

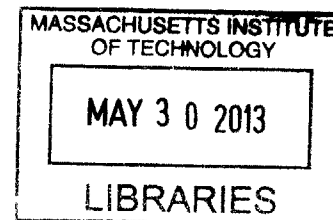
Analysis on the KOSPI200 Option from the Time-Series and Cross- Sectional Perspectives

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By

Jaewook Jung

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Jaewook Jung

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ABSTRACT

The Korean derivatives market is one of the most active markets in the world. The KOSPI200 options accounted for 43.4% of the global trading volume in equity index futures and options in 2011. It also accounted for 93.5% of the total trading volume in the Korean derivatives market in 2011. In this thesis, I examine why investors have traded KOSPI200 options so much among various equity index options in many global exchanges, and which factors have caused the change of the trading volume of the KOSPI200 options. From the cross-sectional perspective, I find that no-tax, low transaction fee and low margin requirement are the crucial factors explaining the high trading volume of the KOSPI200 options. High volatility of underlying index and high proportion of individual investors are also contributing factors that have differentiated the Korean derivatives market from other competing exchanges. From the time-series perspective, I conclude that contract size and margin requirement have clear causal effect on the trading volume of KOSPI200 options, while the proportion of individual investors has less clear effect on volume. In fact, the trading volume of KOSPI200 options shows an increasing pattern as these three factors decrease, and a decreasing pattern as three factors increase.

Thesis Supervisor: Hui Chen
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Part 1: Introduction of Korean Derivatives Market

In terms of the trading volume, the Korean derivatives market has been the most active market in the world for the recent periods. The significant growth of Korean derivatives market has been mainly driven by the KOSPI200 option. The main objective of this thesis is to answer two questions; which factors have differentiated the Korean derivatives market from other competing exchanges and which factors have caused the change of the trading volume of KOSPI200 options over time. Low level of transaction fee, tax, and margin requirement and high level of volatility and proportion of individual investors are the major contributing factors to the global presence of KOSPI200 index options. From the time-series analysis, it turns out that three factors have statistically significant negative relationship with the trading volume of KOSPI200 options: contract size, margin requirement, and proportion of individual investors.

Section 1(a): History of Derivatives Market in Korea

The Korea Stock Exchange (KSE) was established in 1956 and the Korea Composite Stock Price Index (KOSPI) began to represent the overall price of the stock market starting from 1964. In June 1994, KOSPI200, which was made up of 200 representative large-cap stocks in Korea, was launched in the Korean stock market. In accordance with the development of the stock market, Korea's exchange-traded derivatives market was established in 1996 and KSE listed KOSPI200 futures and options contract in 1996 and 1997, respectively.

The derivatives market in Korea entered a fast-growing phase with the birth of the Korea Futures Exchange (KOFEX) in 1999. New financial products such as repo, exchange traded fund (ETF), and options on individual equities began to be traded from 2002. Three major financial markets – the KSE, the KOFEX, and the Korean Securities Dealers Automated Quotation (KOSDAQ) had been independently operating until the Korea Exchange (KRX) integrated the three individual

markets in 2005, causing it to become the only standing exchange market in Korea dealing with equity and derivatives transactions.

[Table 1: The History of the Listing Exchange-traded Derivatives in Korea]

Date	Derivative	Underlying Asset	Asset Class
May. 1996	KOSPI200 futures	KOSPI200 Index	Equity Index
Jul. 1997	KOSPI200 options	KOSPI200 Index	Equity Index
Apr. 1999	KRW/USD futures	KRW/USD	Exchange rate
	KRW/USD options	KRW/USD	Exchange rate
	CD futures	Certificate of deposit	Short-term interest rate
	Gold futures	Gold	Precious metal
Sep. 1999	3-year Korea T-bond futures	3-year Korea T-bonds	Mid-term interest rate
Jan. 2001	KOSDAQ50 futures	KOSDAQ50 Index	Equity Index
Sep. 2001	KOSPI200 futures spread	KOSPI200 Index	Equity Index
Dec. 2001	KOSDAQ50 options	KOSDAQ50 Index	Equity Index
Jan. 2002	Options on individual equities	33 individual equities	Individual equities
May. 2002	Options on the 3-year Korea T-bond futures	3-year Korea T-bonds	Mid-term interest rate
Dec. 2002	MSB futures	364-day MSB	Short-term interest rate
Aug. 2003	5-year Korea T-bond futures	5-year Korea T-bonds	Mid-term interest rate
Nov. 2005	KOSDAQ STAR futures	KOSTAR Index	Equity Index
May. 2006	KRW/JPY futures	KRW/JPY	Exchange rate
	KRW/EUR futures	KRW/EUR	Exchange rate
Feb. 2008	10-year Korea T-bond futures	10-year Korea T-bonds	Long-term interest rate
May. 2008	Futures on individual equities	25 individual equities	Individual equities
Jul. 2008	Lean hog futures	Lean hogs	Agricultural
Sep. 2010	Mini-gold futures	Gold	Precious metal

Source: Park, C. (2011). How to Improve the Exchange-Traded Derivatives Market in Korea. *Korea Capital Market Institute* 3 (2), 23.

- 1) The figures of futures and options on individual equities are as of the end of May 2011.
- 2) The KRX unlisted the CD futures, options on the 3-year KTB futures, the KOSDAQ50 equity index futures and options, and the 364-day MSB futures.

Section 1(b): Current Product Line-Up

The derivatives products consist of five major categories: stock index products, individual equity products, interest rate products, currency products, and commodity products. Stock index products have three sub-categories: KOSPI200 futures, KOSPI200 options, and KOSTAR futures. Under the individual equity product category, single stock options are traded based on 33 stocks listed on the KRX stock market, and single stock futures are traded based on 25¹ large-cap stocks on the stock market. Interest rate products have three sub-categories: 3-year KTB futures, 5-year KTB futures, and 10-year KTB futures. The underlying assets are Korea Treasury Bonds with a 5% coupon rate and semiannual coupon payments. Currency products consist of four sub-categories: US dollar futures and options, Japanese Yen futures, and Euro futures. Commodity products have three sub-categories of gold futures, lean hog futures, and mini gold futures.

Among these various derivatives products, only four derivatives products based on financial underlying assets (KOSPI200 futures, KOSPI200 options, 3-year KTB futures, and KRW/USD futures) have obtained enough liquidity and global presence, while other derivatives products including the three commodity products have taken an insignificant portion of the trading volume in the Korean derivatives market. This heavy concentration on a few products has been told to be a main problem in Korean market.

Section 1(c): Trading Volume

It is worth noting that the two major derivatives products (KOSPI200 options and KOSPI200 futures) have obtained outstanding presence in the world of the derivatives market² and account for almost all trading volumes in the Korean derivatives market. As shown in table 2 below, the

¹ The list of 25 individual stock futures is presented in the appendix.

² KOSPI200 options and KOSPI200 futures account are ranked at 1st and 14th place in terms of the number of contracts traded and/or cleared in 2010 according to FIA, (2011). Annual Volume Survey – 2010 Record Volume. 4.

total trading volume of three major products has reached 3.7 billion contracts with 15.2 million daily trading volume and 46.6 trillion KRW daily trading value in 2011.

Among these three major products, KOSPI200 call and put options account for a dominating proportion of the entire trading volume in the KRX, even though its proportion of the trading volume decreased to 85.8% in 2012 due to the increase of contract size from 100,000 KRW to 500,000 KRW. KOSPI200 futures only account for 2%~3% of the trading volume in 2012, but its proportion in trading value represents 96.2% due to the fundamental characteristic of interest rate derivatives products. “Others” category mainly consists of KRW/USD futures and futures on individual equities.

[Table 2: Trading Volume of Derivatives Products in KRX for the Recent 3 Years]

(Unit: 1,000 Contracts and Billion KRW)

Product	Total Trading Volume			Daily Avg. Trading Volume			Daily Avg. Trading Value		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
KOSPI200 Options Call	1,769,477 (47.2%)	1,968,101 (50.1%)	824,562 (44.9%)	7,050 (47.2%)	7,936 (50.1%)	3,325 (44.9%)	616 (1.1%)	820 (1.2%)	620 (1.1%)
KOSPI200 Options Put	1,756,422 (46.8%)	1,703,561 (43.4%)	750,832 (40.9%)	6,998 (46.8%)	6,869 (43.4%)	3,028 (40.9%)	650 (1.2%)	938 (1.4%)	608 (1.1%)
KOSPI200 Options	3,525,899 (94.0%)	3,671,662 (93.5%)	1,575,394 (85.8%)	14,048 (94.0%)	14,805 (93.5%)	6,353 (85.8%)	1,266 (2.2%)	1,758 (2.7%)	1,228 (2.3%)
KOSPI200 Futures	85,814 (2.3%)	86,121 (2.2%)	61,270 (3.3%)	342 (2.3%)	347 (2.2%)	247 (3.3%)	39,190 (69.5%)	44,810 (67.6%)	31,430 (57.6%)
3-year KTB Futures	26,915 (0.7%)	32,676 (0.8%)	28,171 (1.5%)	107 (0.7%)	132 (0.8%)	114 (1.5%)	11,920 (21.1%)	13,646 (20.6%)	11,953 (21.9%)
Others	113,274 (3.0%)	137,497 (3.5%)	170,783 (9.3%)	451 (3.0%)	554 (3.5%)	689 (9.3%)	4,043 (7.2%)	6,082 (9.2%)	9,964 (18.3%)
Total	3,751,902 (100%)	3,927,957 (100%)	1,835,618 (100%)	14,948 (100%)	15,839 (100%)	7,402 (100%)	56,420 (100%)	66,299 (100%)	54,576 (100%)

Source: KRX

1) “Other” category refers to all the remaining products other than three major products.

Section 1(d): Market Participants

The types of investors are typically divided into three sub-categories: institutional investors, individual investors, and foreigners. In the Korean derivatives market, these three major types of investors represent relatively evenly distributed market shares in terms of the trading volume as compared to other derivatives markets in the world. Individual investors in the US and Japan markets are known to take roughly 10%³ level of the total trading volume, although the actual proportions of investors are not openly disclosed.

In the futures market, institutional investors take the largest portion, roughly 50% of the total trading volume for the recent three years. Foreigners take the smallest portion of 20% on average and individuals take the rest, roughly 30% and a little bit more. The reason has to do with the fact that institutional investors have incentives to be actively engaged in the transactions of 3-year KTB futures and USD futures for the purpose of hedging the interest rate risk. In contrast to this, individuals are not likely to have a large position in the interest rate, thus prefer investing in options for hedging their original stock positions or speculating stock price movement. More leveraging effect is another reason why individual investors prefer options to futures.

The options market shows more evenly distributed market shares by three types of participants than the futures market does. For the recent three years, foreigners have taken the largest portion followed by institutions and individuals. In 2012, foreigners accounted for 43.2% of the total trading volume of entire options. The proportion of individual investors decreased to 27.9%. The notable common trend of both futures and options market is that the portion of foreigners has steadily increased, whereas institutional and individuals has lost their market shares for the past three years.

³ Park, C. (2011). How to Improve the Exchange-Traded Derivatives Market in Korea. *Korea Capital Market Institute* 3 (2), 30.

[Table 3: Trading Volume by the Type of Investors for the Recent 3 Years]

(Unit: Number of Contracts)

Products	Year	Institutional	Individuals	Foreigners	Grand Total
Entire Futures	2010	240,527,448 (53.2%)	135,588,933 (30.0%)	75,865,437 (16.8%)	451,981,818 (100.0%)
	2011	247,531,420 (48.3%)	160,516,738 (31.3%)	104,540,658 (20.4%)	512,588,816 (100.0%)
	2012	236,378,599 (45.4%)	168,503,167 (32.4%)	115,565,190 (22.2%)	520,446,956 (100.0%)
Entire Options	2010	2,472,800,883 (35.1%)	2,289,995,297 (32.5%)	2,289,025,116 (32.5%)	7,051,821,296 (100.0%)
	2011	2,179,651,714 (29.7%)	2,344,519,001 (31.9%)	2,819,153,811 (38.4%)	7,343,324,526 (100.0%)
	2012	910,873,669 (28.9%)	878,716,432 (27.9%)	1,361,198,397 (43.2%)	3,150,788,498 (100.0%)
Entire Market	2010	2,713,328,331 (36.2%)	2,425,584,230 (32.3%)	2,364,890,553 (31.5%)	7,503,803,114 (100.0%)
	2011	2,427,183,134 (30.9%)	2,505,035,739 (31.9%)	2,923,694,469 (37.2%)	7,855,913,342 (100.0%)
	2012	1,147,252,268 (31.2%)	1,047,219,599 (28.5%)	1,476,763,587 (40.2%)	3,671,235,454 (100.0%)

Source: KRX and own analysis

- 1) The number of contracts above is the sum of purchases and sales in each market.
- 2) Market shares refer to the average shares of purchases and sales transactions.

Section 1(e): KRX in the Global Derivatives Market

The global derivatives market has steadily grown in the past 10 years and the number of futures and options traded on exchanges around the world has risen to 11.4% with a total of 24.97 billion contracts at the end of 2011. The KRX is the number one exchange in the world, followed by CME group in terms of the number of contracts traded and/or cleared in 2011 as shown in the table 4.

The KRX reported 3.9 billion contracts which increased by 4.8% in 2011. The growth rate of the KRX is the smallest among top 10 exchanges in 2011. Newly developed exchanges such as National Stock Exchange in India and Russia Trading Systems Stock Exchange showed such a fast-growing phase in 2011.

The global trading volumes of sub-categories are described in the table 5 below. In 2011, equity index accounted for the largest trading volume with 33.9% of the total trading volume and individual equities took the second largest portion at 28.3%. Thus, the equity-related derivatives products in total accounted for 62.2% of the total trading volume in 2011. Interest rate derivatives and currency derivatives trailed equity derivatives with 14.0% and 12.6% of market shares, respectively. All sub-categories have shown the steady increase except non-precious metals which reported negative growth in 2011.

[Table 4: Top 10 Derivatives Exchanges]

(Unit: Number of Contracts, %)

Rank	Product	2010	2011	% Change
1	Korea Exchange	3,748,861,401	3,927,956,666	4.8%
2	CME Group (includes CBOT and Nymex)	3,080,497,016	3,386,986,678	9.9%
3	Eurex (includes ISE)	2,642,092,726	2,821,502,018	6.8%
4	NYSE Euronext (includes U.S. and EU markets)	2,154,742,282	2,283,472,810	6.0%
5	National Stock Exchange of India	1,615,790,692	2,200,366,650	36.2%
6	BM&FBovespa	1,423,753,671	1,500,444,003	6.1%
7	Nasdaq OMX (includes U.S. and Nordic markets)	1,099,437,223	1,295,641,151	17.8%
8	CBOE Group (includes CFE and C2)	1,123,505,008	1,216,922,087	8.3%
9	Multi Commodity Exchange of India (includes MCX-SX)	1,081,813,643	1,196,322,051	10.6%
10	Russia Trading Systems Stock Exchange	623,992,363	1,082,559,225	73.5%

Source: FIA, (2012). Annual Volume Survey – Volume Climbs 11.4% to 25 Billion Contracts Worldwide. 26.

The KRX has been ranked at the first place in the world for many years in a row in terms of the number of contracts traded and/or cleared. In 2011, the trading volume of the KRX represented 15.7% of the total trading volume worldwide (3.93 billion out of 24.97 billion contracts).

[Table 5: Global Futures and Options Trading Volume by Category]

(Unit: Number of Contracts and %)

Products	2009		2010		2011	
	Trading Vol	(%)	Trading Vol	(%)	Trading Vol	(%)
Equity index	6,382,027,655	36.0%	7,416,030,134	33.1%	8,459,520,735	33.9%
Individual equities	5,588,884,611	31.5%	6,295,265,079	28.1%	7,062,363,140	28.3%
Interest rate	2,467,763,942	13.9%	3,202,061,602	14.3%	3,491,200,916	14.0%
Foreign currency	992,397,372	5.6%	2,525,942,415	11.3%	3,147,046,787	12.6%
Ag commodities	927,693,001	5.2%	1,305,531,145	5.8%	991,422,529	4.0%
Energy products	657,025,702	3.7%	723,614,925	3.2%	814,767,491	3.3%
Non-precious metals	462,823,715	2.6%	643,645,225	2.9%	435,111,149	1.7%
Precious metals	151,512,950	0.9%	174,943,677	0.8%	341,256,129	1.4%
Other	114,475,070	0.6%	137,655,075	0.6%	229,713,692	0.9%
Total	17,744,604,018	100.0%	22,424,689,277	100.0%	24,972,402,568	100.0%

Source: FIA, (2012). Annual Volume Survey – Volume Climbs 11.4% to 25 Billion Contracts Worldwide. 26. FIA, (2011). Annual Volume Survey – 2010 Record Volume. 4.

