

Required fields are shown with yellow backgrounds and asterisks.

Page 1 of * 72		SECURITIES AND EXCHANGE COMMISSION WASHINGTON, D.C. 20549 Form 19b-4		File No. * SR 2023 - * 083 Amendment No. (req. for Amendments *)	
Filing by Cboe EDGX Exchange, Inc.					
Pursuant to Rule 19b-4 under the Securities Exchange Act of 1934					
Initial * <input checked="" type="checkbox"/>		Amendment * <input type="checkbox"/>		Withdrawal <input type="checkbox"/>	
Section 19(b)(2) * <input checked="" type="checkbox"/>		Section 19(b)(3)(A) * <input type="checkbox"/>		Section 19(b)(3)(B) * <input type="checkbox"/>	
Pilot <input type="checkbox"/>		Extension of Time Period for Commission Action * <input type="checkbox"/>		Date Expires * <input type="text"/>	
		Rule			
		<input type="checkbox"/> 19b-4(f)(1)		<input type="checkbox"/> 19b-4(f)(4)	
		<input type="checkbox"/> 19b-4(f)(2)		<input type="checkbox"/> 19b-4(f)(5)	
		<input type="checkbox"/> 19b-4(f)(3)		<input type="checkbox"/> 19b-4(f)(6)	
Notice of proposed change pursuant to the Payment, Clearing, and Settlement Act of 2010 Section 806(e)(1) * <input type="checkbox"/>			Security-Based Swap Submission pursuant to the Securities Exchange Act of 1934 Section 3C(b)(2) * <input type="checkbox"/>		
Exhibit 2 Sent As Paper Document <input type="checkbox"/>			Exhibit 3 Sent As Paper Document <input type="checkbox"/>		
Description Provide a brief description of the action (limit 250 characters, required when Initial is checked *). <div>Proposed rule change to make permanent Pilot Programs in Connection with the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options</div>					
Contact Information Provide the name, telephone number, and e-mail address of the person on the staff of the self-regulatory organization prepared to respond to questions and comments on the action. First Name * Laura Last Name * Dickman Title * VP, Associate General Counsel E-mail * ldickman@cboe.com Telephone * (312) 786-7572 Fax					
Signature Pursuant to the requirements of the Securities Exchange of 1934, Cboe EDGX Exchange, Inc. has duly caused this filing to be signed on its behalf by the undersigned thereunto duly authorized. Date 12/26/2023 (Title *) By Laura G. Dickman (Name *) VP, Associate General Counsel <div>NOTE: Clicking the signature block at right will initiate digitally signing the form. A digital signature is as legally binding as a physical signature, and once signed, this form cannot be changed.</div> <div>Sign</div>					

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SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

For complete Form 19b-4 instructions please refer to the EDFS website.

Form 19b-4 Information *

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23-083 19b-4 (Permanent Nonstandar

The self-regulatory organization must provide all required information, presented in a clear and comprehensible manner, to enable the public to provide meaningful comment on the proposal and for the Commission to determine whether the proposal is consistent with the Act and applicable rules and regulations under the Act.

Exhibit 1 - Notice of Proposed Rule Change *

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23-083 Exhibit 1 - Regular Way and A

The Notice section of this Form 19b-4 must comply with the guidelines for publication in the Federal Register as well as any requirements for electronic filing as published by the Commission (if applicable). The Office of the Federal Register (OFR) offers guidance on Federal Register publication requirements in the Federal Register Document Drafting Handbook, October 1998 Revision. For example, all references to the federal securities laws must include the corresponding cite to the United States Code in a footnote. All references to SEC rules must include the corresponding cite to the Code of Federal Regulations in a footnote. All references to Securities Exchange Act Releases must include the release number, release date, Federal Register cite, Federal Register date, and corresponding file number (e.g., SR-[SRO]-xx-xx). A material failure to comply with these guidelines will result in the proposed rule change being deemed not properly filed. See also Rule 0-3 under the Act (17 CFR 240.0-3)

Exhibit 1A - Notice of Proposed Rule Change, Security-Based Swap Submission, or Advanced Notice by Clearing Agencies *

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The Notice section of this Form 19b-4 must comply with the guidelines for publication in the Federal Register as well as any requirements for electronic filing as published by the Commission (if applicable). The Office of the Federal Register (OFR) offers guidance on Federal Register publication requirements in the Federal Register Document Drafting Handbook, October 1998 Revision. For example, all references to the federal securities laws must include the corresponding cite to the United States Code in a footnote. All references to SEC rules must include the corresponding cite to the Code of Federal Regulations in a footnote. All references to Securities Exchange Act Releases must include the release number, release date, Federal Register cite, Federal Register date, and corresponding file number (e.g., SR-[SRO]-xx-xx). A material failure to comply with these guidelines will result in the proposed rule change being deemed not properly filed. See also Rule 0-3 under the Act (17 CFR 240.0-3)

Exhibit 2- Notices, Written Comments, Transcripts, Other Communications

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Copies of notices, written comments, transcripts, other communications. If such documents cannot be filed electronically in accordance with Instruction F, they shall be filed in accordance with Instruction G.

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Exhibit Sent As Paper Document

Exhibit 3 - Form, Report, or Questionnaire

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23-083 Exhibit 3 (Final).docx

Copies of any form, report, or questionnaire that the self-regulatory organization proposes to use to help implement or operate the proposed rule change, or that is referred to by the proposed rule change.

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Exhibit Sent As Paper Document

Exhibit 4 - Marked Copies

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The full text shall be marked, in any convenient manner, to indicate additions to and deletions from the immediately preceding filing. The purpose of Exhibit 4 is to permit the staff to identify immediately the changes made from the text of the rule with which it has been working.

Exhibit 5 - Proposed Rule Text

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The self-regulatory organization may choose to attach as Exhibit 5 proposed changes to rule text in place of providing it in Item I and which may otherwise be more easily readable if provided separately from Form 19b-4. Exhibit 5 shall be considered part of the proposed rule change

Partial Amendment

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If the self-regulatory organization is amending only part of the text of a lengthy proposed rule change, it may, with the Commission's permission, file only those portions of the text of the proposed rule change in which changes are being made if the filing (i.e. partial amendment) is clearly understandable on its face. Such partial amendment shall be clearly identified and marked to show deletions and additions.

Item 1. Text of the Proposed Rule Change

(a) Cboe EDGX Exchange, Inc. (the “Exchange” or “EDGX Options”) proposes to make permanent the operation of its programs that allow the Exchange to list options on the Mini-SPX Index (“XSP options”) with P.M.-settlement and to list broad-based index options with nonstandard expirations (“Nonstandard Expirations Pilot Program”). The text of the proposed rule change is provided in Exhibit 5.

(b) Not applicable.

(c) Not applicable.

Item 2. Procedures of the Self-Regulatory Organization

(a) The Exchange’s President (or designee) pursuant to delegated authority approved the proposed rule change on December 26, 2023.

(b) Please refer questions and comments on the proposed rule change to Patrick Sexton, Executive Vice President, General Counsel, and Corporate Secretary, (312) 786-7467, or Laura G. Dickman, (312) 786-7572, Cboe EDGX Exchange, Inc., 433 West Van Buren, Chicago, Illinois 60607.

Item 3. Self-Regulatory Organization’s Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

(a) Purpose

The Exchange proposes to make permanent its XSPPM Pilot Program and its Nonstandard Expirations Pilot Program. Specifically, the Exchanges proposes to be permitted to list on a permanent basis (1) XSP options with third-Friday-of-the-month expiration dates whose exercise settlement value is derived from closing prices on the last trading day prior to expiration (“P.M.-settled”) (“XSPPM options”) and (2) options on broad-based indexes that are P.M.-settled and expire (a) on any Monday, Wednesday, or

Friday (other than the third Friday-of-the-month or days that coincide with an end-of-month (“EOM”) expiration) (“Weekly Expirations”) and (b) on the last day of the trading month (“EOM Expirations”).¹ The Securities and Exchange Commission (the “Commission”) approved a rule change that established a pilot program under which the Exchange is permitted to list (1) XSP options with third-Friday-of-the-month expiration dates that are P.M.-settled (the “XSPPM Pilot Program”) and (2) options on broad-based indexes with Weekly Expirations and Monthly Expirations (the “Nonstandard Expirations Pilot Program” and, with the XSPPM Pilot Program, the “Pilot Programs”).² XSPPM Options, Weekly Expirations, and EOMs are cash-settled and have European-style exercise. The Pilot Programs became effective on a pilot basis for a period of twelve months from the date of the approval of the Pilot Programs³ and were subsequently extended.⁴ Pursuant to Rule 29.11(a)(6) and (j)(3), the Pilot Programs are scheduled to

¹ In addition to proposing to delete the language in Rule 29.11(a)(6) and (j)(3) regarding the expiration date of the Pilot Programs, the Exchange proposes to delete the word “pilot” from the heading of Rule 29.11(j) and make a corresponding change to Rules 29.11(c)(5)(C).

² See Securities Exchange Act Release No. 85182 (February 22, 2019), 84 FR 6846 (February 28, 2019) (SR-CboeEDGX-2018-037) (“Pilot Programs Approval Order”). Under the terms of the Nonstandard Expirations Pilot Program, Weekly Expirations and EOMs are permitted on any broad-based index that is eligible for regular options trading.

³ See id.

⁴ See 88054 (January 27, 2020), 85 FR 5761 (January 31, 2020) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2020-002); 88787 (April 30, 2020), 85 FR 26995 (May 6, 2020) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2020-019); 90253 (October 22, 2020) 85 FR 68390 (October 28, 2020) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2020-050); 91700 (April 28, 2021), 86 FR 23770 (May 4, 2021) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2021-022); 93453 (October 28, 2021), 86 FR 60667 (November 3, 2021) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2021-047); 94803 (April 27, 2022), 87 FR 26237 (May 3,

expire on May 6, 2024. The Exchange hereby requests that the Commission approve the Pilot Programs on a permanent basis.

By way of background, when cash-settled⁵ index options were first introduced in the 1980s, settlement was based on the closing value of the underlying index on the option's expiration date. The Commission later became concerned about the impact of P.M.-settled, cash-settled index options on the markets for the underlying stocks at the close on expiration Fridays. Specifically, certain episodes of price reversals around the close on quarterly expiration dates attracted the attention of regulators to the possibility that the simultaneous expiration of index futures, futures options, and options might be inducing abnormal volatility in the index value around the close.⁶ Academic research at the time provided at least some evidence suggesting that futures and options expirations contributed to excess volatility and reversals around the close on those days.⁷ In light of the concerns

2022) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2022-025); 96209 (November 2, 2022), 87 FR 67520 (November 8, 2022) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change to Extend the Pilot Programs in Connection with the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2022-047); 97443 (May 5, 2023) 88 FR 30356 (May 11, 2023) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2023-035); and 98640 (September 28, 2023), 88 FR 68846 (October 4, 2023) (SR-CboeEDGX-2023-061) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options).

⁵ The seller of a “cash-settled” index option pays out the cash value of the applicable index on expiration or exercise. A “physically settled” option, like equity and ETF options, involves the transfer of the underlying asset rather than cash. See Characteristics and Risks of Standardized Options, available at: <https://www.theocc.com/Company-Information/Documents-and-Archives/Options-Disclosure-Document>.

⁶ The close of trading on the quarterly expiration Friday (i.e., the third Friday of March, June, September and December), when options, index futures, and options on index futures all expire simultaneously, became known as the “triple witching hour.”

