

CAPITAL GAINS TAX AND MARKET QUALITY: EVIDENCE FROM THE KOREAN DERIVATIVES MARKET

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Abstract

After a lively debate on whether there were not too much trading on the Korean derivatives market and whether, as a result, this market should be taxed, the Korean government decided to introduce, in 2016, a capital gains tax on Kospi 200 futures and options. The stated goals were both to securize tax revenue and to restrict speculative demand by private investors. This tax is somewhat unique, not only because it concerns derivatives, but in the sense that it is not based on transactions (like the Tobin tax, the UK stamp duty, the French or Italian financial transaction taxes, etc.), but on capital gains. This article aims to assess the impact of the Korean tax on the liquidity and the volatility of the Korean derivatives market. We apply Difference-in-Differences (DiD) analysis over the period August 2015-August 2016 using the mini-Kospi 200, which is not taxed, as a control. The introduction of the capital gains tax reduced market activity (the value and volume of transactions), however, it had no significant effect on the bid-ask spread and other measures of liquidity. A closer look at the activities of the different types of traders shows a shift in trading activity from individual to institutional traders and from the Kospi 200 to the mini-Kospi 200 derivatives.

JEL classification: G21, H25.

Keywords: Capital Gains Tax, Financial Regulation, Liquidity, Volatility, Korea Exchange (KRX).

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1 Introduction

The global financial crisis has renewed interest in the taxation of financial markets, a trend that has been fueled by a mix of tight public finances and public distrust towards the financial sector (Matheson, 2011; McCulloch and Pacillo, 2011). This debate most often concerns the possibility of introducing a financial transaction tax (FTT). Broadly speaking, on the one hand, proponents of FTT claim that it would be income-generating, restrict speculative or noise trading, reduce price fluctuations and foster long-term strategies (Keynes, 1936; Tobin, 1984; Stiglitz, 1989; Summers and Summers, 1989; Kupiec, 1996). On the other hand, opponents of FTT are afraid that it will harm market efficiency and increase volatility by reducing liquidity. There is also a large empirical literature on this topic: in the US (Pomeranets and Weaver, 2018), in Europe (Umlauf, 1993; Saporta and Kan, 1997; Capelle-Blancard and Havrylchyk, 2016; Capelle-Blancard, 2017; Colliard and Hoffmann, 2017) or in Asia (Hu, 1998; Baltagi, Li and Li, 2006; Chou and Wang, 2006; Liao, Wu and Hsu, 2012). Overall, empirical studies find a negative effect on market volume, but no impact on market volatility.

In this paper, we provide evidence from the Korean derivatives market. Most of the FTTs are similar to stamp duties on purchases of shares. Albeit some tax on derivatives markets exist (in Taiwan or Italy for instance), it is fairly rare. Yet, given the large and growing size of the derivatives markets, this kind of tax base could be promising (Persaud, 2012). After a lively debate on whether there were not too much trading on the Korean derivatives market and whether, as a result, this market should be taxed, the Korean government decided in 2016 to tax Kospi 200 futures and options. The stated goals of this tax reform were to securize tax revenue and to restrict speculative demand by private investors. Since the Korean market is one of the most important derivatives market in the world, it provides us a relevant and unique framework to assess the impact of a tax. Moreover, the Korean tax on derivatives is not based on the amounts of transaction (which is somewhat tricky in the case of derivatives), but it is a capital gains tax. To the best of our knowledge, this paper is the first to examine the introduction of a tax on capital gains on derivatives. This paper assesses the impact on market liquidity (trading volume and value, bid-ask spread and Amihud illiquidity ratio) by using Difference-in-Differences (DiD) over the period August 2015-August 2016 with the mini-Kospi 200, which is not taxed, as a control. In addition, in order to investigate whether the tax affects the composition of trading activity, we analyse the market share by trader type: institutions, individuals and foreigners. The results of the DiD analysis show that the introduction of the tax reduced the volume and the value of transactions, but it had no significant effect on the bid-ask spread and other measures of liquidity. A closer look at the activities of the different types of traders shows a shift in trading activity from individual investors to institutional traders and from the Kospi 200 to the mini-Kospi 200 derivatives.

The remainder of this paper is organized as follows. Section 2 describes the Korean market and details the tax reform. Section 3 presents the data, the empirical strategy and the liquidity

measures. Section 4 comments the results of the DID analysis. Section 5 provides additional evidence on the effect of the tax by analysing the trading activity of different trader types. Section 6 concludes.

2 Korea Exchange and financial market reforms

2.1 The Korea Exchange

The Korea Exchange (KRX) is the only securities exchange operator in South Korea. Under the Korea Stock & Futures Exchange Act in 2005, the Korea Exchange was created through the integration of Korea Stock Exchange (established in March 1956), Korea Futures Exchange and KOSDAQ Stock Market. The business divisions of Korea Exchange are now: the Stock Market Division, the KOSDAQ Market Division and the Derivatives Market Division. The exchange has normal trading sessions from 09:00 am to 03:30 pm on all business days. As of January 2015, Korea Exchange had more than 2,000 listed companies with a combined market capitalization larger than \$1 trillion and it was the 15th largest financial market in the world in terms of market capitalization.

Kospi 200 futures and options were first listed in May 1996 and July 1997, respectively. Since then, the Kospi 200 derivatives have achieved a significant growth. At the time of inauguration, the average trading amount in the Kospi 200 futures market was just around KRW 200 billion. In 2012, the trading amount rose to KRW 30 trillion, which was 150 times larger compared to 1996. Thanks to this rapid growth, the Korean derivatives market is now among the Top 10 in the world (some years the Kospi 200 futures were even ranked first in the world in terms of the number of contracts traded). In 2009, Kospi 200 futures commenced CME-linked trading, and in 2010 Kospi 200 option-linked Eurex trading began.