The global derivatives products have eight categories according to “Annual Volume Survey” of the Futures Industry Association. The major four products of the KRX have been ranked within the top 20 derivatives products in each category (equity index, foreign currency, and interest rate derivatives) in 2010 and 2011. Among these four products, the KOSPI200 option is the most prominent derivatives product in the global market, which is responsible for explaining roughly half of the total trading volume in global equity index market. The market shares of other three products are only 1% to 2% in each category.

[Table 6: KRX Products in the Global Derivatives Market]

(Unit: Number of Contracts, %)

KRX Products	Product Category	2010			2011		
		Volume	(%)	Ranks	Volume	(%)	Ranks
KOSPI200 Options	Equity index	3,525,898,562	47.5%	1	3,671,662,258	43.4%	1
KOSPI200 Futures	Equity index	86,214,025	1.2%	14	87,274,461	1.0%	15
U.S Dollar Futures	Foreign currency	64,256,678	2.5%	6	70,212,467	2.2%	8
3 Year Treasury Bond Futures	Interest rate	26,922,414	0.8%	20	34,140,210	1.0%	20

Source: FIA, (2012). Annual Volume Survey – Volume Climbs 11.4% to 25 Billion Contracts Worldwide. 31-32.

1) Trading volume percentage and ranks means the figures in the global derivatives market.

Part 2: Examination of Korean Equity Index Derivatives

Although the KRX dealing with stock and derivatives products has a relatively shorter history than many advanced markets, thus a lower degree of maturity, the KRX has shown astonishingly fast growth. Several major derivatives products have ended up being one of the most actively traded products in the global market. Among these products, equity index futures and options (KOSPI200 options and futures) have led the Korean derivatives market to have a global presence. In particular, KOSPI200 options solely explained 93% of the total trading volume in the Korean derivatives market of 2011. In this section, the reason why KOSPI200 options and futures in the KRX could show such great growth for the past ten to twelve years will be examined. On the one hand, I explore the relationship between the trading volume and several potential causal factors from the time-series perspective, focusing on Korean market. On the other hand, I will analyze which features of KOSPI200 options and futures have differentiated the Korean market from the competing exchanges in the world.

Section 2(a): Trading Volume of KOSPI200 Options and Futures

As aforementioned, KOSPI200 options accounted for 43.4% of the trading volume in the global equity index market in 2011. In other words, roughly one of two global equity index derivatives transactions had taken place in Korea during that period. In this paper, six factors are regarded as crucial factors explaining the outstanding trading volume of KOSPI200 options: volatility in the underlying index, proportion of individuals and foreigners, contract size, margin requirement, tax, and transaction fee.

[Table 7: Trend of Trading Volume of Global Equity Indexes and KOSPI200 Options]

(Unit: Number of Contracts, %)

Year	Global Equity Index		KOSPI200 Options		
	Trading volume	% Change	Trading volume	% Change	Global shares
2000	674,800,000	-	193,829,070	-	28.7%
2001	1,498,150,000	122.0%	823,289,608	324.8%	55.0%
2002	2,789,980,000	86.2%	1,889,823,786	129.5%	67.7%
2003	3,960,870,000	42.0%	2,837,724,953	50.2%	71.6%
2004	3,775,430,000	-4.7%	2,521,557,274	-11.1%	66.8%
2005	4,080,330,000	8.1%	2,535,201,693	0.5%	62.1%
2006	4,454,222,902	9.2%	2,414,422,955	-4.8%	54.2%
2007	5,616,816,347	26.1%	2,709,844,077	12.2%	48.2%
2008	6,488,620,434	15.5%	2,766,474,404	2.1%	42.6%
2009	6,382,027,655	-1.6%	2,920,990,655	5.6%	45.8%
2010	7,416,030,134	16.2%	3,525,898,562	20.7%	47.5%
2011	8,459,520,735	14.1%	3,671,662,258	4.1%	43.4%
2012	-	-	1,575,394,249	-57.1%	-

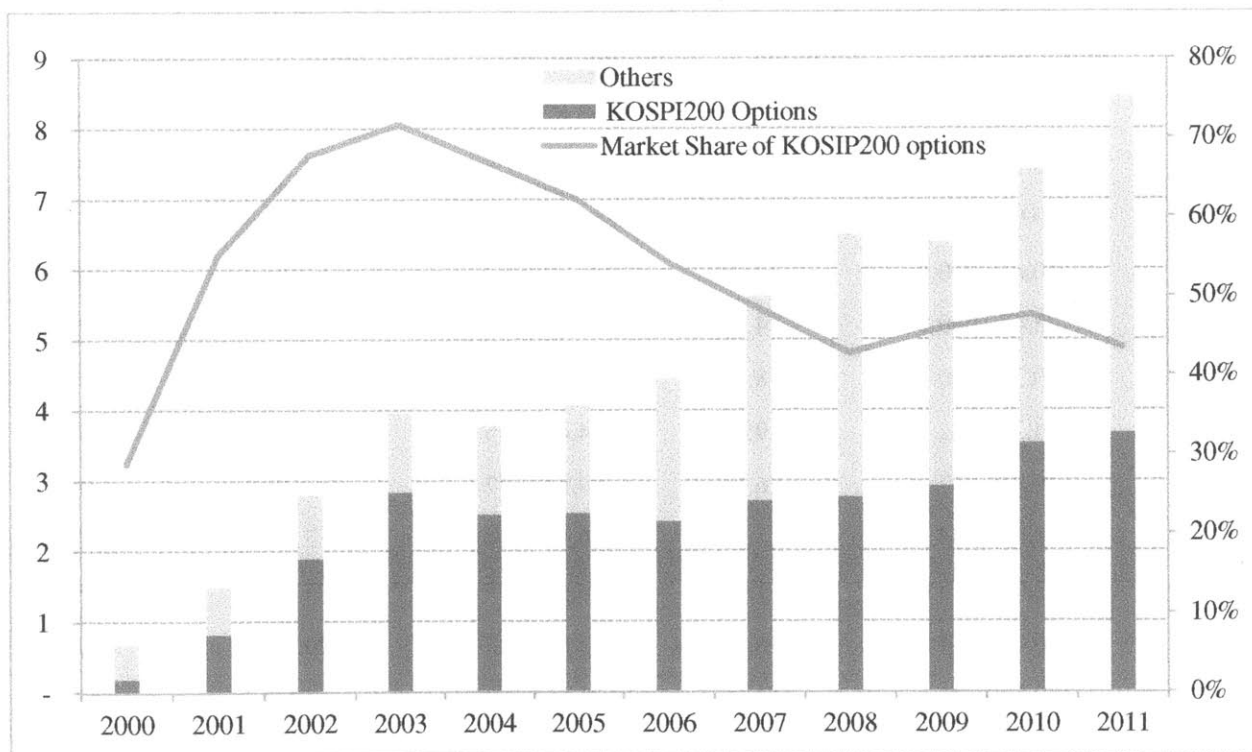
Source: KRX

- 1) The trading volume and percent change of global equity index in 2012 are not disclosed.
- 2) Global equity index include both futures and options.

In order to convey a sense of the historical evolution of KOSPI200 options on the global market, we can compare the trading volume of KOSPI200 options with the trading volume of the entire global equity index market for the past twelve years. The table below provides data on the total trading volumes of the entire global equity index market and KOSPI200 options from 2000 to 2011. As shown in the graph 1, the trend of the total trading volume in a global equity index category shows significant growth from 2000 to 2003, gradual increase with ups and downs from 2004 to 2011. The KOSPI200 options represent the similar trend with a global equity indexes market, except 2006 and 2009, when both categories showed opposite growth rates.

[Graph 1: Market Share of KOSPI200 Options in Global Equity Index Market]

(Unit: Billion Contracts, %)



Source: KRX

The market shares of KOSPI200 options on the global market have dramatically increased from 2000 to 2003, with the maximum number of 71.6% in 2003. Since then, it has shown gradual ups and downs and reached 43.4% in 2011. It is clear that the overall growth in global equity index market has mainly been driven by the growth of KOSPI200 options. One interesting fact about KOSPI200 options is that the total trading volume decreased significantly in 2012. It is reported that the growth rate of 2012 was negative 57.1%. The main reason for this is the change in contract size from 100,000 KRW to 500,000 KRW in March 2012.

Section 2(b): Comparison of Spot-Futures/Options Ratio

In order to get a sense of how fast KOSPI200 futures and options have grown as compared to their underlying asset, we can refer to the growth of the two derivatives products and the growth of the stock in the spot market in terms of the trading value and the trading volume. In terms of the trading value, the average annual growth rates of KOSPI200 futures and KOSPI200 options are 20.17% and 27.43%, respectively from 2000 to 2012. These growth rates are far beyond the average growth rate of 7.70% in the equity spot market.

Likewise, if we measure the growth rate based on the trading volume, KOSPI200 futures and options show more growth rates than equity spot market does. Aside from 2012 when KRX increased the contract size of KOSPI200 options from 100,000 KRW to 500,000 KRW, having a large negative impact on the trading volume, KOSPI200 futures and options have annually grown at the rate of 8.17% and 7.66% from 2002 to 2011, whereas equity spot market recorded the negative growth rate of 9.20% for the same period. It is controversial to say that a certain level of spot-futures ratio is appropriate so that higher ratio over a certain level means the excessively overheated futures market. Instead, we can say that it is true that the growth rate of KOSPI200 futures and options exceeded the growth rate of spot equity market by significant difference.

[Table 8: Trend of Spot-Futures/Options Ratio in terms of *Trading Value*]

(Unit: Billion KRW, %)

Year	Stock (KOSPI)		KOSPI200 Futures		KOSPI200 Options		Ratio (F/S)	Ratio (O/S)
	Trading Value	Change (%)	Trading Value	Change (%)	Trading Value	Change (%)		
2000	491,365	-	859,711	-	16,621	-	1.75	0.03
2001	627,133	27.6	1,124,045	30.7	47,344	184.8	1.79	0.08
2002	742,150	18.3	1,979,940	76.1	125,228	164.5	2.67	0.17
2003	547,509	Δ26.2	2,649,358	33.8	159,687	27.5	4.84	0.29
2004	555,795	1.5	2,935,961	10.8	144,689	Δ9.4	5.28	0.26
2005	786,258	41.5	2,987,042	1.7	140,825	Δ2.7	3.80	0.18
2006	848,490	7.9	3,985,970	33.4	144,534	2.6	4.70	0.17
2007	1,362,877	60.6	5,174,122	29.8	218,374	51.1	3.80	0.16
2008	1,287,165	Δ5.6	6,128,624	18.4	287,229	31.5	4.76	0.22
2009	1,466,275	13.9	7,547,782	23.2	256,578	Δ10.7	5.15	0.17
2010	1,410,562	Δ3.8	9,836,796	30.3	318,060	24.0	6.97	0.23
2011	1,702,060	20.7	11,113,081	13.0	436,326	37.2	6.53	0.26
2012	1,196,263	Δ 29.7	7,794,745	Δ29.9	304,685	Δ30.2	6.52	0.25
Total	7.70% (2000~2012)		20.17% (2000~2012)		27.43% (2000~2012)		-	-

Source: KRX and Ohk., K. & Huh, H. (2003). A Study on the Trading Behavior of KOSPI200 Futures Market and Margin Policy. 7.

- 1) Ratio (F/S) equals the trading value of KOSPI200 futures divided by the trading value of stock (KOSPI)
- 2) Ratio (O/S) equals the trading value of KOSPI200 options divided by the trading value of stock (KOSPI)

KiYool Ohk and Hwa Huh pointed out in their paper that the demand tended to be concentrated on KOSPI200 futures, because various alternatives such as OTC products which could have replaced the demand for KOSPI200 futures had not matured in Korean derivatives market. They also mentioned that the spot-futures ratio in KRX was not excessively high as compared to other countries. The major futures markets shows as high spot-futures ratio as KRX in a few years after futures markets were initially established.

[Table 9: Trend of Spot-Futures/Options Ratio in terms of *Trading Volume*]

(Unit: 10,000 Contracts, %)

Year	Stock (KOSPI)		KOSPI200 Futures		KOSPI200 Options		Ratio (F/S)	Ratio (O/S)
	Trading Value	Change (%)	Trading Value	Change (%)	Trading Value	Change (%)		
2000	-	-	1,967	-	19,383	-	-	-
2001	-	-	3,138	59.6	82,329	324.8	-	-
2002	20,916,780	-	4,264	35.3	188,982	129.5	0.00020	0.00903
2003	13,387,643	Δ 36.0	6,156	45.0	283,772	50.2	0.00046	0.02120
2004	9,285,077	Δ 30.6	5,483	Δ10.9	252,156	Δ11.1	0.00059	0.02716
2005	11,643,973	25.4	4,302	Δ21.5	253,520	0.5	0.00037	0.02177
2006	6,893,678	Δ40.8	4,561	6.0	241,442	Δ4.8	0.00066	0.03502
2007	8,950,608	29.8	4,686	2.7	270,984	12.2	0.00052	0.03028
2008	8,814,906	Δ1.5	6,530	39.3	276,647	2.1	0.00074	0.03138
2009	12,287,129	39.4	8,198	25.5	292,099	5.6	0.00067	0.02377
2010	9,559,571	Δ22.2	8,581	4.7	352,590	20.7	0.00090	0.03688
2011	8,773,241	Δ8.2	8,612	0.4	367,166	4.1	0.00098	0.04185
2012	12,064,692	37.5	6,127	Δ28.9	157,539	Δ57.1	0.00051	0.01306
Total	Δ9.20% (2002~2011)		8.17% (2002~2011)		7.66% (2002~2011)		-	-
Total	Δ5.35% (2002~2012)		3.73% (2002~2012)		Δ1.80%(2002~2012)		-	-

Source: KRX and Ohk., K., & Huh, H. (2003). A Study on the Trading Behavior of KOSPI200 Futures Market and Margin Policy. 7.