⁷ See Securities and Exchange Commission, Division of Economic Risk and Analysis, Memorandum, Cornerstone Analysis of PM Cash-Settled Index Option Pilots (February 2, 2021) (“DERA Staff

with P.M. settlement and to help ameliorate the price effects associated with expirations of P.M.-settled, cash-settled index products, in 1987, the Commodity Futures Trading Commission (“CFTC”) approved a rule change by the Chicago Mercantile Exchange (“CME”) to provide for A.M. settlement⁸ for index futures, including futures on the S&P 500.⁹ The Commission subsequently approved a rule change by Cboe Options, Inc. (“Cboe Options”) to list and trade A.M.-settled SPX options.¹⁰ In 1992, the Commission approved Cboe Options’ proposal to transition all of its European-style cash-settled options on the S&P 500 Index to A.M. settlement¹¹; however, in 1993, the Commission approved a rule allowing Cboe Options to list P.M.-settled options on certain broad-based indices, including the S&P 500, expiring at the end of each calendar quarter (“Quarterly Index Expirations”) (since adopted as permanent).¹² Starting in 2006, the Commission approved numerous rule changes, on a pilot basis, permitting the Cboe Options to introduce other index options, including SPX options, with P.M.-settlement. These include P.M.-settled index options expiring weekly (other than the third Friday of the month) and at the end of

PM Pilot Memo”) at 5, available at:
https://www.sec.gov/files/Analysis_of_PM_Cash_Settled_Index_Option_Pilots.pdf.

⁸ The exercise settlement value for an A.M.-settled index option is determined by reference to the reported level of the index as derived from the opening prices of the component securities on the business day before expiration.

⁹ See Securities Exchange Act Release No. 24367 (April 17, 1987), 52 FR 13890 (April 27, 1987) (SR-CBOE-87-11) (noting that CME moved S&P 500 futures contract’s settlement value to opening prices on the delivery date).

¹⁰ See *id.*

¹¹ See Securities Exchange Act Release No. 30944 (July 21, 1992), 57 FR 33376 (July 28, 1992) (SR-CBOE-92-09). Thereafter, the Commission approved proposals by the options markets to transfer most of their cash-settled index products to A.M. settlement.

¹² See Securities Exchange Act Release No. 31800 (February 1, 1993), 58 FR 7274 (February 5, 1993) (SR-CBOE-92-13); see also Securities Exchange Act Release Nos. 54123 (July 11, 2006), 71 FR 40558 (July 17, 2006) (SR-CBOE-2006-65); and 60164 (June 23, 2009), 74 FR 31333 (June 30, 2009) (SR-CBOE-2009-029).

each month (“EOM”),¹³ P.M.-settled options on the S&P 500 Index that expire on the third Friday-of-the-month (“SPXPM”),¹⁴ as well as P.M.-settled Mini-SPX Index (“XSP”) options and Mini-Russell 2000 Index (“MRUT”) options expiring on the third Friday of the month.¹⁵ As noted above, the Commission approved a rule to allow the Exchange to list XSPPM options and broad-based index options with Weekly and EOM Expirations.¹⁶ The Commission recently approved proposed rule changes to make Cboe Options’ pilot programs to list P.M.-settled index options (including pilot programs substantively the same as the Pilot Programs) permanent.¹⁷

As stated above, since its inception in 2019, the Exchange has continuously extended the Pilot Program periods and, during the course of the Pilot Programs and in support of the extensions of the Pilot Programs, the Exchange has submitted reports to the Commission regarding the Pilot Programs that detail the Exchange’s experience with the

¹³ See Securities Exchange Act Release Nos. 62911 (September 14, 2010), 75 FR 57539 (September 21, 2010) (SR-CBOE-2009-075); 76529 (November 30, 2015), 80 FR 75695 (December 3, 2015) (SR-CBOE-2015-106); 78132 (June 22, 2016), 81 FR 42018 (June 28, 2016) (SR-CBOE-2016-046); and 78531 (August 10, 2016), 81 FR 54643 (August 16, 2016) (SR-CBOE-2016-046).

¹⁴ See Securities Exchange Act Release No. 68888 (February 8, 2013), 78 FR 10668 (February 14, 2013) (SR-CBOE-2012-120). Pursuant to Securities Exchange Act Release No. 80060 (February 17, 2017), 82 FR 11673 (February 24, 2017) (SR-CBOE-2016-091), the Exchange moved third-Friday P.M.-settled options into the S&P 500 Index options class, and as a result, the trading symbol for P.M.-settled S&P 500 Index options that have standard third Friday-of-the-month expirations changed from “SPXPM” to “SPXW.” This change went into effect on May 1, 2017, pursuant to Cboe Options Regulatory Circular RG17-054.

¹⁵ See Securities Exchange Act Release Nos. 70087 (July 31, 2013), 78 FR 47809 (August 6, 2013) (SR-CBOE-2013-055); and 91067 (February 5, 2021) 86 FR 9108 (February 11, 2021) (SR-CBOE-2020-116).

¹⁶ See *supra* note 2.

¹⁷ See Securities Exchange Act Release Nos. 98454 (September 20, 2023) (SR-CBOE-2023-005) (order approving proposed rule change to make permanent the operation of a program that allows the Exchange to list p.m.-settled third Friday-of-the-month SPX options series); 98455 (September 20, 2023) (SR-CBOE-2023-019) (order approving proposed rule change to make permanent the operation of a program that allows the Exchange to list p.m.-settled third Friday-of-the-month XSP and MRUT options series); and 98456 (September 20, 2023) (SR-CBOE-2023-020) (order approving proposed rule change to make the nonstandard expirations pilot program permanent).

Pilot Programs, pursuant to the Pilot Programs Approval Order.¹⁸ Specifically, the Exchange has submitted annual Pilot Program reports to the Commission that contain an analysis of volume, open interest, and trading patterns. In addition, for series that exceed certain minimum open interest parameters, the annual report would provide analysis of index price volatility and, if needed, share trading activity. The Exchange has also submitted periodic interim reports that contain some, but not all, of the information contained in the annual reports (together with the periodic interim reports, the “pilot reports”).¹⁹

The pilot reports for the XSPPM Pilot Program contained the following volume and open interest data:

- (1) monthly volume aggregated for all trades;
- (2) monthly volume aggregated by expiration date;
- (3) monthly volume for each individual series;
- (4) month-end open interest aggregated for all series;
- (5) month-end open interest for all series aggregated by expiration date; and
- (6) month-end open interest for each individual series.

The pilot reports for the Nonstandard Expirations Pilot Program contained the following volume and open interest data:

- (1) monthly volume aggregated for all Weekly and EOM trades;
- (2) volume in Weekly and EOM series aggregated by expiration date;
- (3) month-end open interest aggregated for all Weekly and EOM series;

¹⁸ See supra note 2.

¹⁹ In providing the pilot reports to the Commission, the Exchange previously requested confidential treatment of the pilot reports under the Freedom of Information Act (“FOIA”). See 5 U.S.C. 552.

- (4) month-end open interest for EOM series aggregated by expiration date and week-ending open interest for Weekly series aggregated by expiration date;
- (5) ratio of monthly aggregate volume in Weekly and EOM series to total monthly class volume; and
- (6) ratio of month-end open interest in EOM series to total month-end class open interest and ratio of week-ending open interest in EOW series to total week-ending open interest.

The annual reports for the Pilot Programs also contained the information noted in respective Items (1) through (6) above for Expiration Friday, A.M.-settled series, if applicable, for the period covered in the pilot report. With respect to the Nonstandard Expirations Pilot Program, upon request by the Commission, the Exchange provided data files containing: (1) Weekly and EOM option volume data aggregated by series, and (2) Weekly week-ending open interest for expiring series and EOM month-end open interest for expiring series. In the annual reports, the Exchange also provided the following analyses of trading patterns in XSPPM options and index options with Weekly and EOM Expirations:

- with respect to the XSPPM Pilot Program, a time series analysis of open interest and an analysis of the distribution of trade sizes; and
- with respect to the Nonstandard Expirations Pilot Program, Weekly and EOM option volume data aggregated by series, and Weekly open interest for expiring series and EOM month-end open interest for expiring series.

Finally, for series that exceed certain minimum parameters,²⁰ the annual reports contained the following analysis related to index price changes and underlying share trading volume at the close on Expiration Fridays:

- (1) a comparison of index price changes at the close of trading on a given Expiration Friday with comparable price changes from a control sample. The data includes a calculation of percentage price changes for various time intervals and compare that information to the respective control sample. Raw percentage price change data as well as percentage price change data normalized for prevailing market volatility, as measured by the Cboe Volatility Index (VIX), is provided; and
- (2) a calculation of share volume for a sample set of the component securities representing an upper limit on share trading that could be attributable to expiring in-the-money series. The data includes a comparison of the calculated share volume for securities in the sample set to the average daily trading volumes of those securities over a sample period.

Also, during the course of the Pilot Programs, the Exchange provided the Commission with any additional data or analyses the Commission requested if it deemed such data or analyses necessary to determine whether the Nonstandard Expirations Pilot Program was consistent with the Exchange Act. The Exchange has made public on its website all data and analyses previously submitted to the Commission under the

²⁰ The Exchange and the Commission determined the minimum open interest parameters, control sample, time intervals, method for randomly selecting the component securities, and sample periods.

Nonstandard Expirations Pilot Program,²¹ and will continue to make public any data and analyses it submits to the Commission while the Pilot Programs is still in effect.

The Exchange has concluded that the Pilot Programs do not negatively impact market quality or raise any unique or prohibitive regulatory concerns. The Exchange has not identified any evidence from the pilot data indicating that the trading of XSPPM, Weekly options, and EOM options has any adverse impact on fair and orderly markets on Expiration Fridays for the underlying indexes or the underlying securities comprising those indexes, nor have there been any observations of abnormal market movements attributable to XSPPM, Weekly and EOM options from any market participants that have come to the attention of the Exchange.

Based on a study conducted by the Commission's Division of Economic and Risk Analysis ("DERA") staff on the pilot data from 2006 through 2018,²² and the Exchange's review of the pilot data from 2019 through 2021, the size of the market for P.M.-settled SPX options (including quarterly, weekly, EOM and third Friday expirations) since 2007 has grown from a trivial portion of the overall market to a substantial share (from around 0.1% of open interest in 2007 to 30% in 2021).²³ Notional value of open interest in P.M.-settled SPX options increased from approximately a median of \$1.5 billion in 2007 to \$1.9

²¹ Available at <https://www.cboe.com/aboutcboe/legal-regulatory/national-market-system-plans/pm-settlement-spxpm-data>.

²² See DERA Staff PM Pilot Memo, at 13 ("Option settlement quantity data for A.M.- and P.M.-settled options were obtained from the Cboe, including the number of contracts that settled in-the-money for each exchange-traded option series on the S&P 500 index...on expiration days from January 20, 2006 through December 31, 2018. Daily open interest and volume data for [SPX] option series were also obtained from Cboe, including open interest data from January 3, 2006 through December 31, 2018 and trading volume data from January 3, 2006 through December 31, 2018.")

²³ The DERA staff study reviewed and provided statistics for market share, median notional value of open interest and median volume in 2007 and in 2018. The Exchange provides updated statistics for market share, median notional value of open interest and median volume in 2021, replacing the 2018 statistics provided in the Commission staff study.

trillion in 2021, approximately 1260 times its value in 2007. Notional open interest in A.M.-settled SPX options was already hovering around a median of \$1.4 trillion in 2007, and it has since increased to approximately \$4.4 trillion in 2021. It is also important to note that open interest on expiring P.M.-settled SPX options, as compared to A.M.-settled options, is spread out across a greater number of expiration dates, which results in a smaller percentage of open interest expiring on any one date, thus mitigating concerns that SPXPM option expiration may have a disruptive effect on the market.²⁴ Daily trading volume in P.M.-settled SPX options has increased from a median of about 700 contracts in 2007 to nearly 1.9 million contracts in 2021,²⁵ and now exceeds trading volume in A.M.-settled SPX options.

Moreover, the DERA staff study of the P.M.-settled SPX options pilot data (2006 through 2018) did not identify any significant economic impact on S&P 500 futures,²⁶ the S&P 500, or the underlying component securities of the S&P 500 surrounding the close. For purposes of the study, volatility was by and large measured by using the standard deviation²⁷ of one-minute returns of S&P 500 futures values and the index value during regular hours on each day reviewed (excluding the first and last 15 minutes of trading) and then compared with the standard deviation of one-minute returns (for S&P 500 futures, the

²⁴ See DERA Staff PM Pilot Memo, at 2.

