

Report - November 25, 2015

NASDAQ OMX BX, Inc. (“BX Options”), The NASDAQ Stock Market LLC’s Nasdaq Options Market (“NOM”) and NASDAQ OMX PHLX LLC (“PHLX”) (“together, the “Exchanges”)

Pilot Program Regarding Options Obvious and Catastrophic Errors in Response to the Regulation NMS Plan to Address Extraordinary Market Volatility

Requirement:

1. Evaluate the statistical and economic impact of Limit and Straddle States on liquidity and market quality in the options markets.
2. Assess whether the lack of obvious error rules in effect during the Straddle and Limit States are problematic.

Analysis:

The Exchange will conduct an analysis concerning the elimination of obvious and catastrophic error provisions during Limit States and Straddle States and agrees to provide the Commission with relevant data to assess the impact of this proposed rule change. As part of its analysis, the Exchange will: (1) evaluate the options market quality during Limit States and Straddle States; (2) assess the character of incoming order flow and transactions during Limit States and Straddle States; and (3) review any complaints from members and their customers concerning executions during Limit States and Straddle States.

The Exchanges report the following (covering May 2015 – October 2015 (the “Current Period”)):

- There were no requests for a review of an options trade occurring during a Limit State or Straddle State on BX Options, NOM or PHLX.
- There were no complaints regarding the Pilot Program.

- The Exchanges observe that the Pilot Program once again coincides with a period of relatively low volatility in the marketplace as demonstrated by a VIX averaging slightly above 17.
- The ability of the Exchanges to provide comprehensive analysis of market quality continues to be limited by the small number of cases available. The vast majority of Limit and Straddle States that have occurred were in underlying securities that did not have exchange-traded options contracts listed and available for trading. Of those securities that do have overlying options contracts, few had any options trading volume during Limit and Straddle States.
- The ability of the Exchanges to offer conclusive analysis is further hindered by the instability of options market quality statistics in such a small sample. While the small number of Limit and Straddle State cases available for study reveals highly variable market quality, market quality in any small sample of relatively illiquid options series is similarly highly variable. Both the available cases of options markets in Limit or Straddle States and their non-Limit State and non-Straddle State control cases often have no trading volume, little depth, relatively wide quotes or lack two-sided quotes.

This analysis covers all Limit State and Straddle State events that occurred during the Current Period (Table 1). An “event” is a case when at least one trade occurred on BX in at least one option series during a Limit or Straddle State in the underlying. Every event that occurred during an included month was evaluated for this report. Compared to the period October 2014 – April 2015, the total numbers of Limit State Events and Straddle State Events were slightly higher during the Current Period. Similarly, the average numbers per month for both states were also higher.

Table 1: Cases evaluated for this report

Year	Month	Limit State Events	Straddle State Events
2015	May	3	1
2015	June	1	0
2015	July	4	0
2015	August	0	0
2015	September	1	3
2015	October	0	0
Total		9	4
Average per Month		1.5	0.7

During the months studied, 7 underlying symbols had cases of option series with at least one trade on BX during a Limit or Straddle State (Table 2). The symbols had a wide variety of characteristics. They ranged in market capitalization from \$294M to \$28B, in price from \$5.21 to \$135.14, and in average daily volume from 1.2M shares to over 16M.

For this analysis, market quality during events was compared to market quality during control periods. For each Limit or Straddle State event, a control was found by measuring market quality in the same option series during the same period on the day before. Each control period lasts the same amount of time as the event.

For each event, this analysis looks for an impact in every option series on the affected underlying as long as one of the series had a trade on BX. In the results that follow, averages are shown both across all series and across only those that had trading volume on BX.

Table 2: Characteristics of the underlying

Year	Month	Underlying	Limit State Events	Straddle State Event	Name	ETP	Market Capitalization (M)	Price	ADV (M)	AD\$V(M)
2015	5	AVP	2	0	Avon Products, Inc.	No	\$2,924	\$6.72	16.3	\$115.1
2015	5	DGX	0	1	Quest Diagnostics Incorporated	No	\$10,816	\$75.23	2.2	\$162.9
2015	5	POM	1	0	Pepco Holdings, Inc.	No	\$6,895	\$27.25	3.0	\$79.2
2015	6	ZTS	1	0	Zoetis, Inc. Class A	No	\$24,108	\$48.22	3.6	\$176.9
2015	7	CZR	4	0	Caesars Entertainment Corporation	No	\$754	\$5.21	2.2	\$12.7
2015	9	MNST	0	1	Monster Beverage Corporation	No	\$27,771	\$135.14	1.2	\$167.0
2015	9	RJET	1	2	Republic Airways Holdings, Inc.	No	\$294	\$5.78	4.4	\$18.2
Min							\$294	\$5.21	1.2	\$12.7
Max							\$27,771	\$135.14	16.3	\$176.9
Average							\$10,509	\$43.36	4.7	\$104.6

Table 3 shows BX trading activity in the events analyzed. By construction, all events have trading volume in at least one series. By contrast, in all cases the control period had no trading in any series (Table 3a). Similarly, when all series are included in the event averages, very few have traded volume (Table 3b).