2.2 Financial market reforms in Korea

The growth of the Kospi 200 derivatives market has been at the root of strong speculation by individual investors. Unlike the main derivatives markets, where individual investors account for less than 20% of the transactions, individual investors in the Korean market made up more than 40% of the Kospi 200 derivatives market in the early 2000s and more than 30% of transactions after various measures to limit speculative transactions. According to KRX, the proportion of individual investors in the futures and options market as of early 2016 was reported to be about 27% and 30% respectively. In order to curb this speculative activity, several reforms has been introduced over the year, but mostly through non-tax policies such as increasing basic deposits or trading multipliers until 2015 (see in appendix).

In addition, since January 2016, a capital gains tax of 5% has been applied to income arising from transactions on Kospi 200 futures and options, as described in the Article 159-2 of the

Presidential Decree of the Income Tax Act. It is also important to note that only individual traders are subject to capital gains tax; institutional and foreigners are exempted.

3 Data and methodology

3.1 The sample

Our sample contains daily data related to the Kospi 200 and the mini-Kospi 200 contracts (futures and options). The date of the introduction of the capital gains tax is January 1, 2016. The pre-tax imposition period is from August 1, 2015 through December 31, 2015 (103 trading days) and the post-tax imposition period is from January 1, 2016 to August 31, 2016 (142 trading days). For each day, we use the opening and closing prices, the volume, the trading value, and the highest and lowest prices. All of these data are provided by the Korea Exchange. The Kospi 200 index and the 5-minute data of the index futures used to measure realized volatility are provided by Bloomberg. Table 5 in the Appendix presents the descriptive statistics (data are averaged over the whole period).

3.2 The difference-in-difference approach

In order to investigate the post-tax changes in the derivatives market, we rely on a generalized version of the difference-in-difference (DiD) method. The DiD is very appropriate here because of a particular (and strange) feature of the tax reform: while Kospi 200 futures and options are taxed since January 2016, the mini-Kospi options and futures, which are just like regular contracts but with a lower size, are not. Therefore, the mini-Kospi contracts is a perfect candidate for the control group. The following econometric model is estimated:

$$Y_{i,t} = \alpha + \beta_1 * time_t + \beta_2 * treated_i + \beta_{12} * time_t * treated_i + \varepsilon_{i,t}$$

The dependent variable, $Y_{i,t}$ is a measure of market liquidity (trading volume, trading value, investor weight), volatility (high-low range) or inefficiency for contract i on day t . The first dummy variable, $time_t$, has a value of 1 for the period after the introduction of the tax, and 0 for the previous period. For the second dummy variable, $treated_i$, the data for Kospi 200 futures or options are 1, mini-Kospi 200 futures and options have a value of zero. The third dummy variable, $time_t * treated_i$, is used to test the cross-effect to verify whether the change in Kospi 200 futures and options is significant compared to the mini-Kospi 200 futures and options as the product of two dummy variables. α and ε_i denote the constant and residual terms of the DiD analysis, respectively. The coefficient of interest is β_{12} , which measures the impact of the capital gains tax on liquidity, volatility and market quality: if a genuine change is observed in the Kospi 200 futures and options as compared to the comparative group, β_{12} should be significant. Time dummy variables capture all other changes in the regulatory and economic environment during the

period that affect the treated and control groups similarly, and group dummy variables control for potential differences between Kospi 200 and mini-Kospi 200 that are constant over time.

3.3 Measuring market liquidity

There is no single measure to assess market liquidity and, based on the previous literature, we identify five main aspects: Tightness (the cost of trading, even small amounts); Depth (the capacity to trade without causing price movements); Resiliency (the speed at which the marginal price impact increases as trading quantities increase); Breadth (the overall size of the volume traded); Immediacy (the cost to be applied when selling/buying quickly). As Sarr and Lybek (2002), we classify liquidity measures into three main categories, ranging from the least sophisticated to the most sophisticated : activity-based measures (trading volume, trading value and volume-to-open-interest ratio), transaction-cost measures (bid-ask spread), and price-impact measures (liquidity ratio). Table 2 defines the liquidity measures used in this study. These measures reflect complementary aspects of market liquidity.

Trading volume $V_{i,t}$ is defined as the logarithm (ln) of all contracts traded on day t . Note that when the underlying asset is mini-Kospi 200, the number of contracts is divided by five. The trading value $TV_{i,t}$ is the logarithm of the market value of contract i during a trading day t in millions of KRW. Volume-to-open-interest ratio $VOI_{i,t}$ is the number of open interest for contract i on day t . Garcia et al. (1986) suggested that the total volume of contracts traded in a period relative to the size of open positions at the end of the period reflects the speculative behaviour in a given contract. Gwilym et al. (2002) considered that the daily change in open interest reflects more accurately the activity of hedgers than the level of open interest, because the daily change informs of net positions being opened and/or closed each day and held overnight. For this reason, they proposed a new speculative ratio as the volume divided by the absolute value of the change in the open interest $VOI_{i,t}^*$. Trading value and Volume-to-open-interest ratio capture market breadth and depth.