²⁵ The Exchange notes that the DERA staff study used two-sided volume data for the median volume in 2007 and in 2018; therefore, the Exchange provides two-sided volume data for the median volume in 2021.

²⁶ Futures on the S&P 500 experience high volume and liquidity both before and after the close of the underlying market. Therefore, futures are a useful measure of abnormal volatility surrounding the close and the open. See DERA Staff PM Pilot Memo, at 14. The Exchange agrees with this approach.

²⁷ Standard deviation applied to a rate of return (in this case, one-minute) of an instrument can indicate that instrument's historical volatility. The greater the standard deviation, the greater the variance between price and the mean, which indicates a larger price range, i.e., higher volatility.

S&P 500, and the underlying component securities of the S&P 500) over the last 15 minutes of a trading day.²⁸ Using this as a general measure,²⁹ the DERA staff study then reviewed whether, and to what extent, the settlement quantity of SPXPM options and the levels of open interest in SPXPM options on expiration days (as compared to non-expiration days) may be associated with general price volatility and price reversals for S&P 500 futures, the S&P 500, and the underlying component securities of the S&P 500 near the close. From its review of the study, the Exchange agrees that, although volatility before the market close is generally higher than during the rest of the trading day, there is no evidence of any significant adverse economic impact to the futures, index, or underlying index component securities markets as a result of the quantity of P.M.-settled SPX options that settle at the close or the amount of expiring open interest in P.M.-settled SPX options. For example, the largest settlement event that occurred during the time period of the study (a settlement of \$100.4 billion of notional on December 29, 2017) had an estimated impact on the futures price of only approximately 0.02% (a predicted impact of \$0.54 relative to a closing futures price of \$2,677).

In particular, the DERA staff study found that an additional P.M.-settled SPX options settlement quantity equal to \$10 billion in notional value is associated with a marginal impact on futures prices during the last 15 minutes of the trading day of only

²⁸ For example, if on a particular day the standard deviation of one-minute returns between 3:45 p.m. ET and 4:00 p.m. ET is 0.004 and the standard deviation of returns from 9:45 a.m. ET to 3:45 p.m. ET is 0.002, this metric would take on a value of 2 for that day, indicating that volatility during the last 15 minutes of the trading day was twice as high as it was during the rest of the trading day. See DERA Staff PM Pilot Memo, at 15; see also DERA Staff PM Pilot Memo, at Section V, which discusses in detail the metrics used to measure, for the purposes of the study, the extent to which the market may experience abnormal volatility surrounding SPXPM option settlement.

²⁹ See DERA Staff PM Pilot Memo, at Section V, which discusses in detail the metrics used to measure, for the purposes of the study, the extent to which the market may experience abnormal volatility surrounding SPXPM option settlement.

about \$0.06 (where the hypothetical index level is 2,500), additional expiring open interest in P.M.-settled SPX options equal to \$10 billion in notional value is associated with a marginal impact on futures prices during the last 15 minutes of the trading day of only about \$0.05 (assumed index level is 2,500). Also, an additional increase in settlement quantity or in expiring open interest, each equal to \$20 million in notional value, did not result in any meaningful futures price reversals near the close (neither was found to cause a price reversal of over one standard deviation³⁰).

Likewise, the study identified that an additional total P.M.-settled SPX options settlement quantity equal to \$10 billion in notional value corresponds to price movement in the S&P 500 of only about \$0.08 (assuming an index level of 2,500) during the last 15 minutes of the trading day, and that additional expiring open interest equal to \$10 billion in notional value corresponds to a price movement in the S&P 500 of only about \$0.06 (assuming an index level of 2,500) during the last 15 minutes of the trading day. The study also identified that it would take an increase of \$34 billion in notional value of total settlement quantity and of expiring open interest for one additional S&P 500 price reversal of greater than two standard deviations to occur in the last 15 minutes before the market close. Also, regarding potential impact to S&P 500 component securities, it would take an increase in total P.M.-settled SPX options settlement quantity equal to \$20 billion to effect a price movement of only approximately \$0.03 for a \$200 stock, an increase in expiring open interest in P.M.-settled SPX options equal to \$10 billion to effect a price movement less than half a standard deviation, and an increase in total P.M.-settled SPX settlement quantity equal to \$7 billion to achieve a price reversal greater two standard deviations.

³⁰ See supra note 27.

The study employed the same metrics to determine whether there is greater price volatility for S&P 500 futures, the S&P 500, and the component securities of the S&P 500 related to SPXPM option settlements during an environment of high market volatility (i.e., on days in which the VIX Index was in the top 10% of closing index values) and did not identify indicators of any significant economic impact on these markets near the close as a result of the P.M.-settled SPX options settlement.³¹ In addition to this, the DERA staff study, applying the same metrics and analysis as for P.M.-settled SPX options to A.M.-settled SPX options, did not identify any evidence of a statistically significant relationship between settlement quantity or expiring open interest of A.M.-settled options and volatility near the open.

Upon review of the results of the DERA staff study, the Exchange agrees that each of the above-described marginal price movements in S&P 500 futures, the S&P 500, and the S&P 500 component securities affected by increases in P.M.-settled SPX options settlement quantity and expiring open interest appear to be de minimis pricing changes from those that occur over regular trading hours (outside of the last 15 minutes of the trading day). Further, the Exchange has not observed any significant economic impact or other adverse effects on the market from similar reviews of its pilot reports and data submitted after 2018.³² In its review of a sample of the pilot data from 2019 through 2021, the Exchange similarly measured volatility over the final fifteen minutes of each trading day by taking the standard deviation of rolling one-minute returns of the S&P 500 level

³¹ The Exchange also notes that the study did not identify any evidence that less liquid S&P 500 constituent securities experienced any greater impact from the settlement of P.M.-settled SPX options.

³² Total SPX open interest volumes were examined for expiration dates over a roughly two-year period between October 2019 and November 2021.

(excluding the first and last fifteen minutes of trading) and comparing such with the standard deviation of one-minute returns³³ of the S&P 500 level, over the last 15 minutes of a trading day. The Exchange identified an average standard deviation ratio of 1.42 for the S&P 500 on non-expiration days and an average standard deviation ratio of 1.54 for the S&P 500 on expiration days (a ratio between expiration days and non-expiration days of 1.09). The Exchange also notes that, using the same methodology, it observed that, from 2015 through 2019,³⁴ the average standard deviation ratio for the S&P 500 on non-expiration days was 1.11 and the average standard deviation ratio for the S&P 500 on expiration days was 1.22 (a ratio between expiration days and non-expiration days of 1.10). While the average standard deviation ratio on both expiration and non-expiration days was higher in 2019 through 2021 due to overall market volatility, the ratios between the standard deviation ratios on expiration days and non-expirations days remained nearly identical between the 2015 through 2019 timeframe and the 2019 through 2021. This shows that, in cases where overall market volatility may increase, the normalized impact on expiration days to non-expiration days generally remains consistent.

In addition to this, the Exchange notes that the S&P 500 Index is rebalanced quarterly. The changes resulting from each rebalancing coincide with the third-Friday of the quarterly rebalancing month (i.e., March, June, September, October and December)³⁵ and generally drive an increase in trading activity from investors that seek to track the S&P 500. As such, the Exchange measured volatility on quarterly rebalancing dates and found

³³ Calculated at every tick for the prior minute.

³⁴ November 2015 through November 2021.

³⁵ See S&P Dow Jones Indices, Equity Indices Policies & Practices, Methodology (August 2021), at 15, available at <https://www.spglobal.com/spdji/en/documents/methodologies/methodology-sp-equity-indices-policies-practices.pdf>.

that the average standard deviation ratio was 1.62, which suggests more closing volatility on quarterly rebalance dates compared to non-quarterly expiration dates (for which the average standard deviation ratio was 1.22), thus indicating that the impact rebalancing may have on the S&P 500 is greater than any impact that P.M.-settled SPX options may have on the S&P 500.

The Exchange additionally focused its study of the post-2018 sample pilot data on reviewing for potential correlation between excess market volatility and price reversals and the hedging activity of liquidity providers. As explained in the DERA staff study, potential impact of P.M.-settled SPX options on the correlated equity markets is thought to stem from the hedging activity of liquidity providers in such options.³⁶ To determine any such potential correlation, the Exchange studied the expected action of liquidity providers that are the primary source of the hedging on settlement days. These liquidity providers generally delta-hedge their S&P 500 index exposure via S&P 500 futures and on settlement day unwind their futures positions that correspond with the delta of their in-the-money (ITM) expiring P.M.-settled SPX options. Assuming such behavior, the Exchange estimated the Market-On-Close (“MOC”)³⁷ volume for the shares of the S&P 500 component securities (i.e., “MOC share volume”) that could ultimately result from the unwinding of the liquidity providers’ futures positions by equating the notional value of the futures positions that correspond to expiring ITM open interest to the number S&P 500 component security contracts (based on the weight of each S&P 500 component security). That is, the Exchange calculated (an estimate) of the amount of MOC volume in the S&P

³⁶ See DERA Staff PM Pilot Memo, at 10-12.

³⁷ MOC orders allow a market participant to trade at the closing price. Market participants generally utilize MOC orders to ensure they exit positions at the end of the trading day.

500 component markets attributable hedging activity as a result of expiring ITM P.M.-settled SPX options (i.e., “hedging MOC”). The Exchange then: (1) compared the hedging MOC share volume to all MOC share volume on expiration days and non-expiration trading days; and (2) compared the notional value of the hedging futures positions (i.e., that correspond to expiring ITM P.M.-settled SPX options open interest) to the notional value of expiring ITM P.M.-settled SPX options open interest, the notional value of all expiring P.M.-settled SPX options open interest and the notional value of all P.M.-settled SPX options open interest.

The Exchange observed that, on average, there were approximately 25% more MOC shares executed on expiration days (332 expiration days) than non-expiration days (209 non-expiration days). While, at first glance, the volume of MOC shares executed on expiration days seems much greater than the volume executed on non-expiration days, the Exchange notes that much of this difference is attributable to just eight expiration days — the quarterly index rebalancing dates captured within the scope of the post-2018 sample pilot data. The average MOC share volume on the eight quarterly rebalancing dates was approximately 4.8 times the average MOC share volume on the non-quarterly rebalancing expiration dates; again, indicating that the impact rebalancing may have on the S&P 500 Index is greater than any impact that P.M.-settled SPX options may have on the S&P 500 Index. That is, the Exchange observed that the majority of closing volume on quarterly rebalance dates is driven by rebalancing of shares in the S&P 500, and not by P.M.-settled SPX options expiration-related hedging activity. Notwithstanding the MOC share volume on quarterly rebalancing dates, the volume of MOC shares executed on expiration days (324 expiration days) was only approximately 13% more than that on non-expiration

days, substantially less than the increase in volume over non-expiration days wherein the eight index rebalancing dates are included in expiration day volume. In addition to this, the Exchange observed that the hedging MOC share volume (i.e., the expected MOC share volume resulting from hedging activity in connection with expiring ITM P.M.-settled SPX options) was, on average, less than the MOC share volume on non-expiration days, and was only approximately 20% of the total MOC share volume on expiration days, indicating that other sources of MOC share volume generally exceed the volume resulting from hedging activity of expiring ITM P.M.-settled SPX options and would more likely be a source of any potential market volatility.

The Exchange also observed that, across all third-Friday expirations, the notional value of the hedging futures positions was approximately 25% of the notional value of expiring ITM P.M.-settled SPX options, approximately 3.8% of the notional value of all expiring P.M.-settled SPX options, and approximately only 0.5% of the notional value of all P.M.-settled SPX options. As such, the estimated hedging activity from liquidity providers on expiration days is a fraction of the expiring open interest in P.M.-settled SPX options, which, the Exchange notes, is only 14% of the total open interest in P.M.-settled SPX options; thus, indicating negligible capacity for hedging activity to increase volatility in the underlying markets.

