.

	return(%)			
+n	Mean	S.D.	coefficients	t-statistics
1	0.007651	0.245092	-0.01988	-0.25
2	0.007845	0.245038	-0.04773	-0.59
3	0.006056	0.243744	-0.09732	-1.22
4	0.006473	0.243572	-0.01491	-0.19
5	0.005973	0.243470	-0.06140	-0.77
6	0.005696	0.243415	0.03572	0.45

5. Conclusion

In this article, we selected KOSPI 200 Index Option Market as object and examined the informational content of option volume for future return movements of KOSPI 200 Index. Our main objective is to test the predictive power of the information in option

volume for future stock price. Our finding indicates that there is informed trading in the option market and information contained in option volume is able to forecast future stock price movement in ten minutes.

We defined put-call ratio as our information variable and used a variety of observations to test the predictability of option volume. By analyzing daily observations we found that option volume contains information for contemporaneous stock price but not for future stock price. We further analyzed the intraday trading data at higher frequencies as five-minute, ten-minute, fifteen-minute and thirty-minute. It showed evidence that information in option volume has predictive power for future stock prices in ten minutes, while there is no evidence pointing out that the information is able to forecast stock price movement after 15 minutes or longer. As a result, we conclude that there is informed trading in KOSPI 200 Index Option Market and the option volume contains information for future stock price movements.

Our article has focused on the information content of trading volume in option market about the future direction of stock price in spot market. Although we find evidence that the information in option volume has predictive power for future stock returns, there are still some limitations in our paper. For example, the observations we used in our paper are not large enough. The intraday trading data we selected is from March 7 to April 18, 2012. Since the magnitude of intraday trading data is not that long, the results achieved in this article could be a kind of result which was influenced by specific economic situation at that moment.

Given that there are many limitations and imperfect parts in this article, we will make efforts to improve research methods and avoid limitations in the future. In our future studies on the information contained in option market for future stock price movements in spot market, we will obtain long periods observations to test. Also we would do more detailed research in accordance with diverse categories, for example, break down option volume into partitions by separating options according to their moneyness, or classify investors and examine the information content of option volume traded by different types of investors for future stock price. Besides, since China is also planning to start index options trading in the near future, we could use the experiences of doing empirical studies on Korea derivatives market, to do investigations about index option contract design, risk management and market supervision etc., hoping that we can provide theoretical and empirical supports for the future development of financial derivatives market in China.

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옵션 거래량의 주식 가격에 대한 예측력
: KOSPI200 옵션에 대한 실증분석*

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요 약

본 논문은 KOSPI 200 지수옵션 시장과 현물 시장 중심으로 옵션의 거래량정보가 미래 현물가격의 변화에 대해 예측력을 갖고 있는지를 연구하였다. 옵션 거래량의 현물 주식 가격에 대한 정보 효과를 검증하기 위하여 논문에서 put-call ratio를 설명변수로 정의하고 다양한 시차의 현물 자료에 대하여 그 예측력을 분석하였다. 2001년 1월부터 2012년 3월 까지 일별 거래 자료 및 2012년 3월 7일부터 4월 18일까지 일중 거래 자료를 이용하였다. 일별 거래 자료에 대한 분석을 통하여 옵션 거래량은 같은 시점의 주식 가격에 대해 예측력이 있지만 미래 주식 가격에 대해 정보효과가 없다는 것을 발견하였다. 또 일중 거래 자료를 5분, 10분, 15분, 그리고 30분 간격으로 분석하였다. 일중 거래 자료에 대한 분석에 의하여 옵션의 거래량정보는 10분 후의 주식 가격에 대해 예측력을 갖고 있지만 15분이나 더 긴 시간 후의 주식 가격에 대해 예측력이 없다는 것으로 나타났다. 결국은 KOSPI200 지수옵션 시장에서 정보거래(informed trading)가 있으며, 옵션의 거래량정보가 미래 현물가격의 변화에 대해 예측력을 갖고 있음을 발견하였다.

핵심 주제어 : 예측력, 옵션, Put-call ratio, KOSPI 200, 정보 거래

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