

Report In Support of Extending the SPY Position Limit Pilot Program

NYSE Arca, Inc. (the “Exchange”) received approval to adopt unlimited position and exercise limits for options on the SPDR® S&P 500® ETF (“SPY”) as part of a pilot program (“Pilot”).¹ Subsequently, the Exchange filed to extend the Pilot, most recently until July 12, 2017.² As part of the Pilot, the Exchange stated that it would prepare another Pilot Report in support of a proposal to extend the Pilot, adopt the Pilot on a permanent basis or terminate the Pilot. The Pilot Report would be submitted within thirty (30) days before the end of the extension and would cover the period since the previous extension. The Pilot Report would detail the size and different types of strategies employed with respect to positions established as a result of the elimination of position limits in SPY options. In addition, the Pilot Report would note whether any problems resulted due to the no limit approach and any other information that may be useful in evaluating the effectiveness of the Pilot. The Pilot Report would compare the impact of the Pilot, if any, on the volumes of SPY options and the volatility in the price of the underlying SPY shares, particularly at expiration. In preparing the report the Exchange would utilize various data elements such as volume and open interest.

Impact on SPY volumes and volatility

To assess the impact of the Pilot on SPY volumes, the Exchange compared SPY monthly volume and open interest during January 2013 to December 2013 (the “Pre-Pilot period”) to monthly volume and open interest during June 2016 through May 2017 (the “Pilot period”) (see Table 1). Additionally the Exchange examined S&P 500 cash index (“SPX”) monthly volumes and open interest during the same time periods. In comparing median and average monthly volume of SPY and SPX during the Pre-Pilot and Pilot periods, SPY volumes increased, as measured by average monthly customer volumes, while median volumes also increased during the Pilot, as did SPX volumes, which also increased on an average basis, with a similar median movement.

¹ See Exchange Act Release No. 68001 (October 5, 2012), 77 FR 62303 (October 12, 2012) (SR-NYSEArca-2012-112).

² See Exchange Act Release No. 70968 (December 3, 2013), 78 FR 73899 (December 9, 2013) (SR-NYSEArca-2013-130). See also Exchange Act Release No. 74029 (January 9, 2015), 80 FR 2161 (January 15, 2015) (SR-NYSEArca-2014-151). See also Exchange Act Release No. 75415 (July 9, 2015) 80 FR 41541 (July 15, 2015) (SR-NYSEArca-2015-61). See also Exchange Act Release No. 78242 (July 7, 2016), 81 FR 45330 (July 13, 2016) (SR-NYSEArca-2016-92).

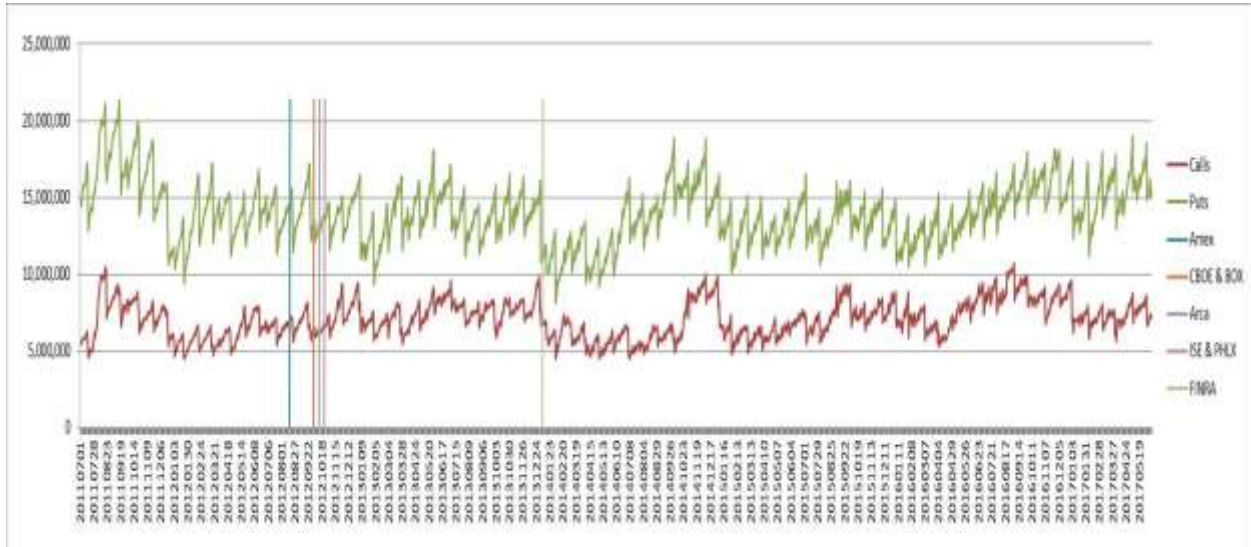
The Exchange also compared SPY and SPX during the Pre-Pilot and Pilot periods and found that open interest declined for both SPY and SPX over the relevant time period (see Table 2).