While unrelated to the initial concerns of P.M.-settlement as described above, at the request of the Commission, the Exchange recently completed an analysis intended to evaluate whether the Pilot Programs impacted the quality of the A.M.-settled option market. Specifically, the Exchange compared values of key market quality indicators

(specifically, the bid-ask spread³⁸ and effective spread³⁹) in SPXW options (which trade on Cboe Options, an affiliated of the Exchange, pursuant to a nonstandard expiration program substantively similar to the Nonstandard Expiration Pilot Program) both before and after the introduction of Tuesday expirations and Thursday expirations for SPXW options on April 18 and May 11, 2022, respectively.⁴⁰ Options on the Standard & Poor's Depositary Receipts S&P 500 ETF ("SPY") were used as a control group to account for any market factors that might influence key market quality indicators. The Exchange used data from January 3, 2022 through March 4, 2022 (the two-month period prior to the introduction of SPXW options with Tuesday expirations) and data from May 11, 2022 to July 10, 2022 (the two-month period following the introduction of SPXW options with Thursday expirations).⁴¹

Given the time that has passed since the implementation of the Pilot Programs, as well as the fact that when the Exchange began offering XSPPM, Weekly and EOM options, XSPPM, Weekly, and EOM options had already been trading on other exchanges for nearly a decade, the Exchange is unable to analyze whether the introduction of those options significantly impacted the market quality of corresponding A.M.-settled options. The

³⁸ The Exchange calculated for each of SPXW options (with Monday, Wednesday, and Friday expirations) and SPY Weekly options (with Monday, Wednesday, and Friday expirations) the daily time-weighted bid-ask spread on the Exchange during its regular trading hours session, adjusted for the difference in size between SPXW options and SPY options (SPXW options are approximately ten times the value of SPY options).

³⁹ The Exchange calculated the volume-weighted average daily effective spread for simple trades for each of SPXW options (with Monday, Wednesday, and Friday expirations) and SPY Weekly options (with Monday, Wednesday, and Friday expirations) as twice the amount of the absolute value of the difference between an order execution price and the midpoint of the national best bid and offer at the time of execution, adjusted for the difference in size between SPXW options and SPY options.

⁴⁰ For purposes of comparison, the Exchange paired SPXW options and SPY options with the same moneyness and same days to expiration.

⁴¹ The Exchange observed comparable market volatility levels during the pre-intervention and post-intervention time ranges.

Exchange believes analyzing whether the introduction of new SPXW P.M.-settled expirations (i.e., SPXW options with Tuesday and Thursday expirations) impacted the market quality of then-existing SPXW P.M.-settled expirations (i.e., SPXW options with Monday, Wednesday, and Friday expirations) provides a reasonable substitute to evaluate whether the introduction of XSPPM, Weekly and EOM options impacted the market quality of any corresponding A.M.-settled options when the pilot began.⁴²

As a result of this analysis, the Exchange believes the introduction of SPX options with Tuesday and Thursday options had no significant impact on the market quality of SPXW options with Monday, Wednesday, and Friday expirations. With respect to the majority of series analyzed, the Exchange observed no statistically significant difference in the bid-ask spread or the effective spread of the series in the period prior to introduction of the Tuesday and Thursday expirations and the period following the introduction of the Tuesday and Thursday expirations. While statistically insignificant, the Exchange notes that in many series, particularly as they were closer to expiration, the Exchange observed that the values of these spreads decreased during the period following the introduction of the Tuesday and Thursday expirations.⁴³

To further note, given the significant changes in the closing procedures of the primary markets in recent decades, including considerable advances in trading systems and technology, the Exchange believes that the risks of any potential impact of Weekly and EOM options on the underlying cash markets are also de minimis.

⁴² The full analysis is included in Exhibit 3 of this rule filing.

⁴³ In any series in which the Exchange observed an increase in the market quality indicators, the Exchange notes any such increase was also statistically insignificant.

The Exchange proposes to make the Pilot Programs permanent as P.M.-settled index products have become a part of the Exchange's product offerings, providing investors with greater trading opportunities and flexibility. As indicated by the significant growth in the size of the market for P.M.-settled options, such options have been, and continue to be, well-received and widely used by market participants. Therefore, the Exchange wishes to be able to have the authority to continue to provide investors with the ability to trade XSPPM, Weekly, and EOM options on a permanent basis. The Exchange believes that the permanent continuation of the Pilot Programs will serve to maintain the status quo by continuing to offer a product to which investors have become accustomed and have incorporated into their business models and day-to-day trading methodologies for nearly 14 years (and for nearly 5 years on the Exchange). As such, the Exchange also believes that ceasing to have the authority to offer XSPPM, Weekly, and EOM options may result in market disruption and investor confusion. The Exchange has not identified any significant impact on market quality nor any unique or prohibitive regulatory concerns as a result of the Pilot Programs, and, as such, the Exchange believes that the continuation of the Pilot Programs as a pilot, including the use of time and resources to compile and analyze interim and annual pilot reports and pilot data, is no longer necessary and that making the Pilot Programs permanent will allow the Exchange to otherwise allocate time and resources to other industry initiatives.

(b) Statutory Basis

The Exchange believes the proposed rule change is consistent with the Securities Exchange Act of 1934 (the "Act") and the rules and regulations thereunder applicable to the Exchange and, in particular, the requirements of Section 6(b) of the Act.⁴⁴ Specifically,

⁴⁴

15 U.S.C. 78f(b).

the Exchange believes the proposed rule change is consistent with the Section 6(b)(5)⁴⁵ requirements that the rules of an exchange be designed to prevent fraudulent and manipulative acts and practices, to promote just and equitable principles of trade, to foster cooperation and coordination with persons engaged in regulating, clearing, settling, processing information with respect to, and facilitating transactions in securities, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, to protect investors and the public interest.

In particular, the Exchange believes that the making the Pilot Programs permanent will allow the Exchange to be able to have the authority to continue to offer XSPPM, Weekly, and EOM options – products that have become a part of the Exchange’s offerings – on a continuous and permanent basis. Since their reintroduction beginning in 2006,⁴⁶ P.M.-settled options have been, and continue to be, well-received and widely used by market participants, providing investors with greater trading opportunities and flexibility. The Exchange believes that the permanent continuation of the Pilot Programs will remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, protect investors and the public interest by continuing to offer a product to which investors have become accustomed and have incorporated into their business models and day-to-day trading strategies for nearly 14 years (including nearly 5 years on the Exchange). As indicated by the significant growth in the size of the market for P.M.-settled options, such options have been, and continue to be, well-received and widely used by market participants. Conversely, the Exchange believes ceasing to offer the Pilot Programs may result in market disruption and

⁴⁵ 15 U.S.C. 78f(b)(5).

⁴⁶ See supra notes 22-42. As described above, the Exchange’s conclusion is consistent with the analysis in the DERA Staff PM Pilot Memo.

investor confusion, as P.M.-settled index products have become a part of the Exchange's product offerings, providing investors with greater trading opportunities and flexibility.

The Exchange further believes that making the Pilot Programs permanent will remove impediments to and perfect the mechanism of a free and open market and a national market system and protect investors, while maintaining a fair and orderly market, as the Exchange believes that previous concerns (arising in the 1980s) regarding options expirations potentially contributing to excess volatility and reversals around the close have been adequately diminished. As described in detail above, the Exchange has observed no significant adverse market impact or identified any meaningful regulatory concerns during the approximately 5-year operation of the Pilot Programs as pilots nor during the nearly years since P.M.-settled SPX options were reintroduced to the marketplace.⁴⁷ Notably, the Exchange did not identify any significant economic impact (including on pricing or volatility or in connection with reversals) on related futures, the underlying indexes, or the underlying component securities of the underlying indexes surrounding the close as a result of the quantity of XSPPM, Weekly, and EOM options that settle at the close or the amount of expiring open interest in XSPPM, Weekly, and EOM options, nor any demonstrated capacity for options hedging activity to impact volatility in the underlying markets. While the DERA staff study and corresponding Exchange study described above specifically evaluated SPX options, because XSPPM, Weekly, and EOM options may only overly broad-based index options, the Exchange believes it is appropriate to extrapolate the data to apply to the XSPPM, Weekly, and EOM options, as SPX options also overlay a broad-based index. Additionally, with respect to XSP options, XSP options overly the same index comprised of the same securities (just one tenth the size).

⁴⁷ See supra notes 22-42.

This is particularly true given that the reports submitted by the Exchange during the pilot period have similarly demonstrated no significant economic impact on the respective underlying indexes or other products.

The Exchange also believes the introduction of XSPPM, Weekly, and EOM options had no significant impact on the market quality of corresponding A.M.-settled options (which the Exchange does not list) or other options. The Exchange believes this as a result of its analysis conducted after the introduction of SPXW options with Tuesday and Thursday expirations, which demonstrated no statistically significant impact on the bid-ask or effective spreads of SPXW options with Monday, Wednesday, and Friday expirations after trading in the SPXW options with Tuesday and Thursday expirations began. While SPXW options are P.M.-settled and SPX options are A.M.-settled, they are otherwise nearly identical products. As noted above, XSPPM options are nearly identical to P.M.-settled and A.M.-settled SPX options, as they are based on an index comprised of the same securities, just 1/10th the size. Additionally, Weekly, and EOM options may only overly broad-based indexes, including the Mini-SPX Index. Therefore, the Exchange believes analyzing the impact of new SPXW options on then-existing SPXW options permit the Exchange to extrapolate from this data that it is unlikely the introduction of any other XSPPM, Weekly, or EOM options significantly impacted the market quality of A.M.-settled options when the pilots began.

Additionally, the significant changes in the closing procedures of the primary markets in recent decades, including considerable advances in trading systems and technology, has significantly minimized risks of any potential impact of XSPPM, Weekly, or EOM options on the underlying cash markets. As such, the Exchange believes that permanent Pilot Programs do not raise any unique or prohibitive regulatory concerns and that such trading has

not, and will not, adversely impact fair and orderly markets on Expiration Fridays for the underlying indexes and their component securities. Further, as the Exchange has not identified any significant impact on market quality or any unique or prohibitive regulatory concerns as a result of offering XSPPM, Weekly, and EOM options, the Exchange believes that the continuation of the Pilot Programs as pilots, including the gathering, submission and review of the pilot reports and data, is no longer necessary and that making the Pilot Programs permanent will allow the Exchange to otherwise allocate time and resources to other industry initiatives.

Item 4. Self-Regulatory Organization's Statement on Burden on Competition

The Exchange does not believe that the proposed rule change will impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act. The Exchange does not believe that making the Pilot Programs permanent will impose any unnecessary or inappropriate burden on intramarket competition because XSPPM, Weekly, and EOM options will continue to be available to all market participants who wish to participate in the markets for those options. The Exchange believes that the growth the market of P.M.-settled options products, including XSPPM, Weekly, and EOM options, has experienced since their reintroduction through pilot programs indicates strong, continued investor interest and demand, warranting a permanent Pilot Program. The Exchange believes that, for the period that XSPPM, Weekly, and EOM options have been in operation as pilot programs, they have provided investors with a desirable product with which to trade and wishes to permanently offer this product to investors. Furthermore, during the pilot period, the Exchange has not observed any significant adverse market effects nor identified any regulatory concerns as a result of the Pilot Programs, and, as

such, the continuation of the Pilot Programs as pilots, including the gathering, submission and review of the pilot reports and data, is no longer necessary. Permanent Pilot Programs will allow the Exchange to otherwise allocate time and resources to other industry initiatives.

The Exchange further does not believe that making the Pilot Programs permanent will impose any burden on intermarket competition that is not necessary or appropriate in furtherance of the purposes of the Act because other exchanges are free to and do offer competing products.⁴⁸ To the extent that the permanent offering and continued trading of XSPPM, Weekly, and EOM options may make the Exchange a more attractive marketplace to market participants at other exchanges, such market participants may elect to become Exchange market participants.

Item 5. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

The Exchange neither solicited nor received comments on the proposed rule change.

Item 6. Extension of Time Period for Commission Action

Not applicable.