- 1) Trading values of stock (KOSPI) in 2001 and 2002 are not officially released through KRX.
- 2) Ratio (F/S) equals the trading volume of KOSPI200 futures divided by the trading volume of stock (KOSPI)
- 3) Ratio (O/S) equals the trading volume of KOSPI200 options divided by the trading volume of stock (KOSPI)

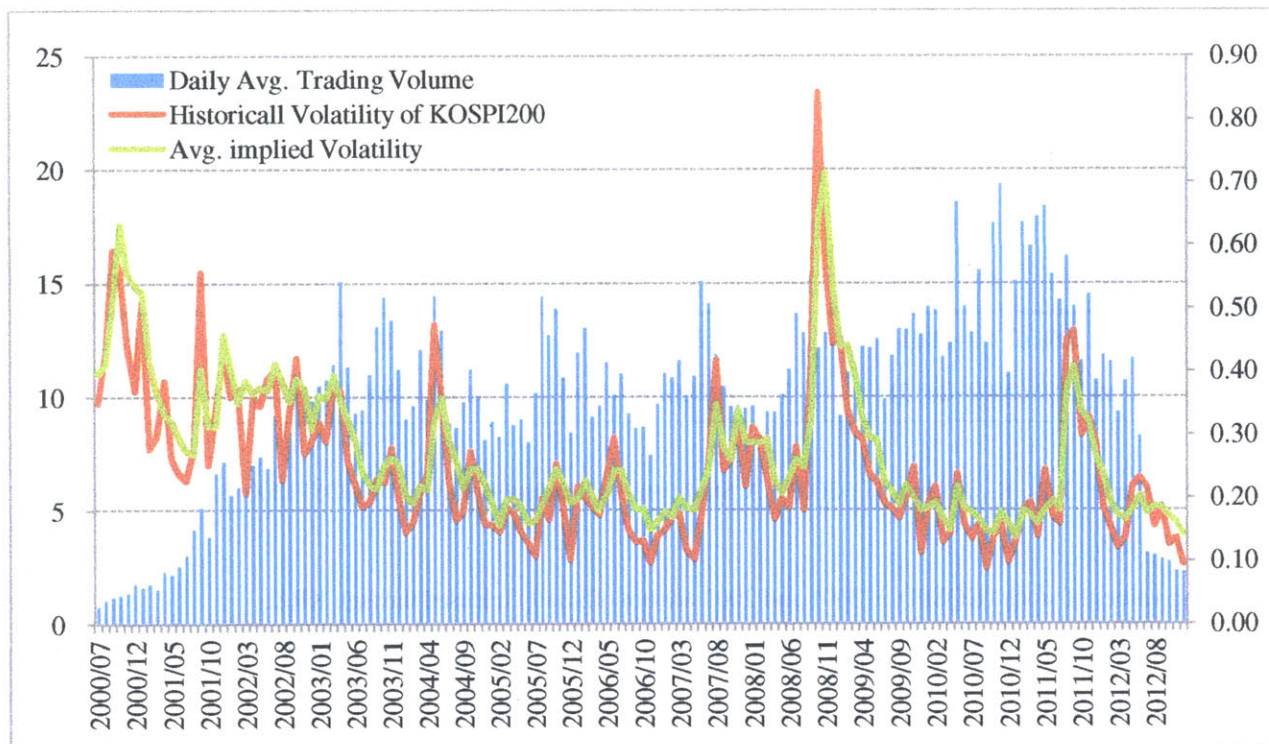
Section 2(c): Volatility in Underlying Index

The high level of volatility in the Korean stock market has provided a good environment in which investors are able to be actively engaged. Speculators who prefer high risk are willing to

participate in the Korean derivatives market for the purpose of obtaining high returns. Hedgers who are exposed to stock position in the Korean market can mitigate the price movement risk by taking the opposite positions in KOSPI200 futures and/or options in Korea. The proportion of individual investors has been higher in Korean market than in other derivatives markets for the recent period, though it has decreased gradually. If individual investors tend to trade the derivatives products for the purpose of speculation, the high volatility can support the idea that the Korean derivatives market has successfully grown due to the high volatility.

[Graph 2: Daily Average Trading Volume and Volatilities of KOSPI200 Index]

(Unit: Millions of Contracts and %)



Source: KRX and own analysis

- 1) Daily average trading volume is the total volume of KOSPI200 options and futures in KRX.
- 2) Average implied volatility is the annual volatility implied by call and put options disclosed by KRX.
- 3) Historical volatility is the annualized volatility based on 1-month volatility of KOSPI200 index.
- 4) Volatilities are standard deviations of log return of KOSPI200 index assuming 252 business days a year.

From the time-series perspective, the volatility of KOSPI200 index has been higher than other major equity indices in the world. From July 2000 to the middle of 2003, the daily average trading volume of equity index derivatives in the KRX has steadily increased, although the overall volatility in underlying index showed the decreasing pattern. Except this period, the daily average trading volume has roughly moved in accordance with the movement of the volatility in underlying index. In particular, the trading volume spiked up when the volatility increased sharply in 2008 and 2011 due to the global financial crises. In order to compare the historical volatilities in many different markets, I picked up five major indices from the list of the top 20 equity index futures and options: KOSPI200, S&P500, DJIA, NIKKEI225, and STOXX50.

[Table 10: Historical Volatilities of Major Equity Indices]

(Unit: Percentage)

	1 year		3 year		5 year		10 year	
	Daily	Annual	Daily	Annual	Daily	Annual	Daily	Annual
KOSPI200 ⁴	1.06%	16.83%	1.31%	20.73%	1.67%	26.51%	1.55%	24.56%
S&P500 ⁵	0.80%	12.76%	1.17%	18.56%	1.66%	26.34%	1.31%	20.84%
DJIA ⁶	0.74%	11.77%	1.06%	16.85%	1.51%	23.96%	1.21%	19.17%
NIKKEI225 ⁷	1.02%	16.25%	1.29%	20.55%	1.83%	29.00%	1.54%	24.45%
STOXX50 ⁸	1.30%	20.59%	1.54%	24.49%	1.80%	28.64%	1.49%	23.66%

Source: sources represented in the footnotes and own analysis

I calculated the daily standard deviations of each month starting from July 2000 to December 2012 and converted the volatilities into annual figures, assuming 252 business days in a year. As

⁴ KRX, Retrieved from http://www.krx.co.kr/m1/m1_1/m1_1_4/JHPKOR01001_04.jsp

⁵ CBOE, Retrieved from <http://www.cboe.com/micro/spx/historicaldata.aspx>

⁶ MSN.com, Retrieved from <http://ca.moneycentral.msn.com/investor/charts/historicdata.aspx?symbol=%24US%3aINDU>

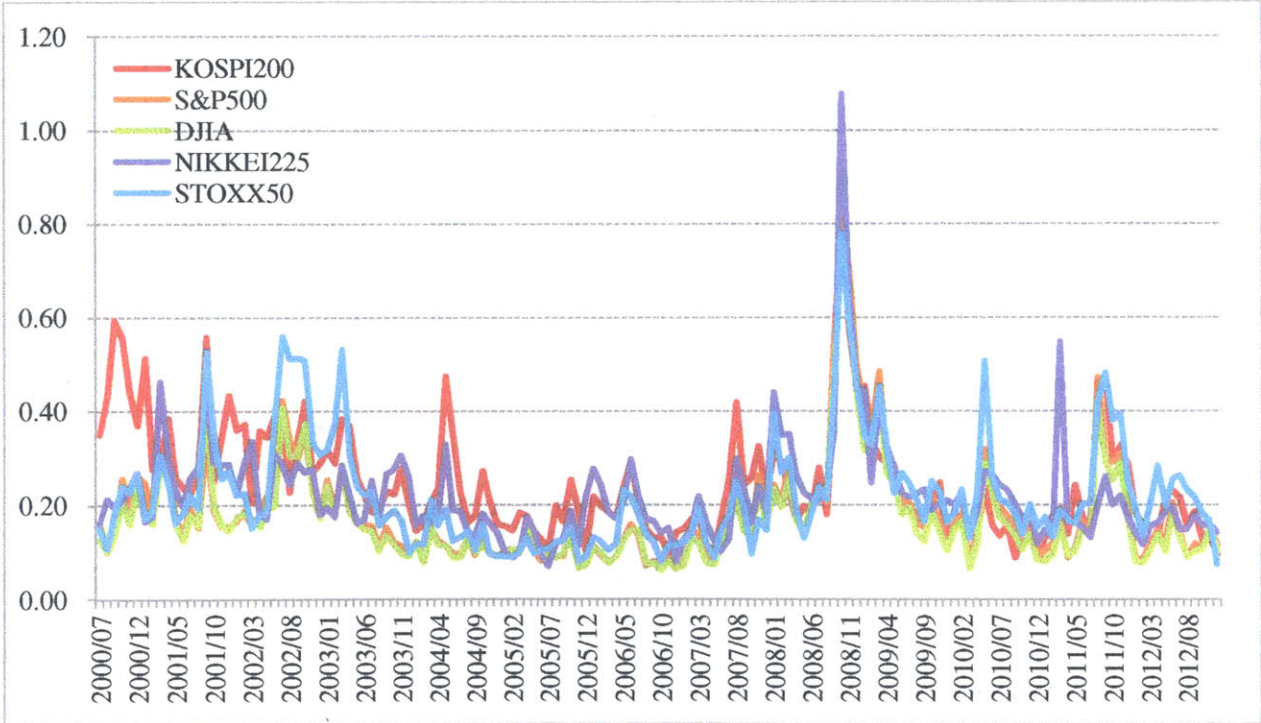
⁷ NIKKEI.com, Retrieved from <http://indexes.nikkei.co.jp/en/nkave/archives/data>

⁸ STOXX.com, Retrieved from http://www.stoxx.com/indices/index_information.html?symbol=sx5E

shown in the table 10, the volatility of KOSPI200 has been higher than the volatilities of other major indices in most of periods. In terms of the past 10-year volatility, KOSPI200 is the most volatile among five major indices. As the time span of data becomes shorter and therefore focuses more on the recent data, the STOXX50 has shown the most volatile price changes due to the recent crisis of the Euro area. The 1-year and 3-year volatility of STOXX50 was the highest among five major indices, followed by the volatility of KOSPI200 index. The KOSPI200 can be regarded as the most volatile index for the recent 10 years among major equity indices. It is also worth noting that the decreasing volatility for the recent periods seems to have a relationship with the decreasing proportion of individual investors and decreasing market shares in the global equity index market.

[Graph 3: Historical Volatilities of Major Equity Indices]

(Unit: Percentage)



Source: sources represented in the footnotes and own analysis

Section 2(d): Contribution of Individual Investors and Foreigners

In order to examine how evenly three major types of investors have taken the proportion of KOSPI200 futures and options, we can refer to the recent 3 year data of the trading volume. In 2012, foreigners accounted for 40.3% and 46.4% of the trading volume in KOSPI200 call and put market, respectively. Individuals and foreigners tend to have more market shares in put options than in call options, whereas institutional investors have more shares in call options than put options. The KOSPI200 futures market shows a similar feature of evenly distributed market shares among the three types of investors. The proportion of institutional has decreased, whereas the proportion of foreigners has increased in both futures and options markets.

[Table 11: Trading Volume by the Type of Investors for the Recent 3 Years]

(Unit: Number of Contracts)

Products	Year	Institutional	Individuals	Foreigners	Grand Total
KOSPI200 Options Call	2010	1,368,216,360 (38.7%)	1,135,147,421 (32.1%)	1,035,590,277 (29.3%)	3,538,954,058 (100.0%)
	2011	1,294,202,985 (32.9%)	1,245,469,789 (31.6%)	1,396,529,628 (35.5%)	3,936,202,402 (100.0%)
	2012	531,007,330 (32.2%)	453,959,480 (27.5%)	664,157,346 (40.3%)	1,649,124,156 (100.0%)
KOSPI200 Options Put	2010	1,104,574,857 (31.5%)	1,154,833,370 (32.9%)	1,253,434,839 (35.7%)	3,512,843,066 (100.0%)
	2011	885,448,729 (26.0%)	1,099,049,208 (32.3%)	1,422,624,183 (41.8%)	3,407,122,120 (100.0%)
	2012	379,866,339 (25.3%)	424,756,952 (28.3%)	697,041,051 (46.4%)	1,501,664,342 (100.0%)
KOSPI200 Futures	2010	75,330,955 (43.4%)	47,019,076 (27.1%)	51,175,921 (29.5%)	173,525,952 (100.0%)
	2011	61,753,326 (35.4%)	57,921,532 (33.2%)	54,874,064 (31.4%)	174,548,922 (100.0%)
	2012	36,511,272 (29.2%)	40,168,639 (32.2%)	48,181,369 (38.6%)	124,861,280 (100.0%)

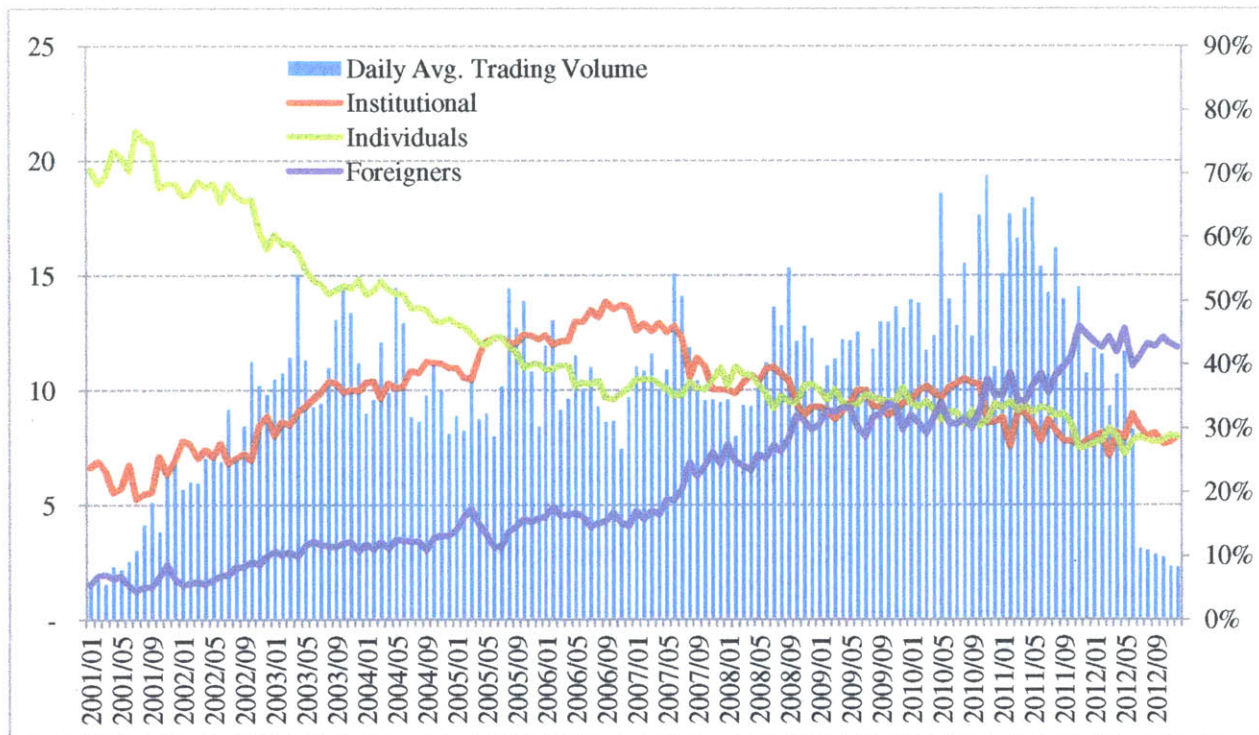
Source: KRX and own analysis

1) The numbers of contracts above are the sum of purchase and sales in each product category.

From the time series perspective in the KRX market, the proportion of foreigners has steadily increased throughout the recent 12 years. In contrast, the proportion of individuals has fallen down and the proportion of institutional investors has shown a relatively moderate phase. As shown in the graph 4, the trend of foreigners' proportion seems to fit well into the movement of the daily average trading volume. Thus, a proportion of foreigners can be regarded as an independent variable, explaining the time-series change of the daily average trading volume. More details will be discussed in the regression analysis section in this paper.

[Graph 4: Daily Average Trading Volume and Portions of Type of Investors]

(Unit: Millions of Contracts, %)



Source: KRX and own analysis

1) Daily average trading volume is the total volume of KOSPI200 options and futures in KRX.

Another interesting feature about KOSPI200 options is that open interest has been relatively small as compared to its trading volume. The ratio of open interests to the daily average trading volume has been gradually decreased as shown in the table 12. Relatively less open interests indicate that a large amount of day trading occur frequently.⁹ It is highly likely that frequent day trading results from the speculative transactions of individual investors, although there is no official statistic on the speculative trading.

[Table 12: Ratio of Open Interest to Daily Average Trading Volume in KOSPI200 Options]

(Unit: Number of Contracts)

Year	KOSPI200 Futures			KOSPI200 Options		
	Daily Avg. Trading Volume	Open Interest	Ratio	Daily Avg. Trading Volume	Open Interest	Ratio
2000	81,604	38,992	0.47782	804,270	733,367	0.91184
2001	128,058	51,653	0.40336	3,364,706	2,124,741	0.63488
2002	175,689	67,770	0.38574	7,745,179	3,192,382	0.41218
2003	251,841	89,652	0.35599	11,488,765	4,033,979	0.35112
2004	220,182	-	-	10,126,736	3,384,285	0.33419
2005	172,774	-	-	10,181,533	3,416,441	0.33555
2006	184,665	-	-	9,774,992	3,434,524	0.35136
2007	190,500	-	-	11,015,626	3,864,875	0.35085
2008	263,304	-	-	11,155,139	3,687,520	0.33057
2009	324,044	-	-	11,545,418	3,536,603	0.30632
2010	341,888	103,668	0.30322	14,047,405	4,600,105	0.32747
2011	347,263	109,275	0.31468	14,805,090	3,659,435	0.24717
2012	247,056	107,375	0.43462	6,352,396	1,697,298	0.26719

Source: KRX and own analysis

1) Ratio means the proportion of open interests over daily average trading volume.