Another widely-used measure of liquidity is the bid-ask spread, which assesses tightness. Bid and ask prices were not provided by the Korea exchange. Then, the bid-ask spread for each contract is estimated from its observed daily high and low price using two methods. The first one is proposed by Corwin and Schultz (2012). This uses the insight that daily high prices are invariably buy orders and daily low prices are usually sell orders. Hence, the high–low ratio on any day can be decomposed into two parts: efficient price volatility and bid-ask spread. The second estimation method is proposed by Abdi and Ranaldo (2017) who propose a model that takes into account the traditional approach proposed by Roll (1984) based on closing prices and the more recent approach of Corwin and Schultz (2012) based on high and low prices. These two methods were used to obtain the Estimated Corwin-Schultz Spread $EC S_{i,t}$ and the Estimated Abdi-Ranaldo

Spread $EAR_{i,t}$. The two measures are computed using daily data of the nearby contracts, as they are the most actively traded. $ECS_{i,t}$ and $EAR_{i,t}$ are expressed in percentage.

The market's response to substantial buying or selling pressure is an important aspect of illiquidity. Liquidity denotes the ability to trade large quantities quickly, at low cost, and without moving the price. A number of indicators of market resiliency reflect this definition. Amihud (2002) proposes a measure of illiquidity, which is the daily ratio of absolute return to its dollar volume, and argues that it serves as a rough measure of price impact. Thus, this measure can be interpreted as the daily price response associated with one dollar of trading volume. We have therefore computed this measure of illiquidity $Illiq_{i,t}$ using the returns that have been calculated using the closing prices of the nearby contracts and the total trading value in million KRW of contract i on a trading day t . The same data have been used to compute the liquidity ratio $LR_{i,t}$, which assesses how much trade is necessary to induce a price change of one percent: larger ratios are associated with greater liquidity. Higher liquidity ratio implies greater market liquidity or depth (Amihud, Mendelson and Lauterbach, 1997). Liquidity ratio captures the notion that large amounts can be traded in a liquid contract without any significant changes in the price (Nielsson 2009). The main purpose of this measure of liquidity is to explain turnover associated with 1% change in price or compare traded volume to the absolute price change during period: in other words, how much trading volume is needed to make a price one percentage positive or negative change.

Table 1: Liquidity measures

Category	Variable	Definition
Activity-based measures	Volume	$V_{i,t} = Ln(volume)$ Note that trading volume is divided by 5 if the contract is the mini-Kospi 200
	Trading value (Million KRW)	$TV_{i,t} = Ln(trading\ value\ in\ million\ KRW)$
	Volume-to-open-interest ratio	$V - OI_{i,t} = V_{i,t} * OI_{i,t}$ where $OI_{i,t}$ is the number of open interest for contract i on day t .
Transaction cost measures	Corwin & Schultz (2012)	$EC S_{i,t} = 100 * \frac{2 * (exp(\alpha_t) - 1)}{(1 + exp(\alpha_t))}$ with $\alpha_{i,t} = \frac{\sqrt{2\beta_{i,t}} - \sqrt{\beta_{i,t}}}{3 - 2\sqrt{2}} - \sqrt{\frac{\gamma_{i,t}}{3 - 2\sqrt{2}}}$, $\beta_{i,t} = 1/2[(h_{i,t+1} - l_{i,t+1})^2 + (h_{i,t} - l_{i,t})^2]$ and $\gamma_{i,t} = (max h_{i,t+1}, h_{i,t} - min l_{i,t+1}, l_{i,t})$ where h_i and l_i are respectively high, and low prices for contract i . Spread is expressed as a percentage.
	Abdi & Ranaldo (2017)	$EAR_{i,t} = 100 * (2 * E(c_{i,t} - \eta_{i,t})(c_{i,t} - \eta_{i,t+1}))$ with $\eta_{i,t} = \frac{h_{i,t} - l_{i,t}}{2}$ and $c_{i,t}$ represents the closing price of contract i . Spread is expressed as a percentage.
Price impact measures	Amihud (2002)	$Illiq_{i,t} = \frac{ r_{i,t} }{TV_{i,t}}$
	Liquidity ratio	$LR_{i,t} = \frac{V_{i,t}}{ R_{i,t} }$

4 Empirical results

4.1 The parallel-trends assumption

The descriptive statistics presented in the appendix suggest that mini-contracts are a good control group. Figures 1-3 confirm this intuition. We plot the evolution of the liquidity and volatility indicators defined in Section 3 between August 2015 and August 2016 for the treated and control groups. The vertical line indicates the date of introduction of the capital gains tax. Overall, whatever the variable of interest, before the introduction of the tax, the two contracts clearly show parallel trends. This observation allows us to make the hypothetical assumption that the variables of interest would have continued these trends if the tax had not been applied.

Figure 1 shows the daily evolution of the trading volume and trading value of Kospi 200 and mini-Kospi 200 contracts (Futures, call options and put options respectively) between August 2015 and July 2016. The dashed vertical line shows the date of introduction of the capital gains tax on January 1, 2016. The graph shows that the volume of transactions and trading value of mini-products has increased slightly compared to KOSPI 200 futures and options contracts, which are subject to capital gains tax. Indeed, the trend in trading volumes and trading values for Kospi 200 contracts and mini-Kospi 200 contracts are in the same direction before the introduction of the tax. But these trends are reversed after the introduction of the tax, particularly in the case of futures contracts and call options. This result suggests that the effect of the tax is not insignificant. This result must be empirically proved.