Item 7. Basis for Summary Effectiveness Pursuant to Section 19(b)(3) or for Accelerated Effectiveness Pursuant to Section 19(b)(2) or Section 19(b)(7)(D)

Not applicable.

Item 8. Proposed Rule Change Based on Rules of Another Self-Regulatory Organization or of the Commission

The Commission recently approved proposed rule changes to make Cboe Options' pilot programs to list XSPPM options and Weekly and EOM index options (each of which

⁴⁸ See, e.g., Cboe Options Rule 4.13(e) and Interpretation and Policy .13.

programs are substantively the same as the Pilot Programs, except Cboe Options' Nonstandard Expirations Program also permits the listing of options with Tuesday and Thursday expirations for certain indexes) permanent.⁴⁹

Item 9. Security-Based Swap Submissions Filed Pursuant to Section 3C of the Act

Not applicable.

Item 10. Advance Notices Filed Pursuant to Section 806(e) of the Payment, Clearing and Settlement Supervision Act

Not applicable.

Item 11. Exhibits

Exhibit 1. Completed Notice of Proposed Rule Change for publication in the Federal Register.

Exhibit 3 Analysis of Market Quality Impact of P.M.-Settled Index Options

Exhibit 5 Proposed rule text

⁴⁹ See supra note 17.

EXHIBIT 1**SECURITIES AND EXCHANGE COMMISSION**

[Release No. 34- ; File No. SR-CboeEDGX-2023-083]

[Insert date]

Self-Regulatory Organizations; Cboe EDGX Exchange, Inc.; Notice of Filing of a Proposed Rule Change Relating to Make Permanent Pilot Programs in Connection with the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 (the “Act”),¹ and Rule 19b-4 thereunder,² notice is hereby given that on [insert date], Cboe EDGX Exchange, Inc. (the “Exchange” or “EDGX”) filed with the Securities and Exchange Commission (the “Commission”) the proposed rule change as described in Items I, II, and III below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization’s Statement of the Terms of Substance of the Proposed Rule Change

The Exchange proposes to make permanent the operation of its programs that allow the Exchange to list options on the Mini-SPX Index (“XSP options”) with P.M.-settlement and to list broad-based index options with nonstandard expirations (“Nonstandard Expirations Pilot Program”).

The text of the proposed rule change is available on the Exchange’s website (http://markets.cboe.com/us/equities/regulation/rule_filings/EDGX/), at the Exchange’s Office of the Secretary, and at the Commission’s Public Reference Room.

¹ 15 U.S.C. 78s(b)(1).

² 17 CFR 240.19b-4.

II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the Exchange included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of these statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant aspects of such statements.

A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

1. Purpose

The Exchange proposes to make permanent its XSPPM Pilot Program and its Nonstandard Expirations Pilot Program. Specifically, the Exchanges proposes to be permitted to list on a permanent basis (1) XSP options with third-Friday-of-the-month expiration dates whose exercise settlement value is derived from closing prices on the last trading day prior to expiration ("P.M.-settled") ("XSPPM options") and (2) options on broad-based indexes that are P.M.-settled and expire (a) on any Monday, Wednesday, or Friday (other than the third Friday-of-the-month or days that coincide with an end-of-month ("EOM") expiration) ("Weekly Expirations") and (b) on the last day of the trading month ("EOM Expirations").³ The Securities and Exchange Commission (the "Commission") approved a rule change that established a pilot program under which the Exchange is permitted to list (1) XSP options with third-Friday-of-the-month expiration dates that are P.M.-settled (the "XSPPM Pilot Program") and (2) options on broad-based

³ In addition to proposing to delete the language in Rule 29.11(a)(6) and (j)(3) regarding the expiration date of the Pilot Programs, the Exchange proposes to delete the word "pilot" from the heading of Rule 29.11(j) and make a corresponding change to Rules 29.11(c)(5)(C).

indexes with Weekly Expirations and Monthly Expirations (the “Nonstandard Expirations Pilot Program” and, with the XSPPM Pilot Program, the “Pilot Programs”).⁴ XSPPM Options, Weekly Expirations, and EOMs are cash-settled and have European-style exercise. The Pilot Programs became effective on a pilot basis for a period of twelve months from the date of the approval of the Pilot Programs⁵ and were subsequently extended.⁶ Pursuant to Rule 29.11(a)(6) and (j)(3), the Pilot Programs are scheduled to expire on May 6, 2024. The Exchange hereby requests that the Commission approve the Pilot Programs on a permanent basis.

⁴ See Securities Exchange Act Release No. 85182 (February 22, 2019), 84 FR 6846 (February 28, 2019) (SR-CboeEDGX-2018-037) (“Pilot Programs Approval Order”). Under the terms of the Nonstandard Expirations Pilot Program, Weekly Expirations and EOMs are permitted on any broad-based index that is eligible for regular options trading.

⁵ See id.

⁶ See 88054 (January 27, 2020), 85 FR 5761 (January 31, 2020) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2020-002); 88787 (April 30, 2020), 85 FR 26995 (May 6, 2020) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2020-019); 90253 (October 22, 2020) 85 FR 68390 (October 28, 2020) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2020-050); 91700 (April 28, 2021), 86 FR 23770 (May 4, 2021) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2021-022); 93453 (October 28, 2021), 86 FR 60667 (November 3, 2021) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2021-047); 94803 (April 27, 2022), 87 FR 26237 (May 3, 2022) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2022-025); 96209 (November 2, 2022), 87 FR 67520 (November 8, 2022) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change to Extend the Pilot Programs in Connection with the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2022-047); 97443 (May 5, 2023) 88 FR 30356 (May 11, 2023) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options) (SR-CboeEDGX-2023-035); and 98640 (September 28, 2023), 88 FR 68846 (October 4, 2023) (SR-CboeEDGX-2023-061) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Extend the Pilot Programs in Connection With the Listing and Trading of P.M.-Settled Series on Certain Broad-Based Index Options).

By way of background, when cash-settled⁷ index options were first introduced in the 1980s, settlement was based on the closing value of the underlying index on the option's expiration date. The Commission later became concerned about the impact of P.M.-settled, cash-settled index options on the markets for the underlying stocks at the close on expiration Fridays. Specifically, certain episodes of price reversals around the close on quarterly expiration dates attracted the attention of regulators to the possibility that the simultaneous expiration of index futures, futures options, and options might be inducing abnormal volatility in the index value around the close.⁸ Academic research at the time provided at least some evidence suggesting that futures and options expirations contributed to excess volatility and reversals around the close on those days.⁹ In light of the concerns with P.M. settlement and to help ameliorate the price effects associated with expirations of P.M.-settled, cash-settled index products, in 1987, the Commodity Futures Trading Commission ("CFTC") approved a rule change by the Chicago Mercantile Exchange ("CME") to provide for A.M. settlement¹⁰ for index futures, including futures on the S&P 500.¹¹ The Commission subsequently approved a rule change by Cboe Options, Inc.

⁷ The seller of a "cash-settled" index option pays out the cash value of the applicable index on expiration or exercise. A "physically settled" option, like equity and ETF options, involves the transfer of the underlying asset rather than cash. See Characteristics and Risks of Standardized Options, available at: <https://www.theocc.com/Company-Information/Documents-and-Archives/Options-Disclosure-Document>.

⁸ The close of trading on the quarterly expiration Friday (i.e., the third Friday of March, June, September and December), when options, index futures, and options on index futures all expire simultaneously, became known as the "triple witching hour."

⁹ See Securities and Exchange Commission, Division of Economic Risk and Analysis, Memorandum, Cornerstone Analysis of PM Cash-Settled Index Option Pilots (February 2, 2021) ("DERA Staff PM Pilot Memo") at 5, available at: https://www.sec.gov/files/Analysis_of_PM_Cash_Settled_Index_Option_Pilots.pdf.

¹⁰ The exercise settlement value for an A.M.-settled index option is determined by reference to the reported level of the index as derived from the opening prices of the component securities on the business day before expiration.

¹¹ See Securities Exchange Act Release No. 24367 (April 17, 1987), 52 FR 13890 (April 27, 1987) (SR-CBOE-87-11) (noting that CME moved S&P 500 futures contract's settlement value to opening

(“Cboe Options”) to list and trade A.M.-settled SPX options.¹² In 1992, the Commission approved Cboe Options’ proposal to transition all of its European-style cash-settled options on the S&P 500 Index to A.M. settlement¹³; however, in 1993, the Commission approved a rule allowing Cboe Options to list P.M.-settled options on certain broad-based indices, including the S&P 500, expiring at the end of each calendar quarter (“Quarterly Index Expirations”) (since adopted as permanent).¹⁴ Starting in 2006, the Commission approved numerous rule changes, on a pilot basis, permitting the Cboe Options to introduce other index options, including SPX options, with P.M.-settlement. These include P.M.-settled index options expiring weekly (other than the third Friday of the month) and at the end of each month (“EOM”),¹⁵ P.M.-settled options on the S&P 500 Index that expire on the third Friday-of-the-month (“SPXPM”),¹⁶ as well as P.M.-settled Mini-SPX Index (“XSP”) options and Mini-Russell 2000 Index (“MRUT”) options expiring on the third Friday of

prices on the delivery date).

¹² See id.

¹³ See Securities Exchange Act Release No. 30944 (July 21, 1992), 57 FR 33376 (July 28, 1992) (SR-CBOE-92-09). Thereafter, the Commission approved proposals by the options markets to transfer most of their cash-settled index products to A.M. settlement.

¹⁴ See Securities Exchange Act Release No. 31800 (February 1, 1993), 58 FR 7274 (February 5, 1993) (SR-CBOE-92-13); see also Securities Exchange Act Release Nos. 54123 (July 11, 2006), 71 FR 40558 (July 17, 2006) (SR-CBOE-2006-65); and 60164 (June 23, 2009), 74 FR 31333 (June 30, 2009) (SR-CBOE-2009-029).

¹⁵ See Securities Exchange Act Release Nos. 62911 (September 14, 2010), 75 FR 57539 (September 21, 2010) (SR-CBOE-2009-075); 76529 (November 30, 2015), 80 FR 75695 (December 3, 2015) (SR-CBOE-2015-106); 78132 (June 22, 2016), 81 FR 42018 (June 28, 2016) (SR-CBOE-2016-046); and 78531 (August 10, 2016), 81 FR 54643 (August 16, 2016) (SR-CBOE-2016-046).

¹⁶ See Securities Exchange Act Release No. 68888 (February 8, 2013), 78 FR 10668 (February 14, 2013) (SR-CBOE-2012-120). Pursuant to Securities Exchange Act Release No. 80060 (February 17, 2017), 82 FR 11673 (February 24, 2017) (SR-CBOE-2016-091), the Exchange moved third-Friday P.M.-settled options into the S&P 500 Index options class, and as a result, the trading symbol for P.M.-settled S&P 500 Index options that have standard third Friday-of-the-month expirations changed from “SPXPM” to “SPXW.” This change went into effect on May 1, 2017, pursuant to Cboe Options Regulatory Circular RG17-054.

the month.¹⁷ As noted above, the Commission approved a rule to allow the Exchange to list XSPPM options and broad-based index options with Weekly and EOM Expirations.¹⁸ The Commission recently approved proposed rule changes to make Cboe Options' pilot programs to list P.M.-settled index options (including pilot programs substantively the same as the Pilot Programs) permanent.¹⁹

As stated above, since its inception in 2019, the Exchange has continuously extended the Pilot Program periods and, during the course of the Pilot Programs and in support of the extensions of the Pilot Programs, the Exchange has submitted reports to the Commission regarding the Pilot Programs that detail the Exchange's experience with the Pilot Programs, pursuant to the Pilot Programs Approval Order.²⁰ Specifically, the Exchange has submitted annual Pilot Program reports to the Commission that contain an analysis of volume, open interest, and trading patterns. In addition, for series that exceed certain minimum open interest parameters, the annual report would provide analysis of index price volatility and, if needed, share trading activity. The Exchange has also submitted periodic interim reports that contain some, but not all, of the information

¹⁷ See Securities Exchange Act Release Nos. 70087 (July 31, 2013), 78 FR 47809 (August 6, 2013) (SR-CBOE-2013-055); and 91067 (February 5, 2021) 86 FR 9108 (February 11, 2021) (SR-CBOE-2020-116).