⁹ Cho, J. (2004). An Analysis of KOSPI200 Futures and Options Markets. 66.

The KRX and related authorities point out that the excessive speculative trading of individual investors is the biggest problem in Korean derivatives market. Many regulatory policies in the KRX have aimed at setting limitations on speculative trading and discouraging individual investors. It is controversial to argue that a large proportion of individual investors should be pulled down to the stable level.

However, it is true that the individual investors have taken a relatively larger proportion in KRX than in other derivatives markets. The gain or loss from transactions of KOSPI200 futures and options in 2002 and 2003 is represented in the table 13. Individual investors were reported to take huge losses and these losses were reversed to gains of financial institutions and foreigners.

[Table 13: Gain or Loss in KOSPI200 Futures and Options]

(Unit: 100 Million KRW)

Investors	KOSPI200 Futures		KOSPI200 Options		Total	
	2002	2003	2002	2003	2002	2003
Individuals	Δ1,789	Δ123	Δ6,089	Δ3,466	Δ7,878	Δ3,589
Institutions	1,216	Δ1,630	3,642	1,928	4,857	298
Foreigners	574	1,753	2,447	1,538	3,021	3,291

Source: Cho, J. (2004). An Analysis of KOSPI200 Futures and Options Markets. 70.

If we divide the gain or loss within the category of individual investors in KOSPI200 options, the loss of small individual investors becomes larger. 30% of total accounts reported 271 billion KRW of gain, whereas remaining 70% reported 660 billion KRW of loss from January to July 2004. The most of remaining 70% was estimated to be accounts of small individual investors and their average loss per account was known to reach 20 million KRW, which was a severe damage to small investors.

[Table 14: Gain or Loss in KOSPI200 Futures and Options (Jan to July 2004)]

(Unit: 100 Million KRW, %)

Products	Individuals			Foreigners		
	Gain or Loss	# of Accounts	Ratio	Gain or Loss	# of Accounts	Ratio
KOSPI200 Futures	+ 2,331	9,205	35%	+5,742	133	47%
	<u>- 3,213</u>	<u>16,950</u>	65%	<u>-4,672</u>	<u>153</u>	53%
	-882	26,155	-	+1,070	286	-
KOSPI200 Options	+2,711	12,553	30%	+3,407	98	55%
	<u>-6,603</u>	<u>28,865</u>	70%	<u>-1,646</u>	<u>79</u>	45%
	-3,832	41,418	-	+1,761	177	-

Source: Cho, J. (2004). An Analysis of KOSPI200 Futures and Options Markets. 71.

1) Ratio means each number of accounts over total accounts.

From this analysis on the open interest and gain or loss, we can understand why the authorities in Korea have addressed a series of policy changes such as increasing the contract size and increasing margin requirement to discourage individual investors from speculative trading. These actions seem to be successful in the sense that the proportion of individual investors has gradually decreased so far. However, the proportion of individual investors is still higher than the proportions of other exchanges.

From the cross-sectional perspective, the most prominent feature in the KOSPI200 options and futures market is that individuals stand shoulder to shoulder with institutional and foreign investors as compared to other major markets in the world. The average proportion of individuals in other equity index markets such as the U.S. and Japan has been estimated to be the 10% level. As shown in the table 15, the proportion of individuals of NIKKEI225 mini futures was 12% to 15%. For the same period, the proportion of individual investors in Korean market was 27% to 35%, which is much higher than Japanese market.

[Table 15: Comparison of KOSPI200 Futures and NIKKEI225 Mini Futures]

(Unit: Number of Contracts, %)

Product	Year	Institutional	Individual	Foreigners	Grand Total
KOSPI200 Futures	2009	67,613,403 (40.7%)	56,945,802 (34.3%)	41,674,855 (25.1%)	166,234,060 (100.0%)
	2010	75,330,955 (43.4%)	47,019,076 (27.1%)	51,175,921 (29.5%)	173,525,952 (100.0%)
	2011	61,753,955 (35.4%)	57,921,532 (33.2%)	54,874,064 (31.4%)	174,548,922 (100.0%)
	2012	36,511,272 (29.2%)	40,168,639 (32.2%)	48,181,369 (38.6%)	124,861,280 (100.0%)
NIKKEI225 Mini Futures	2009	3,477,063 (10.0%)	4,323,866 (12.5%)	26,886,252 (77.5%)	34,687,181 (100.0%)
	2010	2,821,482 (9.0%)	4,528,717 (14.4%)	24,165,352 (76.7%)	31,515,551 (100.0%)
	2011	2,533,919 (8.6%)	3,631,695 (12.3%)	23,252,527 (79.0%)	29,418,141 (100.0%)
	2012	2,919,078 (9.4%)	4,093,461 (13.2%)	24,003,376 (77.4%)	31,015,915 (100.0%)

Source: KRX and OSE (Osaka Securities Exchange)

1) The figures above are the sum of purchase and sales in each product category.

As aforementioned, KOSPI200 options and KOSPI200 futures are ranked at 1st and 15th in the top 20 equity index futures and options category in 2011 as represented in the table 16. If we assume that the portion of individuals is roughly 30% in KOSPI200 options and it stands for the total trading volume of KOSPI200 options, the annual trading volume would have been 1.06 billion and 1.10 billion contracts in 2010 and 2011, respectively. This means that the trading volume of only individuals in Korea was large enough to take the 1st place in the world equity index derivatives market. The retail investors in Korea certainly have provided the solid base to differentiate the KRX from other exchanges in the world.

[Table 16: Top 20 Equity Index Futures & Options Contracts in 2011]

(Unit: Number of Contracts, %)

Rank	Product	2010	2011	% Change
1	KOSPI200 200 Options	3,525,898,562	3,671,662,258	4.1%
1(e)	Individuals portion of KISPI200 Options	1,057,769,569(e)	1,101,498,677(e)	-
2	S&P CNX Nifty Index Options, NSE India	528,831,609	868,684,582	64.3%
3	SPDR S&P 500 ETF Options	456,863,881	729,478,419	59.7%
4	E-mini S&P 500 Index Futures, CME	555,328,670	620,368,790	11.7%
5	Euro Stoxx 50 Futures, Eurex	372,229,766	408,860,002	9.8%

Source: FIA, (2012). Annual Volume Survey – Volume Climbs 11.4% to 25 Billion Contracts Worldwide. 31.

Section 2(e): Contract Size (Multiplier)

Many official authorities dealing with disclosing data on derivatives products measure the trading volume by the number of contracts traded. The number of contracts represents how many transactions have been made by investors for a certain period of time regardless of the type of derivatives products and the value of underlying assets. Other measuring standards such as the value of trading volume are disclosed to provide investors with a sense of monetary value among a variety of products using different monetary units.

Given the fact that the number of contracts is widely used for measuring trading volume as a representative measuring standard, the contract size or multiplier should be the crucial factor for deciding how many transactions would occur. If a contract size for a certain product cut by a half, the total trading volume would be doubled, assuming the total value of the trading stays the same. Whether the total value would stay the same or not, of course, is not obvious and depends on many factors such as the type of products and the feature of investors. For instance, retail investors might be discouraged by the increase of contract size, because they have to invest more money for generating a transaction and some of them can't afford to do it. On the other hand, an

increase of the contract size may offer more efficient way to trade to the institutional investors, resulting in the increase of the number of contracts. One thing quite obvious is that the change of the contract size has the most direct impact on the trading volume, and investors generally tend to reduce their frequency of trading as the contract size becomes bigger. The ¹⁰Futures Industry Association explained that size differences contributed to a general impression that Asia's high volumes are not as meaningful as what we see on the mature U.S. and European exchanges. However, it said that the size issue could cut both ways. Much of the growth in the U.S. market came from higher trading of options on exchange-traded funds, which are typically one-tenth the size of the comparable index options.

From the time-series perspective, the KRX announced the increase of KOSPI200 option's multiplier from 100,000 KRW to 500,000 KRW, which is the same as that for KOSPI200 futures on March 2012. The exact effective date was March 9th, 2012. The multiplier of 100,000 KRW was temporarily maintained for options with the maturity of April, May, and June 2012 which had already been issued before March 2012. From June 2012, a new multiplier of 500,000 KRW was applied to all KOSPI200 options.

The purpose of this change was to discourage retail investors from the excessive speculation. As shown in the table 17 and graph 5, the impact of size change was quite obvious. The daily average trading volume of KOSPI200 options started to decrease dramatically from June 2012, when the increased contract size was applied to all KOSPI200 options. The trading volume on June 2012 was roughly 8.0 million which was only 53.0% of the trading volume of the same month of previous year. The trading volumes from July 2012 to February 2013 were pushed down to roughly 20% level of the same months of previous year.

¹⁰ FIA, (2012). Annual Volume Survey – Volume Climbs 11.4% to 25 Billion Contracts Worldwide. 26.

[Table 17: Daily Average Trading Volume Change of KOSPI200 Options]

(Unit: Number of Contracts, %)

Before Change		After Change		
Yr/Mo	Daily Avg. Trading Volume	Yr/Mo	Daily Avg. Trading Volume	% compared to same month of previous year
2011/03	16,234,730	2012/03	9,061,532	55.8%
2011/04	17,615,605	2012/04	10,436,476	59.2%
2011/05	18,095,586	2012/05	11,377,592	62.9%
2011/06	15,038,283	2012/06	7,967,817	53.0%
2011/07	13,952,561	2012/07	2,789,801	20.0%
2011/08	15,707,313	2012/08	2,754,634	17.5%
2011/09	13,506,764	2012/09	2,600,156	19.3%
2011/10	11,201,804	2012/10	2,483,054	22.2%
2011/11	14,142,968	2012/11	2,105,477	14.9%
2011/12	10,461,826	2012/12	2,096,302	20.0%
2012/01	11,544,805	2013/01	2,443,989	21.2%
2012/02	11,286,282	2013/02	2,399,864	21.3%

Source: KRX and own analysis

According to the Futures Industry Association in 2012, the total trading volume of all global futures and options from January to June 2012 has decreased by 10.2% as compared to the trading volume for the same six months in 2011. The global equity index category showed a little more drop of 14.4% than the drop of entire futures and options market. In contrast to this relatively moderate contraction of the global trading volume, KOSPI200 options showed dramatic decrease by 37.0% for the same period. This is, of course, the biggest contraction of the trading volume among the top 10 equity index futures and options market worldwide. Other equity index products showed one-digit change except RTS Futures and Sensex Options.

[Table 18: Global Futures and Options Trading Volume in 2012]

(Unit: Number of Contracts, %)

Product	Jan-Jun 2011	Jan-Jun 2012	% Change
Futures	5,996,398,463	5,465,477,858	-8.9%
Options	6,397,917,930	5,661,789,242	-11.5%
Total	12,394,316,393	11,127,267,100	-10.2%

Source: FIA, (2012). Trading Volume. 10.

[Table 19: Top 20 Equity Index Futures & Options Contracts in 2012]

(Unit: Number of Contracts, %)

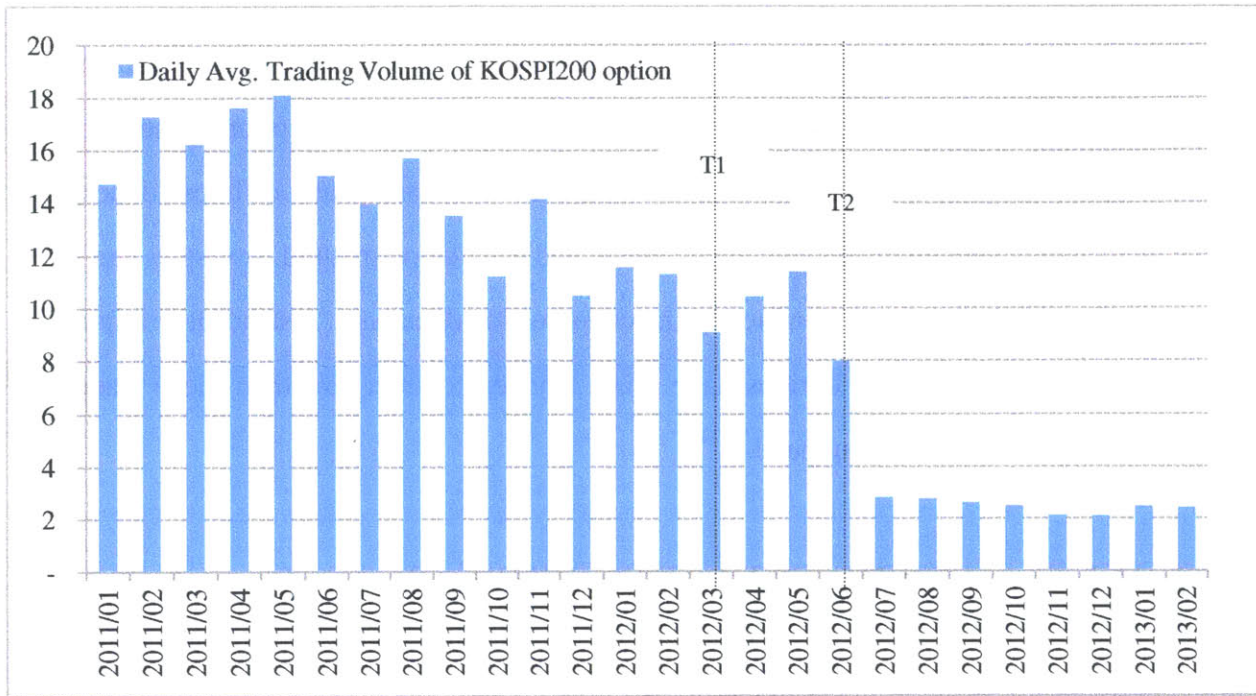
Rank	Product	Jan-Jun 2011	Jan-Jun 2012	% Change
1	KOSPI200 200 Options	2,008,082,595	1,265,215,495	-37.0%
2	S&P CNX Nifty Index Options, NSE India	403,222,935	422,225,379	4.7%
3	SPDR S&P 500 ETF Options	288,117,455	301,292,178	4.6%
4	E-mini S&P 500 Futures, CME	270,461,007	249,730,377	-7.7%
5	Euro Stoxx 50 Futures, Eurex	183,401,694	175,401,268	-4.4%
6	RTS Futures, Micex-RTS	153,328,205	169,447,648	10.5%
7	Euro Stoxx 50 Options, Eurex	152,150,133	154,594,357	1.6%
8	Sensex Options, BSE	3,348	89,688,041	26,785.5%
9	S&P 500 Options, CBOE	83,754,830	87,566,887	4.6%
10	iShares Russell 2000 ETF Options	75,352,463	68,814,525	-8.7%
Total	Equity Indices Category Worldwide	4,166,481,794	3,566,358,850	-14.4%

Source: FIA, (2012). Trading Volume. 14.

The graph 5 shows the time-series change of the daily average trading volume of KOSPI200 options. We can visually see the dramatic decrease of the trading volume after contract size change.

[Graph 5: Daily Average Trading Volume of KOSPI200 Options]

(Unit: Millions of Contracts)



Source: KRX

- 1) T1: March, 2012 (100,000 KRW→500,000 KRW, effective date of change)
- 2) T2: June, 2012 (500,000 KRW started to be applied to all KOSPI200 options.)

Considering the fact that the trading volume of KOSPI200 options showed more prominent decrease from July 2012 (which is not reflected in the statistic of the Futures Industry as of the end of February 2013), we can surely assume that the change in contract size affects the trading volume substantially. One of the main objectives of increasing contract size was to discourage individual investors from excessive speculation. Many research papers published by Korean securities companies point out that increasing contract size will decrease the proportion of individual investors due to the lack of funding capital and increased burden of margin requirement. However, there are dissenting opinions which doubt on the effect of increasing

contract size. They argue that individual investors are likely to turn to relatively cheap OTM options, possibly resulting in more speculation.