Figure 1: Kopsi 200 and mini-Kopsi 200 derivatives: volume, value and open interest

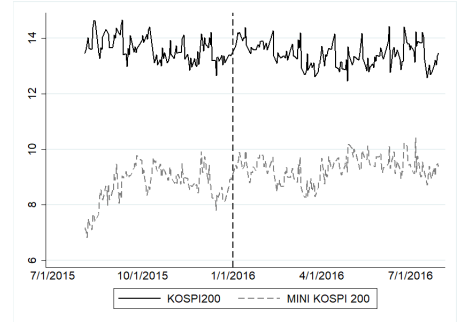
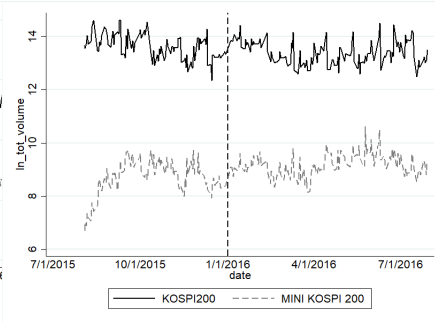
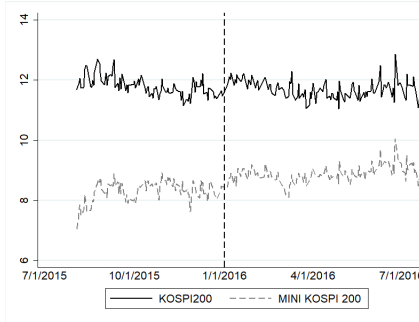
These figures show the daily evolution of trading volume and trading value of Kopsi 200 and mini-Kopsi 200 between August 01, 2015 and July 31, 2016. The dashed vertical lines indicate the application of capital gains tax on January 01, 2016.

Futures

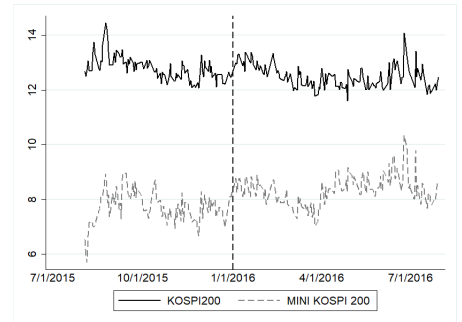
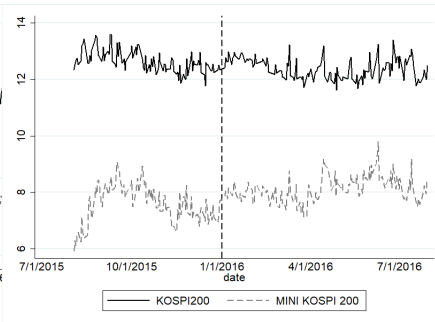
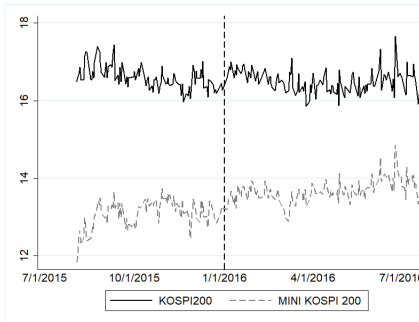
Call options

Put options

Trading volume



Trading value (in million KRW)



Volume to Open Interest

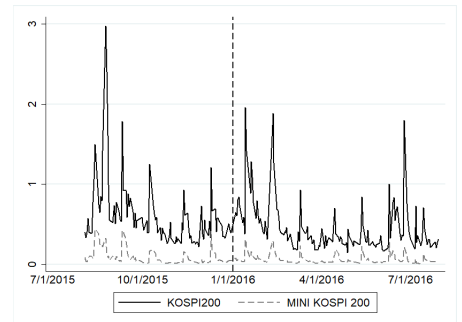
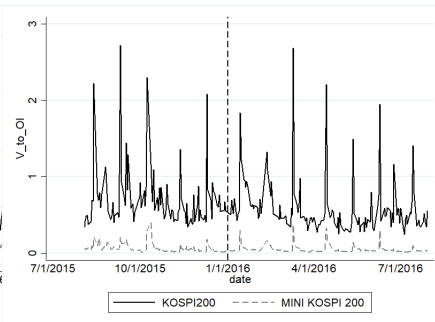
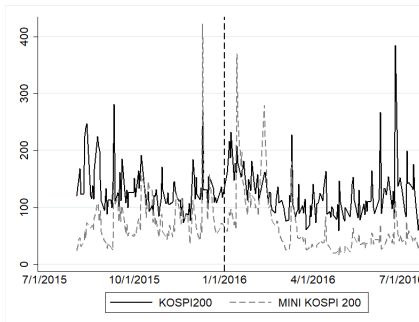


Figure 2: Kopsi 200 and mini-Kopsi 200 derivatives: Estimated bid-ask spreads and liquidity ratio