TABLE 1: Comparison of SPX and SPY Options Volume		
	SPY	SPX
Average Monthly Volume Pre-Pilot	99,384,071	34,581,490
Average Monthly Volume Pilot	112,643,478	46,024,212
Average Monthly Customer Volume Pre-Pilot*	36,277,165	12,558,874
Average Monthly Customer Volume Pilot*	39,781,376	7,095,040
Median Monthly Volume Pre-Pilot	93,784,130	33,354,738
Median Monthly Volume Pilot	105,436,386	45,563,014
Median Monthly Customer Volume Pre-Pilot*	33,354,738	12,295,442
Median Monthly Customer Volume Pilot*	37,999,466	7,129,742
% Change In Average Monthly Volume Pilot vs Pre-Pilot	13.3%	33.09%
% Change in Average Monthly Customer Volume Pilot vs Pre-Pilot*	9.7%	-43.5%
% Change in Median Monthly Volume Pilot vs Pre-Pilot	12.4%	-36.60%
% Change in Median Monthly Customer Volume Pilot vs Pre-Pilot*	13.9%	-58.0%

* Customer volume as reported by activity clearing in the customer range at the Options Clearing Corporation.

TABLE 2: Comparison of SPX and SPY Options Open Interest	SPY	SPX
Average Open Interest Pre-Pilot	20,712,064	11,465,990
Average Open Interest Pilot	20,572,409	10,140,922
Median Open Interest Pre-Pilot	20,691,166	11,719,178
Median Open Interest Pilot	21,127,880	10,132,996
% Change in Average Open Interest Pilot vs Pre-Pilot	-0.67%	-11.55%
% Change in Median Open Interest Pilot vs Pre-Pilot	2.11%	-13.53%

The chart below shows open interest at the time the Exchange adopted unlimited position limit for SPY options. There is no discernible impact of the introduction of unlimited position limits on open interest.



To assess the impact of the Pilot on volatility in SPY shares, the Exchange looked at the reported opening and closing prices for both SPY and SPX during the Pre-Pilot and Pilot periods. Using the opening and closing price reported, the Exchange calculated the variance for both SPY and

SPX for each day.³ The Exchange then grouped the results by regular trading days and expiration days.⁴ By comparing the average and median variance for both SPY and SPX during the Pre-Pilot and Pilot periods for regular trading days and expiration days the Exchange was able to ascertain that there was no discernible impact on volatility as a result of the Pilot.

The results are shown in Table 3 below.