From the cross-sectional perspective, it is less worthwhile to compare the contract size among different exchanges worldwide. The reason is that the derivatives products are based on the different underlying equity indices and the level of equity indices are totally different depending upon the history of listing on public exchange market and calculation method. Investors can refer to the value of trading volume for conducting the cross-sectional analysis, instead. It is important to keep in mind that KOSPI200 options have much smaller contract size than those traded in most other exchanges especially in the U.S.¹¹

[Table 20: Multipliers of Top 20 Equity Index Futures and Options]

(Unit: Monetary Amount, as of September 2012)

Contract	Index Multiplier	Contract	Index Multiplier
KOSPI200 Options	500,000 KRW	Nikkei 225 Mini Futures	100 Yen
S&P CNX Nifty Index Options	100 Indian rupees	Powershares QQQ ETF Options	N/A
SPDR S&P 500 EFT Options	N/A	VIX Options	100 U.S. Dollars
E-mini S&P 500 Index Futures	50 U.S. Dollars	Taix Options	50 New Taiwan dollars
Euro Stoxx 50 Futures	10 Euros	S&P CNX Nifty Index Futures	100 Indian rupees
RTS Index Futures	2 U.S. Dollars	CSI 300 Futures	300 Chinese renminbi
Euro Stoxx 50 Index Options	10 Euros	iShares MSCI Emerging Markets Index	N/A
Sensex Options	15 Indian rupees	KOSPI 200 Futures	500,000 KRW
S&P 500 Options	100 U.S. Dollars	E-mini Nasdaq 100 Futures	20 U.S. Dollars
iShares Russell 2000 ETF Options	N/A	TA-25 Index Options	100 New Israeli shekels

Source: FIA, (2012). Trading Volume. 14.

¹¹ World Federation of Exchanges, (2011). IOMA/IOCA Derivatives Market Survey 2010. 22.

Section 2(f): Margin Requirement

The margin requirement refers to collaterals deposited by investors in advance to guarantee the future payments of loss. By putting collaterals, the market can improve the stability of transactions and mitigate the counterparty risk.

The margin of the KRX is categorized by paying entity and time of payment. Under the type of paying entity, “Member margin” is paid by member companies to the KRX and “Customer margin” is paid by customers to member companies. Under the type of time of payment, “Pre-margin” is collected before accepting order and “Post-margin” is collected after the end of trading at the market. Member margin is subject to post-margin. However, with regard to customer margin, currently only qualified institutional investors who are deemed to have adequate capability to fulfill the settlement obligations are subject to post-margin. Maintenance margin refers to a certain level of margin which should be maintained to continue taking an existing position. If the value of position falls below the maintenance margin, investors have to put variation margin up to the level of initial margin. The current margin rates in the KRX are represented in the table 21 below.

[Table 21: Current Margin Rate for KOSPI200 Options and Futures]

(Unit: Percentage)

Type	Member margin rate	Customer margin rate	Maintenance margin rate
KOSPI200 Futures	9.0%	13.5%	9.0%
KOSPI200 Options	9.0%	13.5%	9.0%

Source: KRX

The current KRX’s COMS (Composite Optimized Margin System) evaluates adequate margin level based on the net risk exposures throughout the entire portfolio. The final margin level is

determined by summing margins of different product groups which have similar characteristics of underlying assets. The pre-margin shall be an amount exceeding the sum of each of the following amounts: amount equivalent to sum of orders, amount equivalent to net risk exposures based on the previous day, amount equivalent to net loss of the day, and net settlement amount of the day. Post-margin shall be an amount exceeding the following amounts: amount equivalent to net risk exposures based on the day and net settlement amount of the day.

In order to set the appropriate margin rate in a timely manner, the KRX reviews margin rates on a quarterly basis. If it is deemed necessary to adjust the margin rate, the rate is adjusted. The amount equivalent to sum of orders is calculated by applying a specific percentage (13.5%) to the value of transaction, whereas the amount equivalent to net risk exposures is determined by considering the maximum loss of a portfolio and the canceling-out effect among different types of derivatives products.

Since the inception of KOSPI200 options and futures, pre-margin requirement had been set at a certain amount until the COMS started to be distributed in 2007. After that, pre-margin started to be represented as a certain percentage rather than absolute amount of money. On July 2010, the KRX began to intervene directly in the market by reflecting the price volatility of underlying assets in the previous quarter into the margin rate. For instance, the customer margin rate increased from 13.5% to 15.0% in the 1st quarter of 2011 due to the crisis of Euro zone.

The current margin system of the KRX was taken a shape at the end of October 2011 for the purpose of improving risk management of derivatives portfolios and stabilizing the settlement. The biggest change was to include the change of volatility as well as the change of price into calculating the net risk exposures as explained in the table 22 and 23.

[Table 22: Change of Calculating Net Risk Exposure *Before October 2011*]

(Unit: Dollar Change)

Products	Loss by Intervals				
Underlying asset	S_{-15}	S_{-14}	S_0	S_{+14}	S_{+15}
KOSPI200 Futures	F_{-15}	F_{-14}	F_0	F_{+14}	F_{+15}
KOSPI200 Call	C_{-15}	C_{-14}	C_0	C_{+14}	C_{+15}
KOSPI200 Put	P_{+15}	P_{+14}	P_0	P_{-14}	P_{-15}
Total	$F_{-15} + C_{-15} + P_{+15}$	$F_{-14} + C_{-14} + P_{+14}$	$F_0 + C_0 + P_0$	$F_{+14} + C_{+14} + P_{-14}$	$F_{+15} + C_{+15} + P_{-15}$

Source: KRX and Samsung Securities

- 1) S_{-15} : stock price after 15% decrease from S_0 , F_{-15} : futures price after 15% decrease from S_0
- 2) C_{-15} : call price after 15% decrease from S_0 , P_{+15} : put price after 15% decrease from S_0

[Table 23: Change of Calculating Net Risk Exposure *After October 2011*]

(Unit: Dollar Change)

Products	Loss by Intervals				
Underlying asset	S_{-15}	S_{-14}	S_0	S_{+14}	S_{+15}
KOSPI200 Futures	F_{-15}	F_{-14}	F_0	F_{+14}	F_{+15}
KOSPI200 Call (Volatility increase)	$C_{-15,H}$	$C_{-14,H}$	$C_{0,H}$	$C_{+14,H}$	$C_{+15,H}$
KOSPI200 Call (Volatility decrease)	$C_{-15,L}$	$C_{-14,L}$	$C_{0,L}$	$C_{+14,L}$	$C_{+15,L}$
KOSPI200 Put (Volatility increase)	$P_{+15,H}$	$P_{+14,H}$	$P_{0,H}$	$P_{-14,H}$	$P_{-15,H}$
KOSPI200 Put (Volatility decrease)	$P_{+15,L}$	$P_{+14,L}$	$P_{0,L}$	$P_{-14,L}$	$P_{-15,L}$
Total	$F_{-15} + C_{-15,H:L} + P_{+15,H:L}$	$F_{-14} + C_{-14,H:L} + P_{+14,H:L}$	$F_0 + C_{0,H:L} + P_{0,H:L}$	$F_{+14} + C_{+14,H:L} + P_{-14,H:L}$	$F_{+15} + C_{+15,H:L} + P_{-15,H:L}$

Source: KRX and Samsung Securities

- 1) $C_{-15,H}$: call price after 15% decrease from S_0 when volatility increased
- 2) $P_{+15,L}$: put price after 15% decrease from S_0 when volatility decreased

Among various types of margin requirement, I would like to focus on the customer margin, which is equivalent to initial margin. One reason is that investors, especially those who considering newly initiating derivatives transactions are mostly concerned about the initial margin rather than maintenance margin or variation margin. Another reason could be that the

change of maintenance margin or variation margin trails the change of initial margin so that it is enough to examine the change of initial margin in order to find out the relationship between the trading volume and margin requirement change.

From the time-series perspective, the relationship between the daily average trading volume and the change of margin requirement can be examined by taking a look at the two phases: one phase from the inception of KOSPI200 options to the end of 2006 (when the pre-margin was set at a fixed amount of money) and another phase from 2010 to 2013 (when margin requirements were represented as a specific percentage).

The pre-margin changes during the first phase were represented in the table 24. As shown in the graph 6, the daily average trading volume showed an increasing pattern after the decrease of pre-margin to 10 million KRW on February 2000. The pattern maintained after the additional decrease of pre-margin to 5 million KRW on February 2001. After the increase of pre-margin to 15 million KRW on March 2003, the trading volume showed an overall decreasing pattern.

[Table 24: Pre-Margin Change for KOSPI200 Options and Futures]

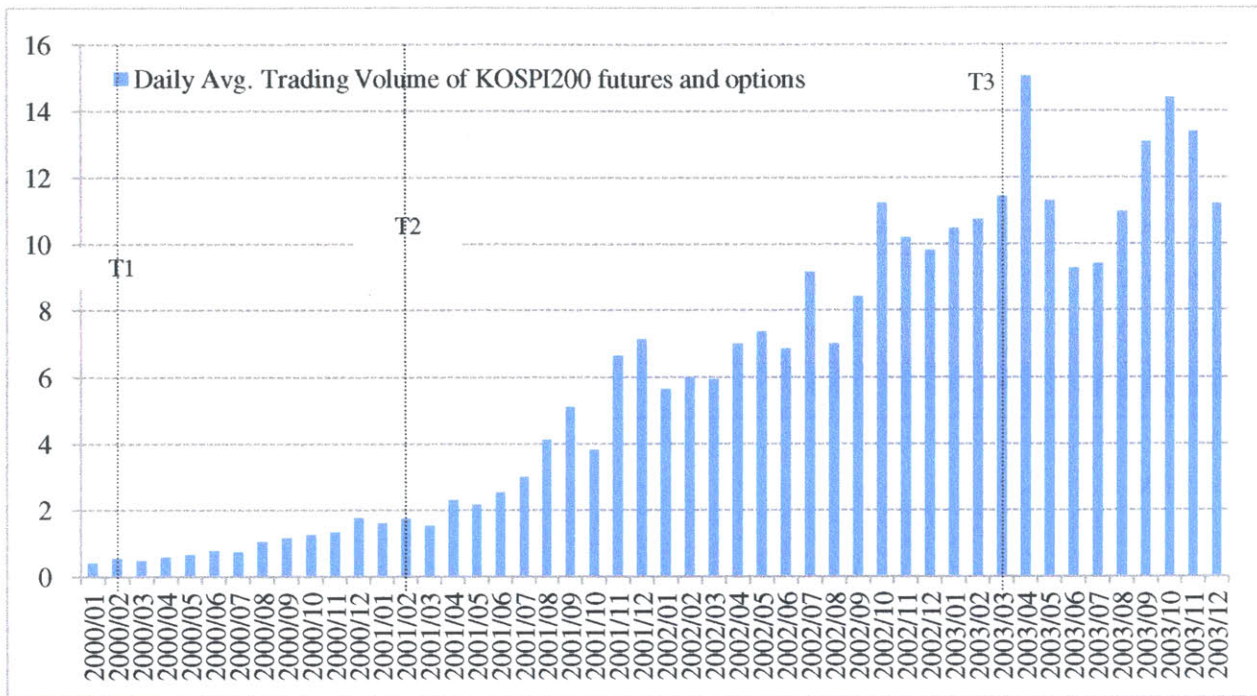
(Unit: KRW)

Date	Pre-margin	Change	Remark
May, 1996	30,000,000	-	Inception of KOSPI200 futures
July, 1997	10,000,000	Decrease	Inception of KOSPI200 options
November, 1997	30,000,000	Increase	-
February, 2000	10,000,000	Decrease	-
February, 2001	5,000,000	Decrease	-
March, 2003	15,000,000	Increase	-
December, 2006	Varies	-	According to the type of clients

Source: Moon, S., Lee, D., Yang, S., & Yoo, Y. (2007). The Intervention Effect of COMS Change on Trading Volume and Individual Investor Weight in KOSPI 200 Futures and Option Market. 9.

[Graph 6: Daily Average Trading Volume Pattern for 1st Phase]

(Unit: Million KRW)



Source: KRX

1) T1: February, 2000 (30 mil→10 mil), T2: February, 2001 (10 mil→5 mil), T3: March, 2003 (5 mil→15 mil)

2) Daily trading volume is the sum of trading volume of KOSPI200 options and futures.

During the second phase, the KRX changed the initial margin requirement several times. The relationship between the trading volume and the change of initial margin requirement was not as clear as the relationship in the first phase. The daily average trading volume showed a small increase in November and substantial decrease on December 2010 after initial margin requirements decrease on October 2010. The increase of initial margin requirements on October 2011 drove the trading volume downward generally, though there were ups and downs.

It is hard to analyze the effect of the last increase of initial margin requirement on January 2013, since the contract size of KOSPI200 options increased from 100,000 KRW to 500,000 KRW on

March 2012. The change of contract size is believed to have much more impact on the trading volume than the change of margin requirement does.

[Table 25: Margin Requirement Change for KOSPI200 Options and Futures]

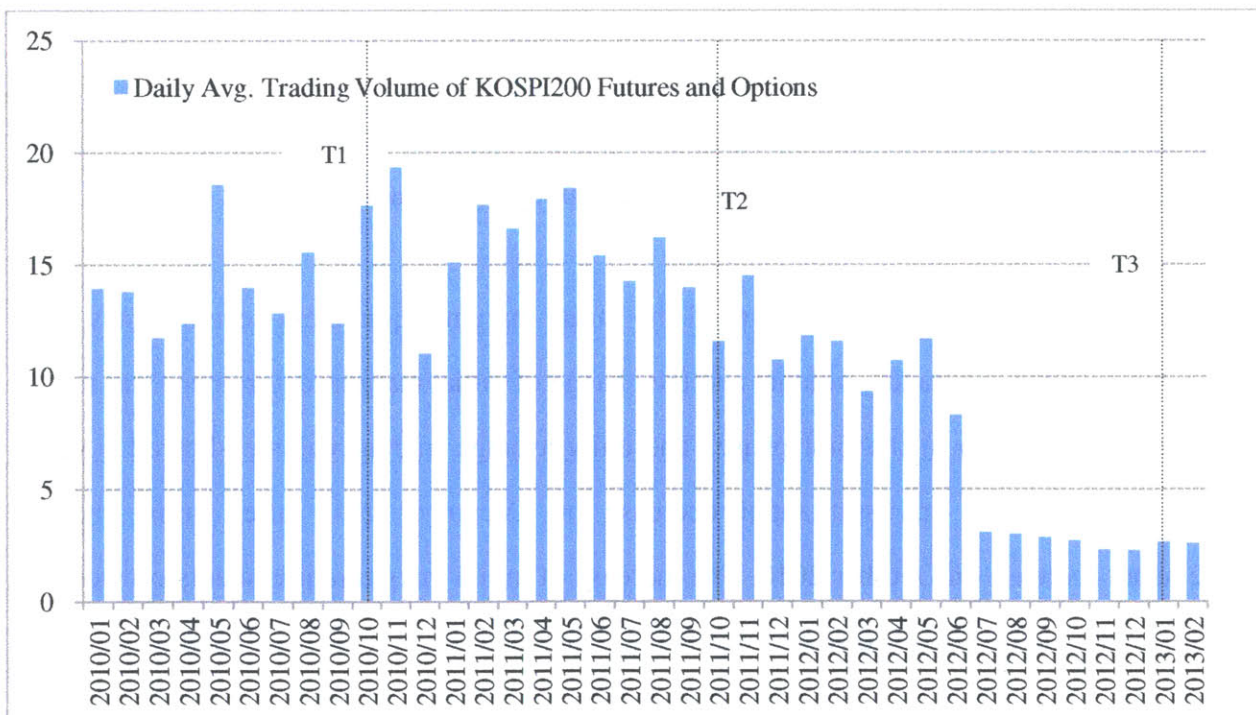
(Unit: Percentage)

Date	Member margin	Customer margin	Maintenance margin	Change
October, 2010	9.0%	13.5%	9.0%	Decrease
October, 2011	10.0%	15.0%	10.0%	Increase
January, 2013	9.0%	13.5%	9.0%	Decrease

Source: KRX

[Graph 7: Daily Average Trading Volume Pattern for 2nd Phase]

(Unit: Million KRW)



Source: KRX

1) T1: October, 2010 (15.0%→13.5%), T2: October, 2011 (13.5%→15.0%), T3: January, 2013 (15.0%→13.5%)

There seems to be a general relationship between the trading volume and the change of margin requirement. The increase of margin requirement causes the increase of required deposit and reduces the leveraging effect, resulting in discouraging investors from participating in this market. Individual investors are more likely to be affected by this change of margin requirement, because they tend to participate in the derivative market for the speculation and they do not have enough funding capabilities than institutional investors have.