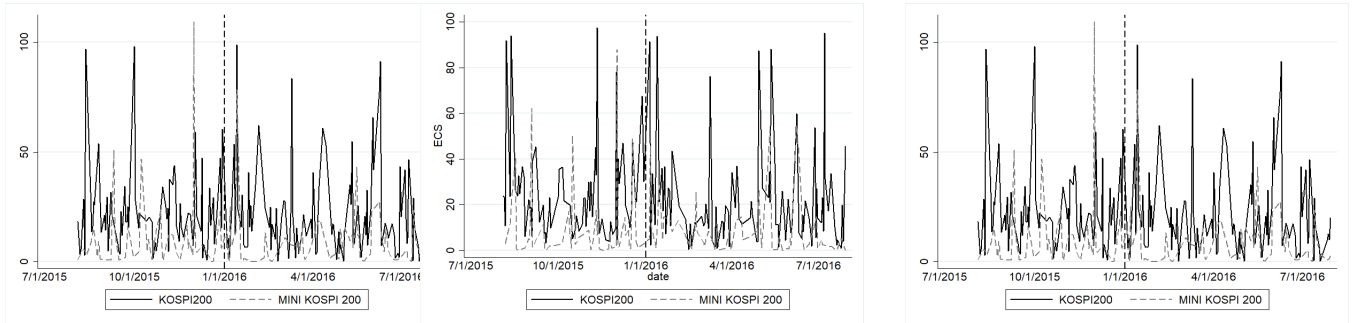
These figures show the daily evolution of trading volume and trading value of Kopsi 200 and mini-Kopsi 200 between August 01, 2015 and July 31, 2016. The dashed vertical lines indicate the application of capital gains tax on January 01, 2016.