¹⁸ See supra note 4.

¹⁹ See Securities Exchange Act Release Nos. 98454 (September 20, 2023) (SR-CBOE-2023-005) (order approving proposed rule change to make permanent the operation of a program that allows the Exchange to list p.m.-settled third Friday-of-the-month SPX options series); 98455 (September 20, 2023) (SR-CBOE-2023-019) (order approving proposed rule change to make permanent the operation of a program that allows the Exchange to list p.m.-settled third Friday-of-the-month XSP and MRUT options series); and 98456 (September 20, 2023) (SR-CBOE-2023-020) (order approving proposed rule change to make the nonstandard expirations pilot program permanent).

²⁰ See supra note 4.

contained in the annual reports (together with the periodic interim reports, the “pilot reports”).²¹

The pilot reports for the XSPPM Pilot Program contained the following volume and open interest data:

- (1) monthly volume aggregated for all trades;
- (2) monthly volume aggregated by expiration date;
- (3) monthly volume for each individual series;
- (4) month-end open interest aggregated for all series;
- (5) month-end open interest for all series aggregated by expiration date; and
- (6) month-end open interest for each individual series.

The pilot reports for the Nonstandard Expirations Pilot Program contained the following volume and open interest data:

- (1) monthly volume aggregated for all Weekly and EOM trades;
- (2) volume in Weekly and EOM series aggregated by expiration date;
- (3) month-end open interest aggregated for all Weekly and EOM series;
- (4) month-end open interest for EOM series aggregated by expiration date and week-ending open interest for Weekly series aggregated by expiration date;
- (5) ratio of monthly aggregate volume in Weekly and EOM series to total monthly class volume; and

²¹ In providing the pilot reports to the Commission, the Exchange previously requested confidential treatment of the pilot reports under the Freedom of Information Act (“FOIA”). See 5 U.S.C. 552.

- (6) ratio of month-end open interest in EOM series to total month-end class open interest and ratio of week-ending open interest in EOW series to total week-ending open interest.

The annual reports for the Pilot Programs also contained the information noted in respective Items (1) through (6) above for Expiration Friday, A.M.-settled series, if applicable, for the period covered in the pilot report. With respect to the Nonstandard Expirations Pilot Program, upon request by the Commission, the Exchange provided data files containing: (1) Weekly and EOM option volume data aggregated by series, and (2) Weekly week-ending open interest for expiring series and EOM month-end open interest for expiring series. In the annual reports, the Exchange also provided the following analyses of trading patterns in XSPPM options and index options with Weekly and EOM Expirations:

- with respect to the XSPPM Pilot Program, a time series analysis of open interest and an analysis of the distribution of trade sizes; and
- with respect to the Nonstandard Expirations Pilot Program, Weekly and EOM option volume data aggregated by series, and Weekly open interest for expiring series and EOM month-end open interest for expiring series.

Finally, for series that exceed certain minimum parameters,²² the annual reports contained the following analysis related to index price changes and underlying share trading volume at the close on Expiration Fridays:

²² The Exchange and the Commission determined the minimum open interest parameters, control sample, time intervals, method for randomly selecting the component securities, and sample periods.

- (1) a comparison of index price changes at the close of trading on a given Expiration Friday with comparable price changes from a control sample. The data includes a calculation of percentage price changes for various time intervals and compare that information to the respective control sample. Raw percentage price change data as well as percentage price change data normalized for prevailing market volatility, as measured by the Cboe Volatility Index (VIX), is provided; and
- (2) a calculation of share volume for a sample set of the component securities representing an upper limit on share trading that could be attributable to expiring in-the-money series. The data includes a comparison of the calculated share volume for securities in the sample set to the average daily trading volumes of those securities over a sample period.

Also, during the course of the Pilot Programs, the Exchange provided the Commission with any additional data or analyses the Commission requested if it deemed such data or analyses necessary to determine whether the Nonstandard Expirations Pilot Program was consistent with the Exchange Act. The Exchange has made public on its website all data and analyses previously submitted to the Commission under the Nonstandard Expirations Pilot Program,²³ and will continue to make public any data and analyses it submits to the Commission while the Pilot Programs is still in effect.

The Exchange has concluded that the Pilot Programs do not negatively impact market quality or raise any unique or prohibitive regulatory concerns. The Exchange has not identified any evidence from the pilot data indicating that the trading of XSPPM,

²³

Available at <https://www.cboe.com/aboutcboe/legal-regulatory/national-market-system-plans/pm-settlement-spxpm-data>.

Weekly options, and EOM options has any adverse impact on fair and orderly markets on Expiration Fridays for the underlying indexes or the underlying securities comprising those indexes, nor have there been any observations of abnormal market movements attributable to XSPPM, Weekly and EOM options from any market participants that have come to the attention of the Exchange.

Based on a study conducted by the Commission's Division of Economic and Risk Analysis ("DERA") staff on the pilot data from 2006 through 2018,²⁴ and the Exchange's review of the pilot data from 2019 through 2021, the size of the market for P.M.-settled SPX options (including quarterly, weekly, EOM and third Friday expirations) since 2007 has grown from a trivial portion of the overall market to a substantial share (from around 0.1% of open interest in 2007 to 30% in 2021).²⁵ Notional value of open interest in P.M.-settled SPX options increased from approximately a median of \$1.5 billion in 2007 to \$1.9 trillion in 2021, approximately 1260 times its value in 2007. Notional open interest in A.M.-settled SPX options was already hovering around a median of \$1.4 trillion in 2007, and it has since increased to approximately \$4.4 trillion in 2021. It is also important to note that open interest on expiring P.M.-settled SPX options, as compared to A.M.-settled options, is spread out across a greater number of expiration dates, which results in a smaller percentage of open interest expiring on any one date, thus mitigating concerns that SPXPM

²⁴ See DERA Staff PM Pilot Memo, at 13 ("Option settlement quantity data for A.M.- and P.M.-settled options were obtained from the Cboe, including the number of contracts that settled in-the-money for each exchange-traded option series on the S&P 500 index...on expiration days from January 20, 2006 through December 31, 2018. Daily open interest and volume data for [SPX] option series were also obtained from Cboe, including open interest data from January 3, 2006 through December 31, 2018 and trading volume data from January 3, 2006 through December 31, 2018.")

²⁵ The DERA staff study reviewed and provided statistics for market share, median notional value of open interest and median volume in 2007 and in 2018. The Exchange provides updated statistics for market share, median notional value of open interest and median volume in 2021, replacing the 2018 statistics provided in the Commission staff study.

option expiration may have a disruptive effect on the market.²⁶ Daily trading volume in P.M.-settled SPX options has increased from a median of about 700 contracts in 2007 to nearly 1.9 million contracts in 2021,²⁷ and now exceeds trading volume in A.M.-settled SPX options.

Moreover, the DERA staff study of the P.M.-settled SPX options pilot data (2006 through 2018) did not identify any significant economic impact on S&P 500 futures,²⁸ the S&P 500, or the underlying component securities of the S&P 500 surrounding the close. For purposes of the study, volatility was by and large measured by using the standard deviation²⁹ of one-minute returns of S&P 500 futures values and the index value during regular hours on each day reviewed (excluding the first and last 15 minutes of trading) and then compared with the standard deviation of one-minute returns (for S&P 500 futures, the S&P 500, and the underlying component securities of the S&P 500) over the last 15 minutes of a trading day.³⁰ Using this as a general measure,³¹ the DERA staff study then

²⁶ See DERA Staff PM Pilot Memo, at 2.

²⁷ The Exchange notes that the DERA staff study used two-sided volume data for the median volume in 2007 and in 2018; therefore, the Exchange provides two-sided volume data for the median volume in 2021.

²⁸ Futures on the S&P 500 experience high volume and liquidity both before and after the close of the underlying market. Therefore, futures are a useful measure of abnormal volatility surrounding the close and the open. See DERA Staff PM Pilot Memo, at 14. The Exchange agrees with this approach.

²⁹ Standard deviation applied to a rate of return (in this case, one-minute) of an instrument can indicate that instrument's historical volatility. The greater the standard deviation, the greater the variance between price and the mean, which indicates a larger price range, i.e., higher volatility.

³⁰ For example, if on a particular day the standard deviation of one-minute returns between 3:45 p.m. ET and 4:00 p.m. ET is 0.004 and the standard deviation of returns from 9:45 a.m. ET to 3:45 p.m. ET is 0.002, this metric would take on a value of 2 for that day, indicating that volatility during the last 15 minutes of the trading day was twice as high as it was during the rest of the trading day. See DERA Staff PM Pilot Memo, at 15; see also DERA Staff PM Pilot Memo, at Section V, which discusses in detail the metrics used to measure, for the purposes of the study, the extent to which the market may experience abnormal volatility surrounding SPXPM option settlement.

³¹ See DERA Staff PM Pilot Memo, at Section V, which discusses in detail the metrics used to measure, for the purposes of the study, the extent to which the market may experience abnormal

reviewed whether, and to what extent, the settlement quantity of SPXPM options and the levels of open interest in SPXPM options on expiration days (as compared to non-expiration days) may be associated with general price volatility and price reversals for S&P 500 futures, the S&P 500, and the underlying component securities of the S&P 500 near the close. From its review of the study, the Exchange agrees that, although volatility before the market close is generally higher than during the rest of the trading day, there is no evidence of any significant adverse economic impact to the futures, index, or underlying index component securities markets as a result of the quantity of P.M.-settled SPX options that settle at the close or the amount of expiring open interest in P.M.-settled SPX options. For example, the largest settlement event that occurred during the time period of the study (a settlement of \$100.4 billion of notional on December 29, 2017) had an estimated impact on the futures price of only approximately 0.02% (a predicted impact of \$0.54 relative to a closing futures price of \$2,677).

In particular, the DERA staff study found that an additional P.M.-settled SPX options settlement quantity equal to \$10 billion in notional value is associated with a marginal impact on futures prices during the last 15 minutes of the trading day of only about \$0.06 (where the hypothetical index level is 2,500), additional expiring open interest in P.M.-settled SPX options equal to \$10 billion in notional value is associated with a marginal impact on futures prices during the last 15 minutes of the trading day of only about \$0.05 (assumed index level is 2,500). Also, an additional increase in settlement quantity or in expiring open interest, each equal to \$20 million in notional value, did not

volatility surrounding SPXPM option settlement.

result in any meaningful futures price reversals near the close (neither was found to cause a price reversal of over one standard deviation³²).

Likewise, the study identified that an additional total P.M.-settled SPX options settlement quantity equal to \$10 billion in notional value corresponds to price movement in the S&P 500 of only about \$0.08 (assuming an index level of 2,500) during the last 15 minutes of the trading day, and that additional expiring open interest equal to \$10 billion in notional value corresponds to a price movement in the S&P 500 of only about \$0.06 (assuming an index level of 2,500) during the last 15 minutes of the trading day. The study also identified that it would take an increase of \$34 billion in notional value of total settlement quantity and of expiring open interest for one additional S&P 500 price reversal of greater than two standard deviations to occur in the last 15 minutes before the market close. Also, regarding potential impact to S&P 500 component securities, it would take an increase in total P.M.-settled SPX options settlement quantity equal to \$20 billion to effect a price movement of only approximately \$0.03 for a \$200 stock, an increase in expiring open interest in P.M.-settled SPX options equal to \$10 billion to effect a price movement less than half a standard deviation, and an increase in total P.M.-settled SPX settlement quantity equal to \$7 billion to achieve a price reversal greater two standard deviations.