Table 3a: Percent of cases with traded volume, including only series with traded volume

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	100.0%	0.0%
2015	5	Straddle State	100.0%	0.0%
2015	6	Limit State	100.0%	0.0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	100.0%	0.0%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	100.0%	0.0%
2015	9	Straddle State	100.0%	0.0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Table 3b: Percent of cases with traded volume, including all options series

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	1.3%	0.0%
2015	5	Straddle State	0.5%	0.0%
2015	6	Limit State	0.4%	0.0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	0.2%	0.0%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	1.0%	0.0%
2015	9	Straddle State	0.3%	0.0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

In most cases, quote quality during the control periods was worse than during the Limit or Straddle State events (Tables 4a and 4b). This may be because news and greater trading activity led to greater market participation during the Limit or Straddle State.

Table 4a: Percent of cases with two-sided quotes, including only series with volume

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	93%	0%
2015	5	Straddle State	100%	0%
2015	6	Limit State	100%	0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	25%	25%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	100%	0%
2015	9	Straddle State	0%	0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Table 4b: Percent of cases with two-sided quotes, including all contract series

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	26%	0%
2015	5	Straddle State	5%	0%
2015	6	Limit State	56%	1%
2015	6	Straddle State	NA	NA
2015	7	Limit State	16%	1%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	2%	0%
2015	9	Straddle State	3%	0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Time-weighted Average Quoted Spreads were highly variable and sensitive to outliers (Tables 5a and 5b). The results are not very informative because of the small number of cases.

Table 5a: Average percent quoted spread, including only series with volume

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	123%	NA
2015	5	Straddle State	74%	NA
2015	6	Limit State	95%	NA
2015	6	Straddle State	NA	NA
2015	7	Limit State	184%	12%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	141%	NA
2015	9	Straddle State	NA	NA
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Table 5b: Average percent quoted spread, including all option series

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	106%	NA
2015	5	Straddle State	66%	NA
2015	6	Limit State	88%	41%
2015	6	Straddle State	NA	NA
2015	7	Limit State	89%	65%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	112%	NA
2015	9	Straddle State	71%	NA
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Time-weighted average depth at the BX inside was often higher during events than during control periods (Tables 6a and 6b).

Table 6a: Average depth in contracts, including only series with trading

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	2	NA
2015	5	Straddle State	8	NA
2015	6	Limit State	9	NA
2015	6	Straddle State	NA	NA
2015	7	Limit State	29	3
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	4	NA
2015	9	Straddle State	NA	NA
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Table 6b: Average depth in contracts, including all option series

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	1	NA
2015	5	Straddle State	7	NA
2015	6	Limit State	7	12
2015	6	Straddle State	NA	NA
2015	7	Limit State	59	5
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	2	NA
2015	9	Straddle State	1	NA
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

In many cases traded prices on BX during the event were more than 30% away from the most recent OPRA price before the Limit or Straddle State event (Tables 7a and 7b). There was almost no trading during the control periods.

Table 7a: Percent of cases where price changed 30% during event, including only series with trading

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	100.0%	0.0%
2015	5	Straddle State	100.0%	0.0%
2015	6	Limit State	100.0%	0.0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	100.0%	0.0%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	100.0%	0.0%
2015	9	Straddle State	100.0%	0.0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Table 7b: Percent of cases where price changed 30% during event, including all option series

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	1.3%	0.0%
2015	5	Straddle State	0.5%	0.0%
2015	6	Limit State	0.4%	0.0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	0.2%	0.0%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	1.0%	0.0%
2015	9	Straddle State	0.3%	0.0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA



During the analyzed period, traded prices on BX within 5 minutes after the event never increased or decreased more than 30% away from the most recent OPRA price before the Limit or Straddle State event (Tables 8a and 8b).

Table 8a: Percent of cases where price changed more than 30% after event, including only series with trading

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	0%	0%
2015	5	Straddle State	0%	0%
2015	6	Limit State	0%	0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	0%	0%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	0%	0%
2015	9	Straddle State	0%	0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Table 8b: Percent of cases where price changed more than 30% after event, including all option series

Year	Month	State Code	Event Cases	Control Cases
2015	5	Limit State	0%	0%
2015	5	Straddle State	0%	0%
2015	6	Limit State	0%	0%
2015	6	Straddle State	NA	NA
2015	7	Limit State	0%	0%
2015	7	Straddle State	NA	NA
2015	8	Limit State	NA	NA
2015	8	Straddle State	NA	NA
2015	9	Limit State	0%	0%
2015	9	Straddle State	0%	0%
2015	10	Limit State	NA	NA
2015	10	Straddle State	NA	NA

Market quality results to date are mixed and limited by the small number of cases available each month for analysis. While the results reveal variable market quality including wide spreads and significant price changes, market quality in any small sample of relatively illiquid options series is similarly highly variable (as shown by the control cases). Perhaps the most telling statistic is the lack of member or customer complaints.

Under the Pilot Program, limit orders that are filled during a Limit State or Straddle State have certainty of execution. Moreover, given that options prices during brief Limit States or Straddle States may deviate substantially from those available shortly following the Limit State or Straddle State, the Exchanges believe giving market participants time to re-evaluate a transaction would create an unreasonable adverse selection opportunity that would discourage participants from providing liquidity during Limit States or Straddle States. On balance, the Exchanges believe that removing the potential inequity of nullifying or adjusting executions occurring during Limit States or Straddle States outweighs any potential benefits from applying those provisions during such unusual market conditions.

The Exchanges believe that continuing the Pilot Program should protect against any unanticipated consequences and permit the industry to gain further experience operating the Plan and further data to evaluate the impact of the Pilots.