Futures

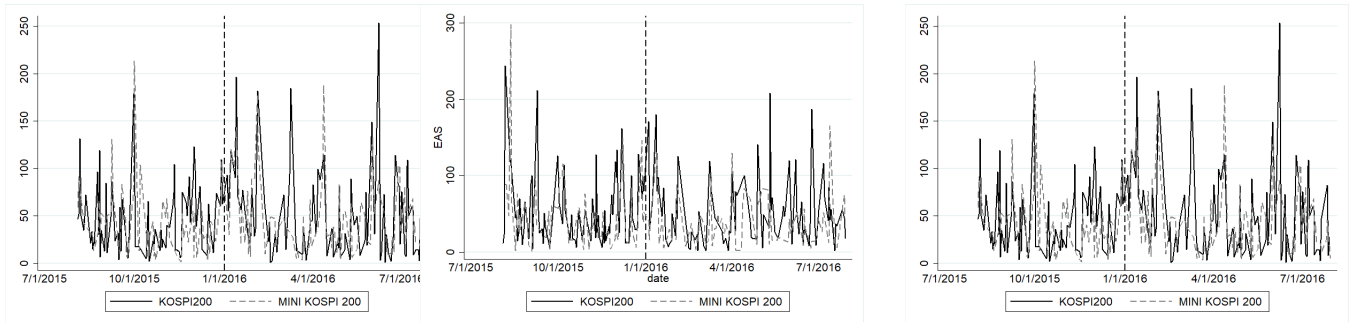
Call options

Put options

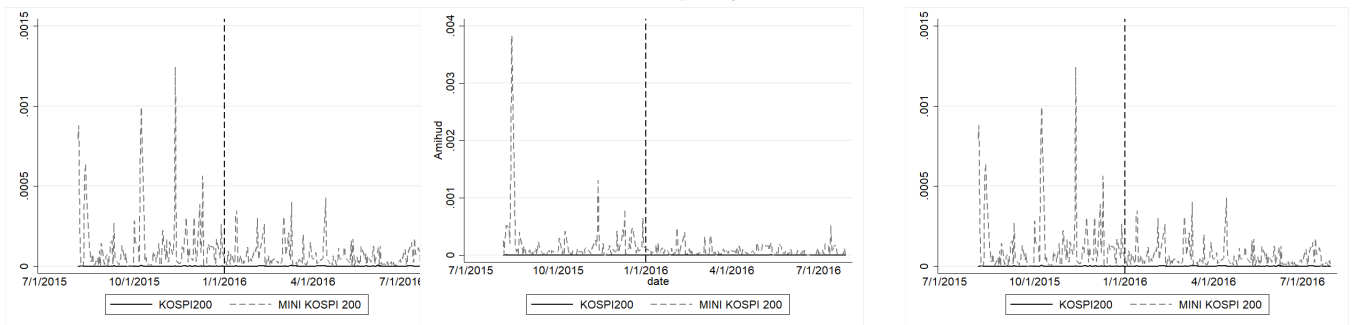
Corwin and Schultz bid-ask spread



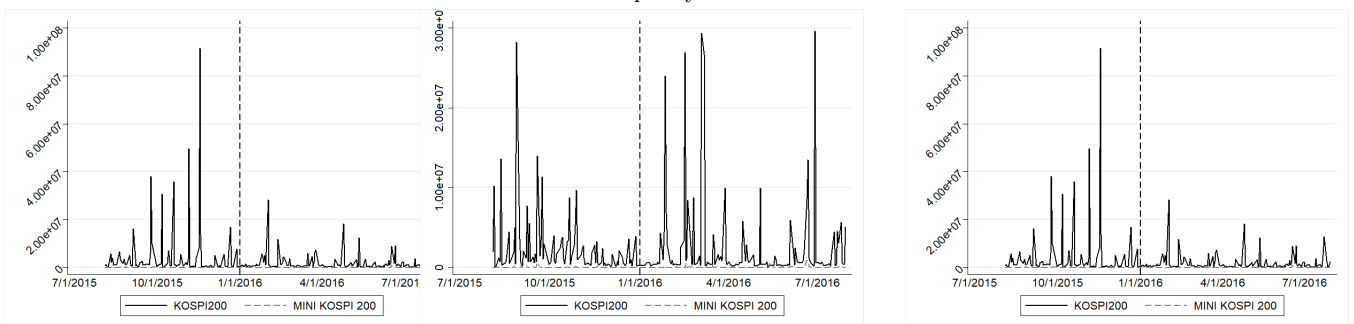
Abdi and Ranaldo bid-ask spread



Amihud illiquidity ratio



Liquidity ratio



4.2 DiD results

This section outlines the estimates of the tax's effects based on our DiD analysis over a one-year period: Pre-tax period is from August 1, 2015 to December 31, 2015 and post-tax period is from January 1, 2016 to July 31, 2016. The left side of the tables shows the results for the mini-products, for which no tax is imposed, whereas the right side displays the results for the Kospi 200 contracts for which the tax is charged. The last column shows the net effect of the tax as estimated using the DiD analysis. Table 2 shows that the trading volume of Kospi 200 futures and options contracts decreased significantly after the introduction of the capital gains tax, while, the variation in the volume of mini-contracts increased significantly. These results are consistent with previous studies by Noronha and Ferris (1992) that the introduction of a capital gains tax has a negative effect on transaction volume. These results are the same for the trading value. Indeed, the Korean tax has significantly lowered trading activity. In addition, there has been a significant decline in speculative activity measured by the volume to open interest ratio for both taxed and non-taxed contracts, but the net effect is less significant in the case of futures contracts. Whereas for options (call and put) the decline in the ratio is much more pronounced for taxed contracts, which implies a lower level of speculative activity. These facts suggest that the decision of the Korean authorities was an important political event that had a serious impact. Table 3 examines the trading costs and the results suggest that the impact of the tax on the spread is, at best, very limited since there is no significant change in the bid-ask spread, as measured by the Corwin and Schultz (2012) or Abdi and Ranaldo (2017) methods. It is essential to know whether the tax discourages "non-rational" or "noisy" operators and, therefore, its impact on market resiliency, but the examination of theoretical measures, such as Amihud illiquidity ratio and liquidity ratio, does not provide any robust evidence that the tax had an effect.

Table 2: Activity based measures before and after capital gains tax

The values in parentheses are the t-statistics. *, **, *** indicate significance at the level of 10%, 5%, and 1%, respectively.

	mini-Kospi 200 (control)			Kopsi 200 (taxed)			
	Before	After	(3)=(2)-(1)	Before	After	(6)=(5)-(4)	DiD=(6)-(3)
	(1)	(2)		(4)	(5)		
Logarithm of transaction volume							
Futures	8.31	8.88	0.57*** (14.61)	11.81	11.70	-0.11*** (-2.70)	-0.68*** (-11.88)
Call Options	8.71	9.18	0.46*** (6.77)	13.64	13.38	-0.25*** (-4.30)	-0.72*** (-7.60)
Put Options	8.71	9.32	0.60*** (8.75)	13.64	13.43	-0.21*** (-3.63)	-0.81*** (-8.74)
Logarithm of transaction value (Million KRW)							
Futures	13.10	13.68	0.58*** (14.47)	16.60	16.50	-0.10*** (-2.75)	-0.68*** (-12.07)
Call Options	7.59	8.12	0.53 (7.42)	12.65	12.38	-0.27*** (-5.47)	-0.80*** (-8.84)
Put Options	7.70	8.34	0.63*** (8.85)	12.79	12.50	-0.29 (-5.18)	-0.92*** (-10.04)
Volume-to-Open Interest ratio (Million KRW)							
Futures	78.13	61.40	-16.73** (-2.61)	132.39	122.54	-9.85* (-1.83)	6.88 (0.84)
Call Options	0.07	0.05	-0.02** (-2.45)	0.72	0.58	-0.14** (-2.85)	-0.12** (-2.40)
Put Options	0.09	0.06	-0.03** (-2.79)	0.61	0.46	-0.15** (-3.21)	-0.12** (-2.45)

Table 3: Transaction cost measures before and after capital gains tax

The values in parentheses are the t-statistics. *, **, *** indicate significance at the level of 10%, 5%, and 1%, respectively.

	mini-Kospi 200 (control)			Kopsi 200 (taxed)			
	Before (1)	After (2)	(3)=(2)-(1) (3)	Before (4)	After (5)	(6)=(5)-(4) (6)	DiD=(6)-(3) (7)
Corwin-Schultz spread (%)							
Futures	0.50	0.36	-0.15** (-2.88)	0.49	0.36	-0.13* (-2.5)	0.018 (0.22)
Call Options	10.73	8.83	-1.90 (-0.66)	26.26	21.12	-5.15 (-1.56)	-3.25 (-0.73)
Put Options	10.78	8.44	-2.33 (-0.81)	23.05	21.54	-1.50 (-0.52)	0.83 (0.20)
Abdi-Ranaldo spread (%)							
Futures	1.07	0.89	-0.18 (-1.49)	1.04	0.89	-0.14 (-1.20)	0.035 (0.21)
Call Options	46.67	37.84	-8.82 (-1.32)	56.06	53.05	-3.01 (-0.43)	5.81 (0.60)
Put Options	42.49	45.11	2.62 (0.43)	45.59	51.37	5.78 (0.87)	3.16 (0.36)

Table 4: Price impact measures before and after capital gains tax

The values in parentheses are the t-statistics. *, **, *** indicate significance at the level of 10%, 5%, and 1%, respectively.