The study employed the same metrics to determine whether there is greater price volatility for S&P 500 futures, the S&P 500, and the component securities of the S&P 500 related to SPXPM option settlements during an environment of high market volatility (i.e., on days in which the VIX Index was in the top 10% of closing index values) and did not identify indicators of any significant economic impact on these markets near the close as a

³² See supra note 29.

result of the P.M.-settled SPX options settlement.³³ In addition to this, the DERA staff study, applying the same metrics and analysis as for P.M.-settled SPX options to A.M.-settled SPX options, did not identify any evidence of a statistically significant relationship between settlement quantity or expiring open interest of A.M.-settled options and volatility near the open.

Upon review of the results of the DERA staff study, the Exchange agrees that each of the above-described marginal price movements in S&P 500 futures, the S&P 500, and the S&P 500 component securities affected by increases in P.M.-settled SPX options settlement quantity and expiring open interest appear to be de minimis pricing changes from those that occur over regular trading hours (outside of the last 15 minutes of the trading day). Further, the Exchange has not observed any significant economic impact or other adverse effects on the market from similar reviews of its pilot reports and data submitted after 2018.³⁴ In its review of a sample of the pilot data from 2019 through 2021, the Exchange similarly measured volatility over the final fifteen minutes of each trading day by taking the standard deviation of rolling one-minute returns of the S&P 500 level (excluding the first and last fifteen minutes of trading) and comparing such with the standard deviation of one-minute returns³⁵ of the S&P 500 level, over the last 15 minutes of a trading day. The Exchange identified an average standard deviation ratio of 1.42 for the S&P 500 on non-expiration days and an average standard deviation ratio of 1.54 for the

³³ The Exchange also notes that the study did not identify any evidence that less liquid S&P 500 constituent securities experienced any greater impact from the settlement of P.M.-settled SPX options.

³⁴ Total SPX open interest volumes were examined for expiration dates over a roughly two-year period between October 2019 and November 2021.

³⁵ Calculated at every tick for the prior minute.

S&P 500 on expiration days (a ratio between expiration days and non-expiration days of 1.09). The Exchange also notes that, using the same methodology, it observed that, from 2015 through 2019,³⁶ the average standard deviation ratio for the S&P 500 on non-expiration days was 1.11 and the average standard deviation ratio for the S&P 500 on expiration days was 1.22 (a ratio between expiration days and non-expiration days of 1.10). While the average standard deviation ratio on both expiration and non-expiration days was higher in 2019 through 2021 due to overall market volatility, the ratios between the standard deviation ratios on expiration days and non-expirations days remained nearly identical between the 2015 through 2019 timeframe and the 2019 through 2021. This shows that, in cases where overall market volatility may increase, the normalized impact on expiration days to non-expiration days generally remains consistent.

In addition to this, the Exchange notes that the S&P 500 Index is rebalanced quarterly. The changes resulting from each rebalancing coincide with the third-Friday of the quarterly rebalancing month (i.e., March, June, September, October and December)³⁷ and generally drive an increase in trading activity from investors that seek to track the S&P 500. As such, the Exchange measured volatility on quarterly rebalancing dates and found that the average standard deviation ratio was 1.62, which suggests more closing volatility on quarterly rebalance dates compared to non-quarterly expiration dates (for which the average standard deviation ratio was 1.22), thus indicating that the impact rebalancing may

³⁶ November 2015 through November 2021.

³⁷ See S&P Dow Jones Indices, Equity Indices Policies & Practices, Methodology (August 2021), at 15, available at <https://www.spglobal.com/spdji/en/documents/methodologies/methodology-sp-equity-indices-policies-practices.pdf>.

have on the S&P 500 is greater than any impact that P.M.-settled SPX options may have on the S&P 500.

The Exchange additionally focused its study of the post-2018 sample pilot data on reviewing for potential correlation between excess market volatility and price reversals and the hedging activity of liquidity providers. As explained in the DERA staff study, potential impact of P.M.-settled SPX options on the correlated equity markets is thought to stem from the hedging activity of liquidity providers in such options.³⁸ To determine any such potential correlation, the Exchange studied the expected action of liquidity providers that are the primary source of the hedging on settlement days. These liquidity providers generally delta-hedge their S&P 500 index exposure via S&P 500 futures and on settlement day unwind their futures positions that correspond with the delta of their in-the-money (ITM) expiring P.M.-settled SPX options. Assuming such behavior, the Exchange estimated the Market-On-Close (“MOC”)³⁹ volume for the shares of the S&P 500 component securities (i.e., “MOC share volume”) that could ultimately result from the unwinding of the liquidity providers’ futures positions by equating the notional value of the futures positions that correspond to expiring ITM open interest to the number S&P 500 component security contracts (based on the weight of each S&P 500 component security). That is, the Exchange calculated (an estimate) of the amount of MOC volume in the S&P 500 component markets attributable hedging activity as a result of expiring ITM P.M.-settled SPX options (i.e., “hedging MOC”). The Exchange then: (1) compared the hedging MOC share volume to all MOC share volume on expiration days and non-expiration

³⁸ See DERA Staff PM Pilot Memo, at 10-12.

³⁹ MOC orders allow a market participant to trade at the closing price. Market participants generally utilize MOC orders to ensure they exit positions at the end of the trading day.

trading days; and (2) compared the notional value of the hedging futures positions (i.e., that correspond to expiring ITM P.M.-settled SPX options open interest) to the notional value of expiring ITM P.M.-settled SPX options open interest, the notional value of all expiring P.M.-settled SPX options open interest and the notional value of all P.M.-settled SPX options open interest.

The Exchange observed that, on average, there were approximately 25% more MOC shares executed on expiration days (332 expiration days) than non-expiration days (209 non-expiration days). While, at first glance, the volume of MOC shares executed on expiration days seems much greater than the volume executed on non-expiration days, the Exchange notes that much of this difference is attributable to just eight expiration days — the quarterly index rebalancing dates captured within the scope of the post-2018 sample pilot data. The average MOC share volume on the eight quarterly rebalancing dates was approximately 4.8 times the average MOC share volume on the non-quarterly rebalancing expiration dates; again, indicating that the impact rebalancing may have on the S&P 500 Index is greater than any impact that P.M.-settled SPX options may have on the S&P 500 Index. That is, the Exchange observed that the majority of closing volume on quarterly rebalance dates is driven by rebalancing of shares in the S&P 500, and not by P.M.-settled SPX options expiration-related hedging activity. Notwithstanding the MOC share volume on quarterly rebalancing dates, the volume of MOC shares executed on expiration days (324 expiration days) was only approximately 13% more than that on non-expiration days, substantially less than the increase in volume over non-expiration days wherein the eight index rebalancing dates are included in expiration day volume. In addition to this, the Exchange observed that the hedging MOC share volume (i.e., the expected MOC share

volume resulting from hedging activity in connection with expiring ITM P.M.-settled SPX options) was, on average, less than the MOC share volume on non-expiration days, and was only approximately 20% of the total MOC share volume on expiration days, indicating that other sources of MOC share volume generally exceed the volume resulting from hedging activity of expiring ITM P.M.-settled SPX options and would more likely be a source of any potential market volatility.

The Exchange also observed that, across all third-Friday expirations, the notional value of the hedging futures positions was approximately 25% of the notional value of expiring ITM P.M.-settled SPX options, approximately 3.8% of the notional value of all expiring P.M.-settled SPX options, and approximately only 0.5% of the notional value of all P.M.-settled SPX options. As such, the estimated hedging activity from liquidity providers on expiration days is a fraction of the expiring open interest in P.M.-settled SPX options, which, the Exchange notes, is only 14% of the total open interest in P.M.-settled SPX options; thus, indicating negligible capacity for hedging activity to increase volatility in the underlying markets.

While unrelated to the initial concerns of P.M.-settlement as described above, at the request of the Commission, the Exchange recently completed an analysis intended to evaluate whether the Pilot Programs impacted the quality of the A.M.-settled option market. Specifically, the Exchange compared values of key market quality indicators (specifically, the bid-ask spread⁴⁰ and effective spread⁴¹) in SPXW options (which trade

⁴⁰ The Exchange calculated for each of SPXW options (with Monday, Wednesday, and Friday expirations) and SPY Weekly options (with Monday, Wednesday, and Friday expirations) the daily time-weighted bid-ask spread on the Exchange during its regular trading hours session, adjusted for the difference in size between SPXW options and SPY options (SPXW options are approximately ten times the value of SPY options).

⁴¹ The Exchange calculated the volume-weighted average daily effective spread for simple trades for

on Cboe Options, an affiliated of the Exchange, pursuant to a nonstandard expiration program substantively similar to the Nonstandard Expiration Pilot Program) both before and after the introduction of Tuesday expirations and Thursday expirations for SPXW options on April 18 and May 11, 2022, respectively.⁴² Options on the Standard & Poor's Depositary Receipts S&P 500 ETF ("SPY") were used as a control group to account for any market factors that might influence key market quality indicators. The Exchange used data from January 3, 2022 through March 4, 2022 (the two-month period prior to the introduction of SPXW options with Tuesday expirations) and data from May 11, 2022 to July 10, 2022 (the two-month period following the introduction of SPXW options with Thursday expirations).⁴³

Given the time that has passed since the implementation of the Pilot Programs, as well as the fact that when the Exchange began offering XSPPM, Weekly and EOM options, XSPPM, Weekly, and EOM options had already been trading on other exchanges for nearly a decade, the Exchange is unable to analyze whether the introduction of those options significantly impacted the market quality of corresponding A.M.-settled options. The Exchange believes analyzing whether the introduction of new SPXW P.M.-settled expirations (i.e., SPXW options with Tuesday and Thursday expirations) impacted the market quality of then-existing SPXW P.M.-settled expirations (i.e., SPXW options with

each of SPXW options (with Monday, Wednesday, and Friday expirations) and SPY Weekly options (with Monday, Wednesday, and Friday expirations) as twice the amount of the absolute value of the difference between an order execution price and the midpoint of the national best bid and offer at the time of execution, adjusted for the difference in size between SPXW options and SPY options.

⁴² For purposes of comparison, the Exchange paired SPXW options and SPY options with the same moneyness and same days to expiration.

⁴³ The Exchange observed comparable market volatility levels during the pre-intervention and post-intervention time ranges.

Monday, Wednesday, and Friday expirations) provides a reasonable substitute to evaluate whether the introduction of XSPPM, Weekly and EOM options impacted the market quality of any corresponding A.M.-settled options when the pilot began.⁴⁴

As a result of this analysis, the Exchange believes the introduction of SPX options with Tuesday and Thursday options had no significant impact on the market quality of SPXW options with Monday, Wednesday, and Friday expirations. With respect to the majority of series analyzed, the Exchange observed no statistically significant difference in the bid-ask spread or the effective spread of the series in the period prior to introduction of the Tuesday and Thursday expirations and the period following the introduction of the Tuesday and Thursday expirations. While statistically insignificant, the Exchange notes that in many series, particularly as they were closer to expiration, the Exchange observed that the values of these spreads decreased during the period following the introduction of the Tuesday and Thursday expirations.⁴⁵

To further note, given the significant changes in the closing procedures of the primary markets in recent decades, including considerable advances in trading systems and technology, the Exchange believes that the risks of any potential impact of Weekly and EOM options on the underlying cash markets are also de minimis.

The Exchange proposes to make the Pilot Programs permanent as P.M.-settled index products have become a part of the Exchange's product offerings, providing investors with greater trading opportunities and flexibility. As indicated by the significant growth in the size of the market for P.M.-settled options, such options have been, and

⁴⁴ The full analysis is included in Exhibit 3 of this rule filing.

⁴⁵ In any series in which the Exchange observed an increase in the market quality indicators, the Exchange notes any such increase was also statistically insignificant.

continue to be, well-received and widely used by market participants. Therefore, the Exchange wishes to be able to have the authority to continue to provide investors with the ability to trade XSPPM, Weekly, and EOM options on a permanent basis. The Exchange believes that the permanent continuation of the Pilot Programs will serve to maintain the status quo by continuing to offer a product to which investors have become accustomed and have incorporated into their business models and day-to-day trading methodologies for nearly 14 years (and for nearly 5 years on the Exchange). As such, the Exchange also believes that ceasing to have the authority to offer XSPPM, Weekly, and EOM options may result in market disruption and investor confusion. The Exchange has not identified any significant impact on market quality nor any unique or prohibitive regulatory concerns as a result of the Pilot Programs, and, as such, the Exchange believes that the continuation of the Pilot Programs as a pilot, including the use of time and resources to compile and analyze interim and annual pilot reports and pilot data, is no longer necessary and that making the Pilot Programs permanent will allow the Exchange to otherwise allocate time and resources to other industry initiatives.