The KRX has been confronted with a concern of discouraging individual investors from imprudent participation. The change of margin requirement and contract size is the typical example of direct intervention of authorities to the market. One thesis¹² examines whether changes in margin requirements affect the composition of investors, especially the proportion of individual investors. This thesis concludes that reducing the margin levels has a statistically significant effect, but differences appear insufficient to achieve the desired regulatory impact. On the other hand, the intervention effect of increasing margin levels on the proportion of individual investors is not always significant. Another thesis¹³ points out that there was a negative relationship in general between the change of pre-margin and the change of the trading volume and/or the proportion of individual investors. It also mentioned that the impact of pre-margin change on the trading volume and the proportion of individual investors were not the same depending on the type of derivatives products (futures or options). The increase of pre-margin caused statistically significant decrease of the trading volume of futures transactions, but had no statistically significant impact on the proportion of individual investors. In contrast, this paper also points out that the decrease of pre-margin led to statistically significant increase of the

¹² Kwon, S. (2011). An Analysis of the Impact of Changing the Pre-margin Level on the Proportion of Individual Investors in the KOSPI200 Option Market.

¹³ Moon, S., Lee, D., Yang, S., & Yoo, Y. (2007). The Intervention Effect of COMS Change on Trading Volume and Individual Investor Weight in KOSPI 200 Futures and Option Market.

proportion of individual investors, but the effect on the trading volume of options transactions was not statistically significant.

From the cross-sectional perspective, it is difficult to compare the margin requirement levels across the different products and different exchanges. The reason has to do with the fact that different exchanges adopt the different margin requirement scheme based on various factors. Fishe, Goldberg, Gosnell, and Sinha described in their paper¹⁴ that CBOT decided the proper level of margin requirement based on price of futures or options, price volatility, daily price change range, open interests and trading volume, and special market environment. If one exchange applies a certain percentage to calculating initial margin and considers price volatility of underlying assets as well as daily possible price fall, it is hard to compare the level of margin with another exchange which adopts simpler margin scheme. For these reasons, we need simplifying assumptions for comparing the margin requirement levels across the difference exchanges.

If investors buy a naked call option on KOSPI200, the initial margin is determined by multiplying the price of option, the number of contracts, and the contract size (multiplier).

- Example: Buying 1 contract for 2.54 pt

$$2.54 * 1 * 500,000 \text{ KRW} = \underline{1,270,000 \text{ KRW}}$$

The initial margin for writing KOSPI200 options is the greatest of the following three calculations multiplied by the number of contracts and the contract size (multiplier).

- (1): Modified theoretical price
- (2): Maximum theoretical price – Closing price of previous day
- (3): Minimum margin per contract (=1)

¹⁴ Fishe, R. H., Goldberg, L.G., Gosnell, T. F., & Sinha, S. (1990). Margin Requirements in Futures Markets: Their relationship to Price Volatility. *Journal of Futures Markets* 5, 541-554.

Modified theoretical price¹⁵

(Theoretical price when KOSPI index increases/decreases two times of margin rate – Closing price of previous day) * 30%

Maximum theoretical price¹⁶

(Theoretical price when KOSPI index increases (call option)/decreases (put option) as much as margin rate)

- Example: Writing a call option 252.5 (strike price), closing price of previous day = 4.15

(1): $(68.233497 - 4.15) * 30\% = 19.225$

(2): $(31.862227 - 4.15) = 27.7122$

(3): 1

(4): $\text{Max}(19.225, 27.7122, 1) * 1 * 500,000 \text{ KRW} = \underline{13,856,114 \text{ KRW}}$

The different calculation method of margin requirement is applied to the stock index option in the U.S. market. The initial margin required by the CBOE for a written naked stock index call option is the greater of the following two calculations multiplied by the number of contracts and contract size (multiplier)¹⁷.

(1): A total of 100% of the proceeds of the sale + 15% of the underlying share price – the amount by which the option is out of the money

(2): A total of 100% of the proceeds + 10% of the underlying share price

The initial margin for a written naked stock index put option is decided by the same formula above except that 10% of the exercise price is applied to calculation instead of 10% of underlying share price.

¹⁵ Modified theoretical price can be found in the website of KRX, <http://www.krx.co.kr>

¹⁶ Maximum theoretical price can be found in the website of KRX, <http://www.krx.co.kr>

¹⁷ Hull, J. C. (2011). *Options, futures, and other derivatives – 8th edition*. U.S: Pearson Education.

For the purpose of comparison, I applied the calculation method of KOSPI200 options to the CBOE and regarded the result as the estimated margin level of KOSPI200 options. Under several assumptions represented in the footnote of the table 26 below, the initial margin of KOSPI200 options is roughly 40% to 60% of that of S&P500 index options being traded in the CBOE. The margin requirement is the crucial factor for deciding the leverage of derivatives transactions and the entry barrier for speculative investors. From this result, we can infer that the low level of margin requirement of KOSPI200 options as compared to S&P500 options contributes to the high trading volume of KOSPI200 options significantly. The major objective of changes in margin requirement rate in the KRX was to discourage excessive speculative trading by individual investors according to public release of the KRX.

[Table 26: Comparison of Initial Margin across Two Products]

(Unit: \$, Ratio, %)

Stock Price	Moneyess	S&P500 Options (1)	KOSPI200 options (2)	(2) / (1)
\$30	1.3333	\$800	\$450	56.25%
\$32	1.2500	\$820	\$480	58.54%
\$34	1.1765	\$840	\$510	60.71%
\$36	1.1111	\$860	\$540	62.79%
\$38	1.0526	\$880	\$570	64.77%
\$40	1.0000	\$1,100	\$600	54.55%
\$42	0.9524	\$1,130	\$630	55.75%
\$44	0.9091	\$1,160	\$660	56.90%
\$46	0.8696	\$1,190	\$690	57.98%

Source: Own analysis

- 1) Number of contract=1, Multiplier=\$100, Current option price=\$5, Strike price=\$40
- 2) Moneyess is the ratio of strike price over stock price.
- 3) Initial margin rate=15.0% for both KOSPI200 options and S&P500 options.
- 4) If stock price changes 15%, option price changes by the change of intrinsic value ignoring the time value.

Section 2(g): Tax

The tax for transactions of derivatives products can be divided into two major categories: transaction tax and the tax for capital gains. Investors can gain interest and dividend income by holding derivatives products. Investors can also obtain capital gain which means the difference between the purchasing price and selling price at the time of disposal.

The tax authority of Korea has charged corporate tax for all types of income including interest, dividends and capital gains to corporations. In contrast, individuals have been exempted from withholding tax for income and dividend gains. For the tax for capital gains, only major shareholders and those who own unlisted stocks have been charged the tax. No tax for the capital gain of derivatives products has been charged to individual investors historically. On the other hand, the transaction tax has been applied to the equity transaction. If equity transactions occur in the stock exchange market, 0.15% of transaction tax and another 0.15% of farming and fishing village special tax are charged. If investors sell stocks in KOSDAQ market, 0.3% of transaction tax is charged to investors. However, transactions of derivatives products are exempt from transaction tax.

From the time-series perspective, we cannot analyze the relationship between the trading volume and the tax rate, just because there has been no tax applied to the transaction of derivatives products in Korea. Instead, we can take a look what relationship would exist between two factors in Korean derivatives market by analyzing the case of other countries.

Taiwan adopted the transaction tax for derivatives on June 1998 with the introduction of "Futures Transaction Tax Act". At the time of initiation, 0.05% of transaction tax was charged. The level of tax had decreased several times since 1998 and reached at 0.004% in 2008. The table 27 clearly represents the decrease of tax has contributed to the increase of the trading volume in Taiwan. The weight of TAIFEX (Taiwan Futures Exchange) has increased from 29.1%

in 1999 to 61.9% in 2010 by taking the trading volume from SGX (Singapore Exchange). From this case, we can infer that the advent of tax in Korean market would discourage the trading volume.

[Table 27: Change of Trading Volume in TAIFEX and SGX]

(Unit: 1,000 Contracts, %)

Year	TAIFEX			SGX			Tax (%)
	Daily Avg. Trading Vol	Change (%)	Weight (%)	Daily Avg. Trading Vol	Change (%)	Weight (%)	
1999	3,653	-	29.1	8,881	-	70.9	0.05
2000	4,944	35.3	28.3	12,510	40.9	71.7	0.05→0.025
2001	11,659	135.8	42.2	15,995	27.9	57.8	-
2002	16,661	42.9	47.2	18,662	16.7	52.8	-
2003	26,163	57	54.4	21,911	17.4	45.6	-
2004	35,445	35.5	55.9	27,995	27.8	44.1	-
2005	28,006	Δ21.0	46.1	32,794	17.1	53.9	-
2006	39,980	42.8	47.8	43,646	33.1	52.2	0.025→0.01
2007	47,827	19.6	46.5	55,107	26.3	53.5	-
2008	79,279	65.8	54.0	67,653	22.8	46.0	0.01→0.004
2009	97,332	22.8	61.0	62,127	Δ8.2	39.0	-
2010	100,928	3.7	61.9	62,059	Δ0.1	38.1	-

Source: Tax Law Association, (2012). A Study on Appropriate Policy on Adoption of Transaction Fees. 31.

1) "Weight" is the relative proportion between TAIFEX and SGX

From the cross-sectional perspective, Korea is one of many countries which do not charge any tax for transaction of derivatives products. As shown in the table 28, most advanced countries which have large-size derivative exchanges including the U.S. and Japan currently charge tax for capital gains from derivatives products. Taiwan is the only country which charges transaction tax for derivatives products. Considering the fact that tax is surely the most concern for both hedgers

and speculators, no tax scheme for derivative transactions in Korea has contributed a lot to the successful growth of Korean derivatives market.

[Table 28: Tax Scheme of Major Countries on Equity and Derivatives]

Country	Equity		Derivatives		Remark
	Transaction Tax	Tax on Capital Gain	Transaction Tax	Tax on Capital Gain	
South Korea	O	X	X	X	Corporate Tax (10%, 20%, or 22%)
The U.S	X	O	X	O	Maximum tax: 39.6%
Japan	X	O	X	O	Equity: 10%, Derivatives: 20%
United Kingdom	O	O	X	O	10%~28%
France	X	O	X	O	32.3%
Germany	X	O	X	O	28%
Spain	X	O	X	O	Equity: 18%, Futures: 15%
Swiss	O	X	X	X	-
Netherland	X	X	X	X	-
Luxembourg	X	X	X	X	-
Greece	O	X	X	X	-
Belgium	X	X	X	X	-
Australia	X	O	X	X	-
Brazil	X	O	X	O	-
Mexico	X	X	X	X	-
Taiwan	O	X	O	X	Futures: 0.004%, Option: 0.1%
Singapore	O	X	X	X	-
Hong Kong	O	X	X	X	-
Thailand	O	X	X	X	-
Malaysia	O	X	X	X	-

Source: Tax Law Association, (2012). A Study on Appropriate Policy on Adoption of Transaction Fees. 24.

The government of Korea is considering the new adoption of tax for derivatives products as of the end of 2012. Those who are favorable to the adoption of tax for derivatives products argue that by doing so the government can obtain a large amount of tax revenue and effectively control the excessive speculation of individual investors. On the other hand, those who are against the adoption of tax insist that new tax scheme could hamper the development of Korean derivatives market and the tax revenue is expected to be shrank rather than increased due to other negative effects such as decreasing corporate tax driven by the decrease in revenue of securities companies.

Section 2(h): Transaction Fee

Transaction fee is a direct cost which reduces the realized return of derivatives investment. The transaction fee should be one of the most crucial factors for both hedgers and speculators. In contrast to volatility which is always uncertain, the transaction fee is certain and known before generating transactions. Thus, there is no doubt that the increase of transaction fees discourages the transactions. It affects the individual investors more, because they lack the funding capacity. There are two types of transaction fees in the KRX as elsewhere. One is charged by the KRX to securities companies and another is charged by securities companies for consignment. The KRX currently charge 0.00021% for the trading value of KOSPI200 futures and 0.010944% for the trading value of KOSPI200 options as of the end of 2012.

From the time-series perspective, the KRX had decreased the level of transaction fees a total of six times since 2005 and reached at the current lowest level worldwide. The level of transaction fee charged by securities companies to customers is the lowest level as compared to other countries because the most trading has been incurred based on the Internet trading. According to public release titled “The Impact of Transaction Tax of Derivatives Products and the Prospectus of Tax Change”, the average transaction fee charged by top five securities companies to

customers through Home Trading System was 0.0056% for KOSPI200 futures and 0.19% for KOSPI200 options. These transaction fee level charged by securities companies to investors is also known to be the lowest level in the world.

There is no official data on the change of transaction fees charged by securities companies to customers because the fee level depends on the company's discretion. However, the overall fee level has been also decreased in accordance with the decrease of transaction fee charged by the KRX to securities companies. Thus, I would like to examine the relationship between the trading volume of KOSPI200 options and the transaction fee level based on the transaction fee charged by the KRX to securities companies, not the fee charged by securities companies to individuals.

As represented in the table 29 and graph 8, the trading volume of KOSPI200 options has been gradually increased starting from 2005 to 2011. The impact of fee reduction is not as clear as the impact of other factors such as contract size or margin requirement. For example, the trading volume of August 2005 increased after the transaction fee decreased on July 2005. The decrease of transaction fee on May 2008 also led to the increase of the next month's trading volume on June 2008. However, the reduction of the transaction fee in 2006 and 2010 caused the contraction of the next month's trading volume.

This is not because there is no relationship between the transaction fee and trading volume, but because there has been other factors affecting trading volume to move in the opposite direction to the direction implied by the change of transaction fee. Although there seems to be not strong relationship between the trading volume and transaction fee, there should be a clear relationship in reality on the ground that the individual investors have taken a significant proportion of the Korean derivatives market and individual investors tend to be surely sensitive to direct costs.