	mini-Kospi 200 (control)			Kopsi 200 (taxed)			
	Before (1)	After (2)	(3)=(2)-(1) (3)	Before (4)	After (5)	(6)=(5)-(4) (6)	DiD=(6)-(3) (7)
Amihud illiquidity ratio							
Futures	1.46e-08	6.91e-09	-7.71e-09*** (-5.8559)	4.05e-10	3.76e-10	-2.85e-11 (-0.6684)	7.68e-09*** (5.37)
Call Options	19.37e-05	7.51e-05	-11.86e-05*** (-3.2038)	1.56e-06	2.02e-06	4.65e-07** (2.2511)	11.91e-05*** (2.76)
Put Options	1.41e-04	0.65e-04	-0.77e-04*** (-3.85)	1.39e-06	1.65e-06	2.60e-07 (1.27)	7.72e-05*** (3.41)
Liquidity ratio							
Futures	2.84e+08	6.91e+08	4.07e+08** (2.517)	7.21e+09	8.11e+09	8.95e+08 (0.5342)	4.88e+08 (0.28)
Call Options	37 050.78	59 949.84	22 899.06 (1.53)	2 332 464	2 356 538	24 073.73 (0.0393)	1 174.662 (0.00)
Put Options	46 187.42	59 156.38	12 968.96 (0.93)	4 624 312	1 981 282	-2 643 030** (-2.50)	-2 655 999** (-2.18)

5 Activity of various trader types

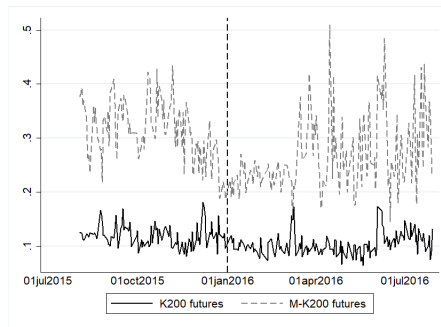
As mentioned previously, only individual traders are subject to capital gains tax.¹ Given that institutions and foreign traders are exempted, they can only be affected indirectly. We can therefore obtain evidence on how taxes affect market activity by examining the trading value of various trader types. To do so, we rely on the daily volume and trading value of individual, institution, and foreign traders provided by KRX. For each category, we compute their market shares. We report separate statistics for Kospi 200 and mini-Kospi 200 contracts. Figure 3 shows the evolution of these market shares. Table 3 contains the DiD estimates for trading volume, as well as the impact on the share of volume attributable to each of the three different trader groups. We find that, in line with our expectations, the tax significantly reduces the share of individual traders in all derivatives and increase the proportion of institutions. On the other hand, most the foreigners did not take sensitive decision. It can be interpreted that most of institutional traders substitute the individual traders activity.

¹ For the impact of individual investors on volatility, see Foucault, Sraer and Thesmar (2011).

Figure 3: Kospi 200 and mini-Kospi 200: Market share by type of traders

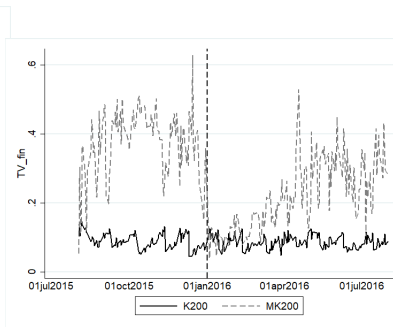
These figures show the daily evolution of trading volume and trading value of Kospi 200 and mini-Kospi 200 between August 01, 2015 and July 31, 2016. The dashed vertical lines indicate the application of capital gains tax on January 01, 2016.

Futures

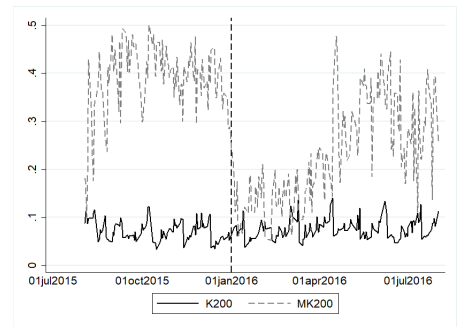


Call options

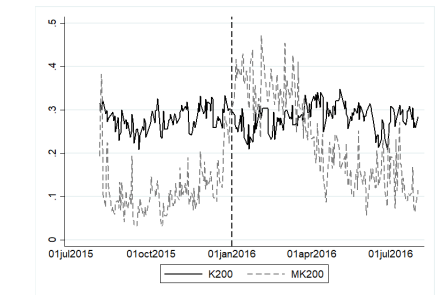
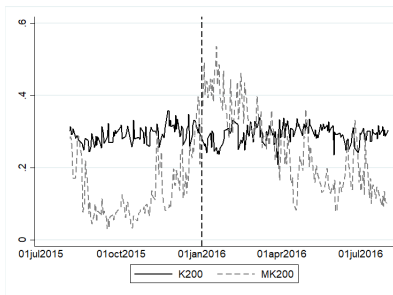
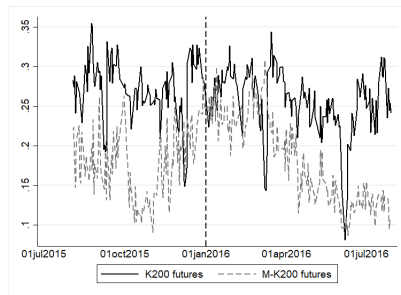
Intitutions