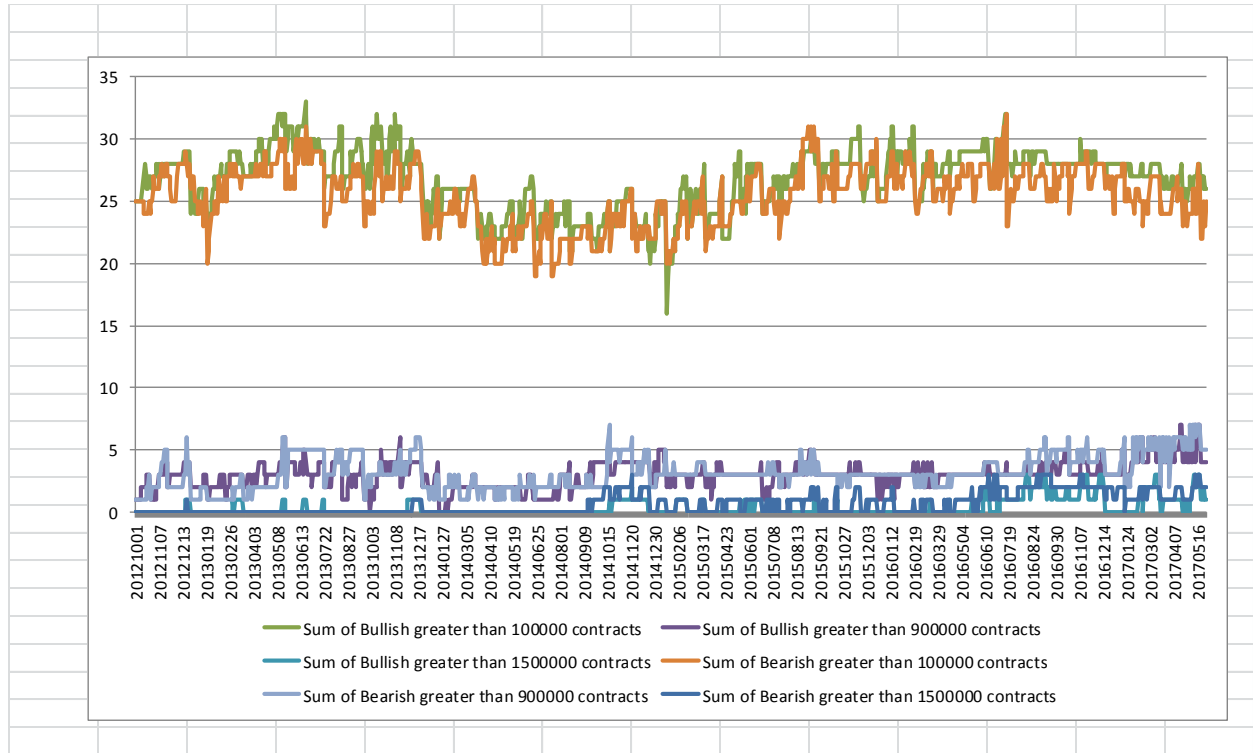
TABLE 3: Variance of S&P 500 Index vs SPY on regular trading days and expiration days			
	S&P 500 Index	SPY	SPX vs SPY
Average Variance Pre-Pilot Regular Trading Day	0.000047	0.000033	0.0000140
Average Variance Pre-Pilot Expiration Day	0.000032	0.000022	0.0000100
Average Variance Pilot Regular Trading Day	0.000026	0.000022	0.0000039
Average Variance Pilot Expiration Day	0.000038	0.000016	0.0000220
Median Variance Pre-Pilot Regular Trading Day	0.000016	0.000016	0.0000000
Median Variance Pre-Pilot Expiration Day	0.000015	0.000012	0.0000030
Median Variance Pilot Regular Trading Day	0.000005	0.000005	0.0000003
Median Variance Pilot Expiration Day	0.000007	0.000005	0.0000020
Change in Average Variance Pilot vs Pre-Pilot Regular Day	0.000021	0.000011	0.0000101
Change in Average Variance Pilot vs Pre-Pilot Expiration Day	-0.000006	0.000006	-0.0000120
Change in Median Variance Pilot vs Pre-Pilot Regular Day	0.000011	0.000011	-0.0000003
Change in Median Variance Pilot vs Pre-Pilot Expiration	0.000008	0.000007	0.0000010

³ Variance is calculated using this formula $(\text{Closing Price} - \text{Opening Price}) / (\text{Opening Price})^2$.

⁴ An expiration day is defined as any Friday, except for those that are exchange holidays in which case expiration day is Thursday. As both SPY and SPX have weekly expirations, the Exchange believes it is appropriate to consider any Friday an expiration day.

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Lastly, the Exchange looked at bullish and bearish positions, as required under NYSE Arca Rule 6.6 – Reporting of Option Positions. The chart below highlights the trend for bullish positions and bearish positions that exceed 100,000 contracts, 900,000 contracts and 1,500,000 contracts beginning in October 2012. There is no discernible trend evidenced.



Conclusion

The Exchange’s study described above does not reveal that the Pilot resulted in any adverse consequences in terms of increased volatility, changes in open interest, or increases in large bullish or large bearish positions. With respect to volume, the Pilot has potentially proven to be beneficial to those participants who clear in the customer range at OCC, as the increase in SPY customer volume during the Pilot has been greater than the increase in SPX customer volume as compared to the Pre-Pilot period.

The Exchange believes that there is ample evidence to support a continuation of the Pilot at this time.