[Table 29: Change of Transaction Fees of KOSPI200 Futures and Options]

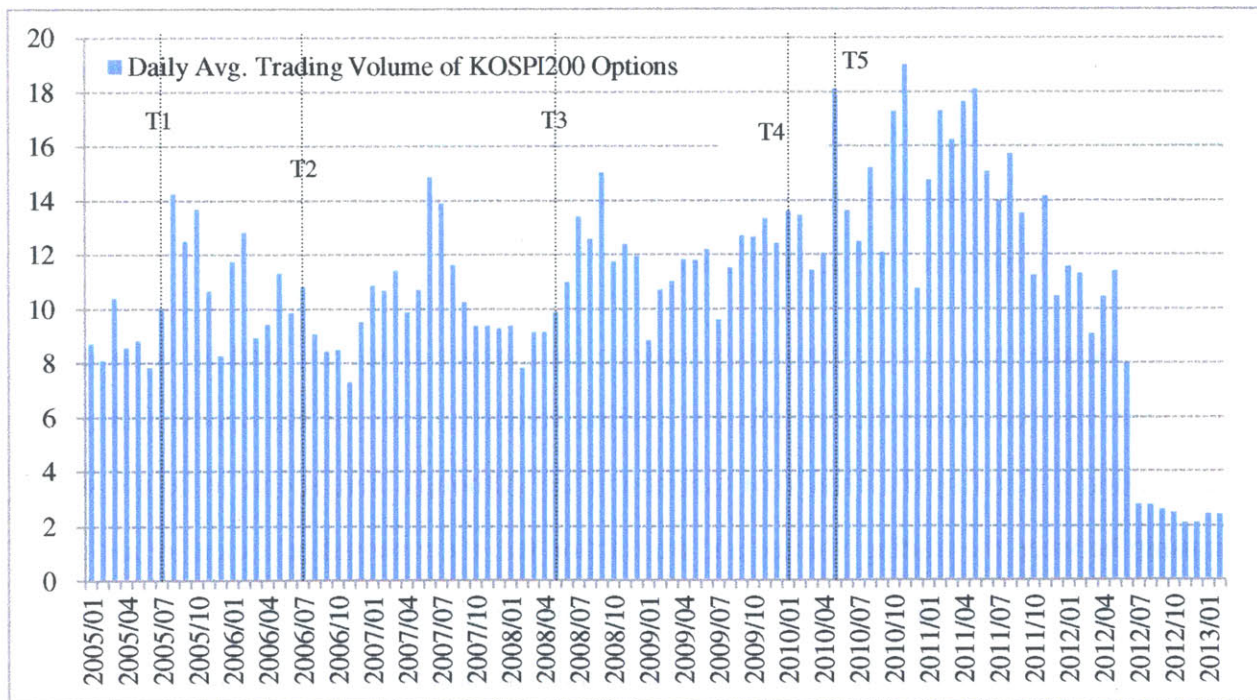
(Unit: Percentage)

Date	KOSPI200 Futures	Change	KOSPI200 Options	Change
Before	0.000675%	-	0.028125%	-
July, 2005	0.000540%	20% Decrease	0.022500%	20% Decrease
July, 2006	0.000513%	5% Decrease	0.021375%	5% Decrease
May, 2008	0.000410%	20% Decrease	0.017100%	20% Decrease
January, 2010	0.000328%	20% Decrease	0.013680%	20% Decrease
May, 2010	0.000263%	20% Decrease	0.010944%	20% Decrease
May, 2012	0.000210%	20% Decrease	0.010944%	Unchanged

Source: KRX

[Graph 8: Daily Trading Volume of KOSPI200 Options Since 2005]

(Unit: Million KRW)



- 1) T1: July, 2005 (0.028125%→0.022500%), T2: July, 2006 (0.022500%→0.021375%)
- 2) T3: May, 2008 (0.021375%→0.017100%), T4: January, 2010 (0.017100%→0.013680%)
- 3) T5: May, 2010 (0.013680%→0.010944%)

From the cross-sectional perspective, the level of transaction fee of KOSPI200 futures and options has been the lowest level among a variety of similar type of derivatives products in the world as shown in the table 30. The main contributing factor for maintaining the low transaction fees has to do with the authority's intention to share the KRX's benefit of increasing trading volume with securities companies and final investors in Korean derivatives market. The Board of Audit and Inspection in Korea has pointed out that the KRX's profit has been excessive, thus should be controlled. As represented in the tables 30 and 31, the transaction fee level of KOSPI200 futures and options is the lowest among many different exchanges. Other renowned exchanges such as in the U.S. and Europe show the lower fee level than other exchanges. From this comparison result across different exchanges, we can argue that the low transaction fee of KOSPI200 futures and options has contributed to differentiate the KRX from other competitors.

[Table 30: Transaction Fee Comparison among Equity Index Futures]

(Unit: Amount of Money, %)

Rank	Products	Contract Size	Fee level per contract
1	KOSPI200 Futures, KRX, Korea	KRW 500,000	0.00021000%
2	DAX, Eurex, Europe	€ 25	0.00028552%
3	CAC40, Euronext-Liffe, Great Britain	€ 10	0.00036387%
4	S&P500, CME, U.S.	USD 250	0.00046345%
5	Dow Jones, CBOT, U.S.	USD 10	0.00074311%
6	SPI200, Australia	AD 25	0.00076185%
7	HangSeng, Hong Kong	HD 50	0.00088044%
8	DJ Euro Stoxx50, Eurex, Europe	€ 10	0.00107218%
9	E-mini S&P500, CME, U.S.	USD 50	0.00115861%
10	Volatility, CBOE, U.S.	USD 100	0.04870921%

Source: Tax Law Association, (2012). A Study on Appropriate Policy on Adoption of Transaction Fees. 15.

- 1) Other exchanges charge a fixed amount per contract, whereas KRX charges a fixed percentage for trading value.
- 2) Average exchange rate from January 2011 to August 2011 is applied into calculation
- 3) Fee level is calculated by dividing a fixed amount of fee per contract by average trading value per contract.

[Table 31: Transaction Fee Comparison among Equity Index Options]

(Unit: Amount of Money, %)

Rank	Products	Contract Size	Fee level per contract
1	KOSPI200 Options, KRX, Korea	KRW 100,000	0.0000454%
2	E-mini S&P500, CME, U.S.	USD 50	0.0002472%
3	S&P500, CBOE, U.S.	USD 100	0.0003399%
4	FTSE100, Euronext-Liffe, Europe	£10	0.0004238%
5	SPI200, Australia	AD 25	0.0005079%
6	CAC40, Euronext-Liffe, Great Britain	€ 10	0.0005198%
7	Dow Jones, CBOT, U.S.	USD 10	0.0007431%
8	HangSeng, Hong Kong	HD 50	0.0008804%
9	DJ Euro Stoxx50, Eurex, Europe	€ 10	0.0010722%
10	DAX, Eurex, Europe	€ 5	0.0014276%

Source: Tax Law Association, (2012). A Study on Appropriate Policy on Adoption of Transaction Fees. 16.

- 1) Other exchanges charge a fixed amount per contract, whereas KRX charges a fixed percentage for trading value.
- 2) Average exchange rate from January 2011 to August 2011 is applied into calculation
- 3) Fee level is calculated by dividing a fixed amount of fee per contract by average trading value per contract.
- 4) Fee of KOSPI200 options is converted into a fixed amount per contract for the ease of comparison.

Section 2(i): Result of the Cross-Sectional Analysis

Tax and Transaction Fee

Tax and transaction fee are the most prominent factors which can differentiate the Korean derivatives market from other competing exchanges. No tax has been applied to derivatives transactions in Korea. In contrast, other advanced countries which have the most liquid derivatives exchanges have charged the tax for capital gains from disposal of derivatives products. The U.S, Japan, United Kingdom, and France were examples of the advanced countries which have charged the tax for capital gains. Likewise, the transaction fee level of the KRX has

been the lowest among many competing products in different exchanges. The fee level of 0.0000454% of KOSPI200 index options is far lower than the fee levels of other products (E-mini S&P500 (CME): 0.0002472%, S&P500 (CBOE): 0.0003399%, FTSE100 Euronext-Liffe (Europe): 0.0004238%). Tax and transaction fee have the most direct and clear impact on the investment decision on the grounds that these are the direct costs which should be deducted from the realized return and are known to investors before initiating transactions. All rational investors regardless of hedgers or speculators have to consider these direct costs before deciding where they invest their money.

Margin Requirement

The margin requirement also has contributed to the KRX's global presence in the sense that high level of margin requirement raises an entry barrier, thus discourages potential investors. The initial margin of the KRX has been roughly 55% to 65% of the initial margin of S&P500 options under several assumptions. This means that investors in KOSPI200 index options are able to avoid high burden of putting more collaterals in their accounts. Thus, it is believed that the KRX has provided the best environment for especially small individual investors who have the limited funding capacity.

Volatility and Proportion of Individual Investors

High volatility and high proportion of individual investors have provided the solid ground to support the high trading volume in the KRX. The annual standard deviation of the underlying KOSPI200 index was 24.56%, the highest among major five equity indices (KOSPI200, S&P500, DJIA, NIKKEI225, and STOXX50). Speculators naturally prefer high volatilities, because high volatilities represent the high chance of big gains. Hedgers who have the original positions in equity position and worry about the price fluctuation due to high volatility in the KRX can mitigate the price change risk by taking positions in derivatives products. The proportion of individual investors in KOSPI200 index options was roughly 30% at the end of 2011 in terms of

the trading volume. This proportion is quite high as compared to the roughly 10% of proportion in other exchanges such as the U.S. or Japan. The individual investors' trading volume of 1.1 billion out of the total trading volume of 3.7 billion in KOSPI200 options exceeded the total trading volume of S&P CNX Nifty Index Options, which was ranked at 2nd in the global equity index options and futures in 2011. The common feature of volatility and the proportion of investors is that two measures showed decreasing pattern in the most recent years. This decreasing pattern of two measures has to do with the fact that the recent global market shares of KOSPI200 index options decreased for the recent periods.

Contract Size

Lastly, it is hard to say that relatively small contract size of KOSPI200 index options has been the crucial factor for explaining the high trading volume in the KRX. The reason is that many different equity index options are based on the different underlying indices and different monetary units.

Section 2(j): Result of the Time-Series Analysis

For the recent 152 months from July 2000 to February 2013, I examined the relationship between the trading volume and six explanatory factors through multiple regression analysis, focusing on KOSPI200 options. The y-variable is the daily average trading volume of KOSPI200 options and the six x-variables are historical volatility, the proportion of foreigners, the proportion of individuals, contract size, initial margin level, and transaction fees. Tax is excluded from regression analysis, since there has been no change in tax during the sample period.

Proportion of Individual Investors, Contract Size, and Margin Requirement

As shown in the table 32 below, it turns out that daily average trading volume of KOSPI200 options a statistically significant relationship with three factors: the proportion of individuals, contract size, and initial margin level. According to the result of regression analysis, all three

factors have negative relationships with the change of the trading volume, meaning that increase of three factors pushes down the daily average trading volume during the sample period. The R square is 64.72%, and adjusted R square is 63.26%.

[Table 32: Regression Result]

	Coefficients	Standard Error	T-stat	P-value
Intercept	34022523.76	6527432.89	5.2122	6.3043
Volatility	-2170026.75	2434559.44	-0.8913	0.3742
Proportion of Foreigners	526461.50	6236543.31	0.0844	0.9328
Proportion of Individuals	-24892688.60	4977328.99	-5.0012	1.6231
Contract Size	-27.12	2.51	-10.8108	2.3965
Margin	-73674090.58	33569931.59	-2.1946	0.0297
Transaction Fee	5259686287.24	10876969355.62	0.4836	0.6294

Source: Own analysis

The contract size and initial margin level are directly associated with the required capital from investors' perspective, as shown in the previous analysis. Two factors turn out to have negative impact on the trading volume of the KOSPI200 options through the regression analysis focusing on the Korean derivatives market. As the contract size increases and/or initial margin increases, the trading volume decreases because of increased burden of putting more money for generating transactions.

The proportion of individual investors which have contributed significantly to the rapid growth of the Korean derivatives market is proved to have negative correlation with the trading volume. The reason might be that the decrease of the proportion of individuals has been successfully replaced by the increase of the proportion of foreigners, resulting in the increase of the total trading volume. The fact that the proportion of foreigners has a positive relationship with the trading volume supports this idea, though its t-stat is not significant.

Transaction Fee and Volatility

The transaction fee and historical volatility turn out to be statistically insignificant. The reason might be that the impact of these two factors is hid by the impact of other factors during the sample period.

Part 3: Conclusion

I have examined six factors for the purpose of explaining why the Korean derivatives market has shown such a fast growth rate for the recent years and what caused the change of the trading volume of KOSPI200 options and futures. I have mainly analyzed the data on KOSPI200 options and attempted to include the data on KOSPI200 futures as long as both products share the common features. Because KOSPI200 options solely accounted for 93.5% and 85.8% of the total trading volume in Korean derivatives market in 2011 and 2012, respectively, it is no exaggeration to say that KOSPI200 options can represent the entire Korean derivatives market. The market shares of KOSPI200 index options in the global equity index derivatives products were 47.5% and 43.4% in 2011 and 2012, respectively.

From the cross-sectional analysis, I find out that low level of transaction fee, tax, and margin requirement have been the crucial factors differentiating the KRX from other competing exchanges in the world. High level of volatility and proportion of individual investors have also contributed to the global presence of KOSPI200 options. From the time-series analysis, contract size, margin requirement, and proportion of individual investors have negative relationships with the trading volume of KOSPI200 options. The regression result tells us that contract size has the most obvious relationship with the trading volume. Margin requirement and proportion of individual investors also shows statistically significant relationships with the trading volume.

Appendix

[Specification of KOSPI 200 Futures]

Underlying Asset	KOSPI 200 Futures
Contract Size	KOSPI 200 Futures price times KRW 500,000
Contract Months	The four consecutive near months from the quarterly cycle(March, June, September and December)
Trading Hours	09:00 ~ 15:15(09:00 ~ 14:50 on the last trading day)
Tick Size & Value	0.05 point(KRW 25,000)
Last Trading Day	Second Thursday of the contract month
Final Settlement Day	The following day of the last trading day
Final Settlement	Cash
Daily Price Limit	±10% of the base price
Position Limit	5,000 contracts (for individuals), 10,000 contracts (for others)
Circuit Breakers	When the lead month contract hits ±5% of the previous closing price for 1 minute, and the difference between the current price and the theoretical price is ± 3% or more, the trading of all contracts are halted for next five minutes. For the next ten minutes following the cooling-off period, orders are collected and then matched at a single price. As well, the futures and options markets are automatically suspended if the stock market is halted. Trading in the stock market is halted for twenty minutes if the KOSPI falls 10% or more from the previous closing value and this continues for one minute or longer.
Listing date	03-May-96

[Specification of KOSPI 200 Options]

Underlying Asset	KOSPI 200 Options
Contract Size	KOSPI 200 Options price times KRW 500,000
Contract Months	The three consecutive near months plus one nearest month from the quarterly cycle (March, June, September and December)
Trading Hours	9:00 ~ 15:15 (9:00 ~ 14:50 on the last trading day)
Tick Size & Value	0.05 point(KRW 25,000) for 3 point or more of premium 0.01 point(KRW 5,000) for less than 3 point of premium
Strike Price Interval	Upon the admission of the options, at least 13 strike prices(six are in-the-money, one is at-the-money and six are out-of-the-money) shall be set at interval of 2.5 points for the three consecutive near-term month contracts Upon the admission of the options, at least 7 strike prices(three are in-the-money, one is at-the-money and three are out-of-the-money) shall be set at interval of 5.0 points for the next quarterly month contract
Last Trading Day	Second Thursday of the contract month
Final Settlement Day	The following day of the last trading day
Final Settlement	Cash
Exercise Style	European (exercisable only at expiration)
Circuit Breakers	When the lead month contract of KOSPI200 Futures hits $\pm 5\%$ of the previous closing price for 1 minute, and the difference between the current price and the theoretical price is $\pm 3\%$ or more, the trading of all contracts are halted for next five minutes. For the next ten minutes following the cooling-off period, orders are collected and then matched at a single price. As well, the futures and options markets are automatically suspended if the stock market is halted. Trading in the stock market is halted for twenty minutes if the KOSPI falls 10% or more from the previous closing value and this continues for one minute or longer.
Listing date	07-Jul-97

[Trading Volume/Value of Major Derivatives Products in KRX for the Recent 13 Years]

(Unit: Number of Contracts, Million KRW)

Products	Year	Total Trading Volume (# of contracts)	Daily Avg. Trading Volume (# of contracts)	Daily Avg. Trading Value (million KRW)
KOSPI200 Options Call	2000	112,127,519	465,259	35,396
	2001	460,733,049	1,872,899	113,958
	2002	1,053,998,304	4,319,665	288,969
	2003	1,482,177,025	6,000,717	346,808
	2004	1,315,200,830	5,281,931	295,387
	2005	1,310,426,228	5,262,756	304,841
	2006	1,208,176,106	4,891,401	285,236
	2007	1,460,773,450	5,938,103	459,522
	2008	1,564,965,032	6,310,343	536,977
	2009	1,466,185,536	5,795,200	498,971
	2010	1,769,477,029	7,049,709	616,780
	2011	1,968,101,200	7,935,892	820,768
	2012	824,562,078	3,324,847	620,256
KOSPI200 Options Put	2000	81,701,551	339,011	33,570
	2001	362,556,559	1,473,807	78,498
	2002	835,825,482	3,425,514	224,259
	2003	1,355,547,928	5,488,048	299,696
	2004	1,206,356,444	4,844,805	285,695
	2005	1,224,775,465	4,918,777	260,723
	2006	1,206,246,849	4,883,590	299,921
	2007	1,249,070,627	5,077,523	428,175
	2008	1,201,509,372	4,844,796	621,204
	2009	1,454,805,119	5,750,218	515,172
	2010	1,756,421,533	6,997,695	650,391
	2011	1,703,561,058	6,869,198	938,612
	2012	750,832,171	3,027,549	608,312
KOSPI200 Futures	2000	19,666,518	81,604	3,567,266
	2001	31,379,866	127,560	4,569,290
	2002	42,462,216	174,025	8,114,508
	2003	61,556,063	249,215	10,726,146
	2004	54,825,244	220,182	11,791,007
	2005	43,020,684	172,774	11,996,154
	2006	45,612,214	184,665	16,137,529
	2007	46,862,948	190,500	21,033,018
	2008	65,299,373	263,304	24,712,193
	2009	81,983,142	324,044	29,833,129
	2010	85,814,008	341,888	39,190,421
	2011	86,121,231	347,263	44,810,810
	2012	61,269,882	247,056	31,430,424