Put options



Individuals



Foreigners

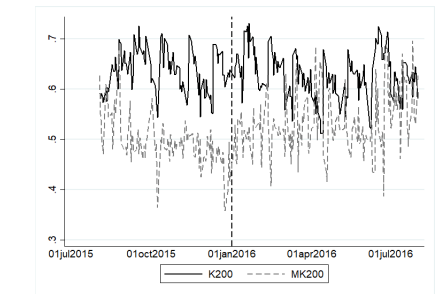
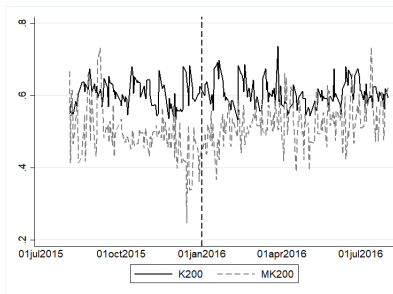
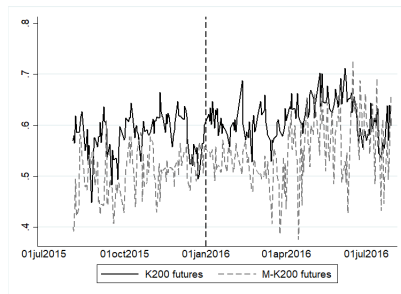


Table 5: Comparison of trading activity before and after capital gains tax

The values in parentheses are the t-statistics. *, **, *** indicate significance at the level of 10%, 5%, and 1%, respectively.

	mini-Kospi 200 (control)			Kopsi 200 (taxed)			
	Before	After	(3)=(2)-(1)	Before	After	(6)=(5)-(4)	DiD=(6)-(3)
	(1)	(2)		(4)	(5)		
Institutions (trading value, Million KRW)							
Futures							-0.65*** (-8.47)
Call Options	6.55	6.48	-0.07 (-0.63)	10.21	9.90	-0.30*** (-4.79)	-0.23* (-1.81)
Put Options	6.72	6.75	0.033 (0.315)	10.12	9.88	-0.23*** (-3.37)	-0.26** (-2.09)
Individuals (trading value, Million KRW)							
Futures							-0.75*** (-13.60)
Call Options	5.40	6.63	1.23*** (21.41)	11.41	11.14	-0.27 (-5.87)	-1.50*** (-20.56)
Put Options	5.43	6.78	1.34*** (20.31)	11.51	11.22	-0.29*** (5.63)	-1.63*** (-19.79)
Foreigners (trading value, Million KRW)							
Futures							-0.71*** (-10.65)
Call Options	6.86	7.47	0.60*** (7.96)	12.14	11.87	-0.26 (5.37)	-0.87*** (-9.22)
Put Options	7.00	7.70	0.70*** (9.56)	12.33	12.02	-0.30 ()	-1.01*** (-10.66)

Table 6: Comparison of trading activity before and after capital gains tax

The values in parentheses are the t-statistics. *, **, *** indicate significance at the level of 10%, 5%, and 1%, respectively.

	mini-Kospi 200 (control)			Kopsi 200 (taxed)			
	Before (1)	After (2)	(3)=(2)-(1)	Before (4)	After (5)	(6)=(5)-(4)	DiD=(6)-(3)
Institutions (market share in trading value, %)							
Futures	31.48	26.49	-4.98*** (-6.15)	11.94	10.30	-1.64*** (-6.39)	3.34*** (4.05)
Call Options	37.19	21.90	-15.29*** (-11.76)	8.99	8.59	-0.39 (-1.52)	14.89*** (11.25)
Put Options	38.44	23.11	-15.33*** (-12.47)	7.21	7.61	0.40 (1.49)	15.73*** (13.08)
Individuals (market share in trading value, %)							
Futures	17.89	18.20	0.31 (0.47)	27.11	25.50	-1.6*** (-3.06)	-1.92** (-2.33)
Call Options	13.45	25.21	11.75*** (9.07)	29.24	29.16	-0.08 (-0.26)	-11.84*** (-9.27)
Put Options	11.78	23.52	11.73*** (10.00)	28.07	28.16	0.09 (0.25)	-11.64*** (-10.15)
Foreigners (market share in trading value, %)							
Futures	50.56	55.11	4.54 (6.10)	58.01	61.42	3.41*** (6.90)	-1.13 (-1.31)
Call Options	49.21	52.76	3.55*** (4.10)	60.41	60.50	0.098 (0.20)	-3.45** (-3.42)
Put Options	49.76	53.83	3.56 (4.86)	63.52	62.61	-0.91 (-1.55)	-4.47*** (-4.88)

6 Conclusion

The taxation of financial markets is a very popular topic, as well as a very controversial one. In this paper, we examine the impact of the capital gains tax introduced in 2016 on the Korean derivatives market. This tax reform is somewhat unique in the world and it gives us the special opportunity to shed light on the desirability of such taxes. Our results unambiguously show that the tax reduced the activity in the derivatives market, mainly for individual. However, the tax did not affect the bid-ask spread or the liquidity. The Korean authorities' objective therefore seems to have been achieved: a decline in speculative activity without an effective deterioration of the efficiency of the derivatives market.

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8 Appendix

Major reforms undertaken on Kospi 200 derivatives market

- May 1996: Kospi 200 futures market opened; Basic deposit = 30 million won
- July 1997: Kospi 200 option market opened; Decrease in the basic deposit = 10 million won
- November 1997: Increase of the basic deposit = 30 million won
- March 2000: Decrease in the basic deposit = 10 million won
- February 2001: Decrease in the deposit is reduced = 5 million won
- March 2003: Increase in the basic deposit = 15 million won
- Dec. 2006: (500 ~ 1,500 for healthy investors; 1,500 ~ 3,000 for general investors; 30 million for investors under management)
- May 2011: Base deposit is unified to 15 million won; Abolish purchase account
- July 2012: Upgraded option trading price from 100,000 won to 500,000 won from maturity products if there is no investment experience in November 2014, pre-education and deposit will be applied differently
- July 2015: mini-Kospi 200 futures and options listing
- January 2016: Transferable income tax imposed on Kospi 200 futures and options trading