Source: KRX

[Trading Volume of Major Products by the Type of Investors in KRX]

(Unit: 1,000 Contracts)

	Year	Institutional Investors							Individual	Foreigners	Grand Total
		Financial Investment	Insurance	Invest Trusts	Banks	Other Financial	Pension, Gov't, etc	Total			
KOSPI 200 Options Call	2006	1,082,641	3,086	35,869	1,772	14,636	2,942	1,140,946	921,546	353,861	2,416,352
	2007	1,288,167	12,464	12,971	8,855	10,986	5,639	1,339,082	1,086,321	496,144	2,921,547
	2008	1,175,504	15,036	9,187	2,712	12,671	14,714	1,229,825	1,114,123	785,982	3,129,930
	2009	1,006,346	11,369	13,489	976	10,945	9,395	1,052,519	1,042,023	837,829	2,932,371
	2010	1,277,612	36,475	29,772	835	17,849	5,673	1,368,216	1,135,147	1,035,590	3,538,954
	2011	1,258,191	4,945	4,922	390	25,450	303	1,294,203	1,245,470	1,396,530	3,936,202
	2012	517,993	1,459	2,019	224	9,190	122	531,007	453,959	664,157	1,649,124
KOSPI 200 Options Put	2006	1,053,711	3,880	36,946	3,215	15,759	3,511	1,117,022	885,074	410,398	2,412,494
	2007	937,375	12,407	15,087	5,310	11,882	5,670	987,732	911,573	598,836	2,498,141
	2008	751,504	11,056	6,263	2,746	11,807	9,067	792,442	872,345	738,231	2,403,019
	2009	839,530	12,544	14,763	859	13,364	10,379	891,440	989,568	1,028,603	2,909,610
	2010	979,603	59,383	34,771	936	21,613	8,270	1,104,575	1,154,833	1,253,435	3,512,843
	2011	852,582	3,401	4,185	343	24,635	303	885,449	1,099,049	1,422,624	3,407,122
	2012	366,881	1,257	2,381	191	9,032	124	379,866	424,757	697,041	1,501,664
KOSPI 200 Futures	2006	26,192	175	2,695	980	2,048	325	32,415	37,435	23,362	93,212
	2007	31,248	338	2,373	711	1,738	218	36,625	34,266	24,626	95,517
	2008	44,035	260	3,714	956	1,384	217	50,566	49,211	33,091	132,868
	2009	61,437	582	3,025	496	1,690	383	67,613	56,946	41,675	166,234
	2010	69,854	323	1,347	538	2,793	476	75,331	47,019	51,176	173,526
	2011	55,629	464	1,750	460	2,610	841	61,753	57,922	54,874	174,549
	2012	32,336	388	1,499	465	1,001	823	36,511	40,169	48,181	124,861
KTB 3-year Futures	2006	7,316	416	1,689	7,517	231	123	17,293	437	2,957	20,687
	2007	10,432	387	1,600	10,552	286	114	23,371	549	3,190	27,110
	2008	14,562	473	1,342	10,646	512	228	27,764	1,192	2,866	31,822
	2009	19,929	694	1,897	10,539	344	382	33,786	2,969	3,346	40,102
	2010	30,468	1,397	1,361	12,428	234	598	46,487	4,902	4,338	55,727
	2011	40,379	1,389	1,418	13,961	192	640	57,979	3,992	6,309	68,280
	2012	37,434	622	1,044	10,876	112	420	50,507	1,496	7,453	59,456
USD Futures	2006	1,734	26	1,082	2,183	282	0.061	5,306	495	409	6,209
	2007	2,040	96	3,278	4,912	314	0.898	10,641	292	571	11,504
	2008	3,038	85	2,678	5,395	584	1	11,781	914	621	13,316
	2009	26,647	391	8,061	26,969	3,982	0	66,049	10,905	5,369	82,324
	2010	51,767	749	9,858	27,034	6,602	0	96,010	20,709	14,669	131,387
	2011	59,083	875	7,882	22,633	7,330	37	97,839	20,807	21,779	140,425
	2012	40,936	879	6,173	19,527	5,665	101	73,281	11,912	21,905	107,099

Source: KRX

[Trading Volume Percentage of Major Products by the Type of Investors in KRX]

(Unit: Percentage)

Products	Year	Institutional Investors							Individual	Foreigners	Grand Total
		Financial Investment	Insurance	Invest Trusts	Banks	Other Financial	Pension, Gov't, etc	Total			
KOSPI 200 Options Call	2006	44.80	0.13	1.48	0.07	0.60	0.12	47.20	38.14	14.64	100.00
	2007	44.09	0.43	0.44	0.30	0.38	0.19	45.83	37.18	16.98	100.00
	2008	37.56	0.48	0.29	0.09	0.40	0.47	39.29	35.60	25.11	100.00
	2009	34.32	0.39	0.46	0.03	0.37	0.32	35.89	35.54	28.57	100.00
	2010	36.10	1.03	0.84	0.02	0.50	0.16	38.65	32.08	29.26	100.00
	2011	31.96	0.13	0.13	0.01	0.64	0.01	32.88	31.64	35.48	100.00
	2012	31.41	0.09	0.12	0.01	0.56	0.01	32.20	27.53	40.27	100.00
KOSPI 200 Options Put	2006	43.68	0.16	1.53	0.13	0.65	0.15	46.30	36.69	17.01	100.00
	2007	37.52	0.50	0.60	0.21	0.47	0.23	39.53	36.49	23.97	100.00
	2008	31.27	0.46	0.26	0.11	0.49	0.38	32.97	36.30	30.72	100.00
	2009	28.85	0.43	0.51	0.03	0.46	0.36	30.64	34.01	35.35	100.00
	2010	27.89	1.69	0.99	0.03	0.61	0.24	31.45	32.87	35.68	100.00
	2011	25.02	0.10	0.12	0.01	0.72	0.01	25.98	32.26	41.75	100.00
	2012	24.43	0.08	0.16	0.01	0.60	0.01	25.29	28.29	46.42	100.00
KOSPI 200 Futures	2006	28.10	0.19	2.89	1.05	2.20	0.35	34.78	40.16	25.06	100.00
	2007	32.71	0.35	2.48	0.74	1.82	0.23	38.33	35.87	25.78	100.00
	2008	33.14	0.20	2.80	0.72	1.04	0.16	38.06	37.04	24.90	100.00
	2009	36.96	0.35	1.82	0.30	1.02	0.23	40.68	34.26	25.07	100.00
	2010	40.26	0.19	0.78	0.31	1.61	0.27	43.42	27.10	29.49	100.00
	2011	31.87	0.27	1.00	0.26	1.50	0.48	35.38	33.18	31.44	100.00
	2012	25.90	0.31	1.20	0.37	0.80	0.66	29.24	32.17	38.59	100.00
KTB 3-year Futures	2006	35.36	2.01	8.16	36.34	1.12	0.60	83.59	2.11	14.30	100.00
	2007	38.48	1.43	5.90	38.92	1.06	0.42	86.21	2.03	11.77	100.00
	2008	45.76	1.49	4.22	33.46	1.61	0.72	87.26	3.75	9.01	100.00
	2009	49.70	1.73	4.73	26.28	0.86	0.95	84.25	7.40	8.34	100.00
	2010	54.67	2.51	2.44	22.30	0.42	1.07	83.42	8.80	7.79	100.00
	2011	59.14	2.03	2.08	20.45	0.28	0.94	84.92	5.85	9.24	100.00
	2012	62.96	1.05	1.76	18.29	0.18	0.71	84.95	2.52	12.54	100.00
USD Futures	2006	27.92	0.42	17.42	35.15	4.53	0.00	85.44	7.97	6.59	100.00
	2007	17.73	0.83	28.49	42.70	2.74	0.01	92.50	2.54	4.97	100.00
	2008	22.81	0.64	20.11	40.52	4.38	0.01	88.47	6.86	4.66	100.00
	2009	32.37	0.47	9.79	32.76	4.84	0.00	80.23	13.25	6.52	100.00
	2010	39.40	0.57	7.50	20.58	5.03	0.00	73.08	15.76	11.16	100.00
	2011	42.07	0.62	5.61	16.12	5.22	0.03	69.67	14.82	15.51	100.00
	2012	38.22	0.82	5.76	18.23	5.29	0.09	68.41	11.12	20.45	100.00

Source: KRX

[Trading Volume of Equity Index Derivatives by the Type of Investors in KRX]

(Unit: Number of Contracts)

Products	Year	Institutional	Individual	Foreigners	Grand Total
KOSPI200 Options	2001	357,219,917	1,197,891,485	103,909,056	1,659,020,458
	2002	1,018,756,686	2,505,199,300	289,539,392	3,813,495,378
	2003	1,945,871,986	3,119,946,210	631,276,514	5,697,094,710
	2004	1,927,793,977	2,523,450,679	603,289,938	5,054,534,594
	2005	2,174,618,449	2,177,922,045	732,091,052	5,084,631,546
	2006	2,264,523,372	1,811,644,321	766,418,699	4,842,586,392
	2007	2,332,453,216	2,004,233,878	1,098,692,860	5,435,379,954
	2008	2,029,036,796	1,995,354,906	1,530,672,872	5,555,064,574
	2009	1,948,993,395	2,037,534,188	1,871,482,359	5,858,009,942
	2010	2,478,802,387	2,296,038,951	2,295,927,278	7,070,768,616
	2011	2,184,449,633	2,349,457,178	2,826,703,423	7,360,610,234
	2012	912,232,887	880,104,764	1,362,996,763	3,155,334,414
KOSPI200 Futures	2001	25,819,325	32,001,219	5,232,300	63,052,844
	2002	30,722,292	45,726,495	8,858,208	85,306,995
	2003	35,134,719	68,594,152	19,660,769	123,389,640
	2004	31,947,202	54,161,335	23,787,457	109,895,994
	2005	28,047,336	38,638,925	19,598,457	86,284,718
	2006	32,414,774	37,434,797	23,362,445	93,212,016
	2007	36,625,087	34,265,762	24,625,739	95,516,588
	2008	50,565,784	49,211,175	33,090,575	132,867,534
	2009	67,613,403	56,945,802	41,674,855	166,234,060
	2010	75,330,955	47,019,076	51,175,921	173,525,952
	2011	61,753,326	57,921,532	54,874,064	174,548,922
	2012	36,511,272	40,168,639	48,181,369	124,861,280
Total	2001	383,039,242	1,229,892,704	109,141,356	1,722,073,302
	2002	1,049,478,978	2,550,925,795	298,397,600	3,898,802,373
	2003	1,981,006,705	3,188,540,362	650,937,283	5,820,484,350
	2004	1,959,741,179	2,577,612,014	627,077,395	5,164,430,588
	2005	2,202,665,785	2,216,560,970	751,689,509	5,170,916,264
	2006	2,296,938,146	1,849,079,118	789,781,144	4,935,798,408
	2007	2,369,078,303	2,038,499,640	1,123,318,599	5,530,896,542
	2008	2,079,602,580	2,044,566,081	1,563,763,447	5,687,932,108
	2009	2,016,606,798	2,094,479,990	1,913,157,214	6,024,244,002
	2010	2,554,133,342	2,343,058,027	2,347,103,199	7,244,294,568
	2011	2,246,202,959	2,407,378,710	2,881,577,487	7,535,159,156
	2012	948,744,159	920,273,403	1,411,178,132	3,280,195,694

Source: KRX

[Trading Volume of Equity Index Derivatives by the Type of Investors in KRX]

(Unit: Number of Contracts)

Products	Year	Institutional	Individual	Foreigners	Grand Total
KOSPI200 Options	2001	21.5%	72.2%	6.3%	100.0%
	2002	26.7%	65.7%	7.6%	100.0%
	2003	34.2%	54.8%	11.1%	100.0%
	2004	38.1%	49.9%	11.9%	100.0%
	2005	42.8%	42.8%	14.4%	100.0%
	2006	46.8%	37.4%	15.8%	100.0%
	2007	42.9%	36.9%	20.2%	100.0%
	2008	36.5%	35.9%	27.6%	100.0%
	2009	33.3%	34.8%	31.9%	100.0%
	2010	35.1%	32.5%	32.5%	100.0%
	2011	29.7%	31.9%	38.4%	100.0%
	2012	28.9%	27.9%	43.2%	100.0%
KOSPI200 Futures	2001	40.9%	50.8%	8.3%	100.0%
	2002	36.0%	53.6%	10.4%	100.0%
	2003	28.5%	55.6%	15.9%	100.0%
	2004	29.1%	49.3%	21.6%	100.0%
	2005	32.5%	44.8%	22.7%	100.0%
	2006	34.8%	40.2%	25.1%	100.0%
	2007	38.3%	35.9%	25.8%	100.0%
	2008	38.1%	37.0%	24.9%	100.0%
	2009	40.7%	34.3%	25.1%	100.0%
	2010	43.4%	27.1%	29.5%	100.0%
	2011	35.4%	33.2%	31.4%	100.0%
	2012	29.2%	32.2%	38.6%	100.0%
Total	2001	22.2%	71.4%	6.3%	100.0%
	2002	26.9%	65.4%	7.7%	100.0%
	2003	34.0%	54.8%	11.2%	100.0%
	2004	37.9%	49.9%	12.1%	100.0%
	2005	42.6%	42.9%	14.5%	100.0%
	2006	46.5%	37.5%	16.0%	100.0%
	2007	42.8%	36.9%	20.3%	100.0%
	2008	36.6%	35.9%	27.5%	100.0%
	2009	33.5%	34.8%	31.8%	100.0%
	2010	35.3%	32.3%	32.4%	100.0%
	2011	29.8%	31.9%	38.2%	100.0%
	2012	28.9%	28.1%	43.0%	100.0%

Source: KRX

Reference

1. KRX, <http://www.krx.co.kr>
2. CBOE, <http://www.cboe.com>
3. CME Group, <http://www.cmegroup.com>
4. OSE, <http://www.ose.or.jp>
5. NIKKEI.com
6. STOXX.com, <http://www.stoxx.com>
7. FIA, <http://www.futuresindustry.org>
8. Park, C. (2011). How to Improve the Exchange-Traded Derivatives Market in Korea. *Korea Capital Market Institute* 3 (2)
9. FIA, (2011). Annual Volume Survey – 2010 Record Volume.
10. Ohk., K. & Huh, H. (2003). A Study on the Trading Behavior of KOSPI200 Futures Market and Margin Policy.
11. Cho, J. (2004). An Analysis of KOSPI200 Futures and Options Markets.
12. FIA, (2012). Annual Volume Survey – Volume Climbs 11.4% to 25 Billion Contracts Worldwide.
13. World Federation of Exchanges, (2011). IOMA/IOCA Derivatives Market Survey 2010.
14. Moon, S., Lee, D., Yang, S., & Yoo, Y. (2007). The Intervention Effect of COMS Change on Trading Volume and Individual Investor Weight in KOSPI 200 Futures and Option Market.
15. Kwon, S. (2011). An Analysis of the Impact of Changing the Pre-margin Level on the Proportion of Individual Investors in the KOSPI200 Option Market.

16. Fische, R. H., Goldberg, L.G., Gosnell, T. F., & Sinha, S. (1990). Margin Requirements in Futures Markets: Their relationship to Price Volatility. *Journal of Futures Markets* 5.
17. Hull, J. C. (2011). *Options, futures, and other derivatives – 8th edition*. U.S: Pearson Education.
18. Tax Law Association, (2012). A Study on Appropriate Policy on Adoption of Transaction Fees.