2. Statutory Basis

The Exchange believes the proposed rule change is consistent with the Act and the rules and regulations thereunder applicable to the Exchange and, in particular, the requirements of Section 6(b) of the Act.⁴⁶ Specifically, the Exchange believes the proposed rule change is consistent with the Section 6(b)(5)⁴⁷ requirements that the rules of an exchange be designed to prevent fraudulent and manipulative acts and practices, to promote

⁴⁶ 15 U.S.C. 78f(b).

⁴⁷ 15 U.S.C. 78f(b)(5).

just and equitable principles of trade, to foster cooperation and coordination with persons engaged in regulating, clearing, settling, processing information with respect to, and facilitating transactions in securities, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, to protect investors and the public interest.

In particular, the Exchange believes that the making the Pilot Programs permanent will allow the Exchange to be able to have the authority to continue to offer XSPPM, Weekly, and EOM options – products that have become a part of the Exchange’s offerings – on a continuous and permanent basis. Since their reintroduction beginning in 2006,⁴⁸ P.M.-settled options have been, and continue to be, well-received and widely used by market participants, providing investors with greater trading opportunities and flexibility. The Exchange believes that the permanent continuation of the Pilot Programs will remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, protect investors and the public interest by continuing to offer a product to which investors have become accustomed and have incorporated into their business models and day-to-day trading strategies for nearly 14 years (including nearly 5 years on the Exchange). As indicated by the significant growth in the size of the market for P.M.-settled options, such options have been, and continue to be, well-received and widely used by market participants. Conversely, the Exchange believes ceasing to offer the Pilot Programs may result in market disruption and investor confusion, as P.M.-settled

⁴⁸

See supra notes 24-44. As described above, the Exchange’s conclusion is consistent with the analysis in the DERA Staff PM Pilot Memo.

index products have become a part of the Exchange's product offerings, providing investors with greater trading opportunities and flexibility.

The Exchange further believes that making the Pilot Programs permanent will remove impediments to and perfect the mechanism of a free and open market and a national market system and protect investors, while maintaining a fair and orderly market, as the Exchange believes that previous concerns (arising in the 1980s) regarding options expirations potentially contributing to excess volatility and reversals around the close have been adequately diminished. As described in detail above, the Exchange has observed no significant adverse market impact or identified any meaningful regulatory concerns during the approximately 5-year operation of the Pilot Programs as pilots nor during the nearly years since P.M.-settled SPX options were reintroduced to the marketplace.⁴⁹ Notably, the Exchange did not identify any significant economic impact (including on pricing or volatility or in connection with reversals) on related futures, the underlying indexes, or the underlying component securities of the underlying indexes surrounding the close as a result of the quantity of XSPPM, Weekly, and EOM options that settle at the close or the amount of expiring open interest in XSPPM, Weekly, and EOM options, nor any demonstrated capacity for options hedging activity to impact volatility in the underlying markets. While the DERA staff study and corresponding Exchange study described above specifically evaluated SPX options, because XSPPM, Weekly, and EOM options may only overly broad-based index options, the Exchange believes it is appropriate to extrapolate the data to apply to the XSPPM, Weekly, and EOM options, as SPX options also overlay a broad-based index. Additionally, with respect to XSP options, XSP options overly the same index

⁴⁹ See supra notes 24-44.

comprised of the same securities (just one tenth the size). This is particularly true given that the reports submitted by the Exchange during the pilot period have similarly demonstrated no significant economic impact on the respective underlying indexes or other products.

The Exchange also believes the introduction of XSPPM, Weekly, and EOM options had no significant impact on the market quality of corresponding A.M.-settled options (which the Exchange does not list) or other options. The Exchange believes this as a result of its analysis conducted after the introduction of SPXW options with Tuesday and Thursday expirations, which demonstrated no statistically significant impact on the bid-ask or effective spreads of SPXW options with Monday, Wednesday, and Friday expirations after trading in the SPXW options with Tuesday and Thursday expirations began. While SPXW options are P.M.-settled and SPX options are A.M.-settled, they are otherwise nearly identical products. As noted above, XSPPM options are nearly identical to P.M.-settled and A.M.-settled SPX options, as they are based on an index comprised of the same securities, just 1/10th the size. Additionally, Weekly, and EOM options may only overly broad-based indexes, including the Mini-SPX Index. Therefore, the Exchange believes analyzing the impact of new SPXW options on then-existing SPXW options permit the Exchange to extrapolate from this data that it is unlikely the introduction of any other XSPPM, Weekly, or EOM options significantly impacted the market quality of A.M.-settled options when the pilots began.

Additionally, the significant changes in the closing procedures of the primary markets in recent decades, including considerable advances in trading systems and technology, has significantly minimized risks of any potential impact of XSPPM, Weekly,

or EOM options on the underlying cash markets. As such, the Exchange believes that permanent Pilot Programs do not raise any unique or prohibitive regulatory concerns and that such trading has not, and will not, adversely impact fair and orderly markets on Expiration Fridays for the underlying indexes and their component securities. Further, as the Exchange has not identified any significant impact on market quality or any unique or prohibitive regulatory concerns as a result of offering XSPPM, Weekly, and EOM options, the Exchange believes that the continuation of the Pilot Programs as pilots, including the gathering, submission and review of the pilot reports and data, is no longer necessary and that making the Pilot Programs permanent will allow the Exchange to otherwise allocate time and resources to other industry initiatives.

B. Self-Regulatory Organization's Statement on Burden on Competition

The Exchange does not believe that the proposed rule change will impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act. The Exchange does not believe that making the Pilot Programs permanent will impose any unnecessary or inappropriate burden on intramarket competition because XSPPM, Weekly, and EOM options will continue to be available to all market participants who wish to participate in the markets for those options. The Exchange believes that the growth the market of P.M.-settled options products, including XSPPM, Weekly, and EOM options, has experienced since their reintroduction through pilot programs indicates strong, continued investor interest and demand, warranting a permanent Pilot Program. The Exchange believes that, for the period that XSPPM, Weekly, and EOM options have been in operation as pilot programs, they have provided investors with a desirable product with which to trade and wishes to permanently offer this product to investors. Furthermore, during the pilot period, the Exchange has not observed any significant adverse market

effects nor identified any regulatory concerns as a result of the Pilot Programs, and, as such, the continuation of the Pilot Programs as pilots, including the gathering, submission and review of the pilot reports and data, is no longer necessary. Permanent Pilot Programs will allow the Exchange to otherwise allocate time and resources to other industry initiatives.

The Exchange further does not believe that making the Pilot Programs permanent will impose any burden on intermarket competition that is not necessary or appropriate in furtherance of the purposes of the Act because other exchanges are free to and do offer competing products.⁵⁰ To the extent that the permanent offering and continued trading of XSPPM, Weekly, and EOM options may make the Exchange a more attractive marketplace to market participants at other exchanges, such market participants may elect to become Exchange market participants.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

The Exchange neither solicited nor received written comments on the proposed rule change.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Within 45 days of the date of publication of this notice in the Federal Register or within such longer period up to 90 days (i) as the Commission may designate if it finds such longer period to be appropriate and publishes its reasons for so finding or (ii) as to which the Exchange consents, the Commission will:

- A. by order approve or disapprove such proposed rule change, or

⁵⁰ See, e.g., Cboe Options Rule 4.13(e) and Interpretation and Policy .13.

B. institute proceedings to determine whether the proposed rule change should be disapproved.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments:

- Use the Commission's internet comment form (<https://www.sec.gov/rules/sro.shtml>); or
- Send an email to rule-comments@sec.gov. Please include file number SR-Cboe-EDGX-2023-083 on the subject line.

Paper Comments:

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549-1090.

All submissions should refer to file number SR-Cboe-EDGX-2023-083. This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (<https://www.sec.gov/rules/sro.shtml>). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for

website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549, on official business days between the hours of 10 a.m. and 3 p.m. Copies of the filing also will be available for inspection and copying at the principal office of the Exchange. Do not include personal identifiable information in submissions; you should submit only information that you wish to make available publicly. We may redact in part or withhold entirely from publication submitted material that is obscene or subject to copyright protection. All submissions should refer to file number SR-CboeEDGX-2023-083 and should be submitted on or before [INSERT DATE 21 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.⁵¹

Sherry R. Haywood,

Assistant Secretary.

⁵¹ 17 CFR 200.30-3(a)(12).

EXHIBIT 3**ANALYSIS OF MARKET QUALITY IMPACT OF P.M.-SETTLED INDEX
OPTIONS****I. Background & Research Questions**

The analysis aims to evaluate the impact on market quality in connection with Cboe Options, Inc.'s ("Cboe Options") and certain of its affiliates' listing of P.M.-settled broad-based index options.

II. Methodology

The study followed the 'difference-in-difference' approach ("DnD") to compare the values of key market quality indicators before-and-after the introduction of Tuesday expirations and Thursday expirations for SPX Weekly ("SPXW") options, which were launched on April 18, 2022 and May 11, 2022 respectively. DnD is a commonly used quasi-experimental technique to estimate causal inference from a nonequivalence control group. It first involves identifying a 'treatment group' and a group of non-treated subjects as 'control group'. In this case, the existing product of SPX Weekly options with Monday/Wednesday/Friday ("M/W/F") expirations was the treatment group and SPY options with Monday/Wednesday/Friday expirations was the control group. Although Cboe Options considered using the E-mini Weekly options as a control group as they are more similarly situated to SPXW options, CME also began listing Tuesday and Thursday expirations, therefore Cboe Options does not believe that E-mini Weekly options can be used as a control group for this study. The Cboe Options notes that the use of SPY options presents certain limitations as a result of systematic differences between SPXW options and SPY options. For example: SPY options pay a dividend every quarter whereas SPX options do not; the minimum tick size requirements differ; and SPY options are American-style and physically settled, whereas SPXW options are European-style and cash-settled.

The study calculated the difference in market quality indicators before and after the ‘treatment’ (the introduction of SPXW Tuesday/Thursday expirations in this case) on each group. The impact could therefore be assessed by comparing the pre/post changes in the SPXW M/W/F expirations series with those from the SPY M/W/F expirations series. In addition, the parallel trend assumption should be met to ensure the internal validity of DnD model, which requires the difference between the treatment and control group to be constant over time before the intervention.

In addition, Cboe Options does not believe that SPX AM options can be used as a treatment group with the SPY options as the control group. First, one of the essences of the DnD framework is to pair the treatment group with the comparable control group. Since there’s only one set of series available for SPY to match with SPX, including SPX in the model will introduce double-counting SPY. Second, SPY might not be a good comparison to SPX given their different settlement schedules. For the contract expiring on the same day, SPY options always have a longer day to expiration than SPX options. The Cboe Options also conducted a correlation test comparing SPX AM vs SPY, from which a weaker correlation in the key market quality indicators was observed. Therefore, adding SPX AM options to the analysis is not recommended due to the intrinsic differences between the products.

Key Market Quality Indicator of Interest

The Bid-Ask Spread (“Spread”) was used as one of the key indicators of market quality in the analysis. Specifically, daily time-weighted Spread on Cboe Options during Regular Trading Hours (“RTH”) was calculated for SPXW M/W/F series, and daily time-weighted Spread of the NBBO will be calculated for SPY M/W/F series. Since an SPX option is about 10

times the value of an SPY option, the Spread of SPY options was adjusted by x10 to scale it with the Spread of SPXW options.

The Effective Spread for simple trades was used as another indicator of market quality, where the Effective Spread measures the twice of the amount for the absolute value of an order execution to the midpoint of the national best bid and national best offer at the time of execution. The volume-weight average daily Effective Spread for the order executions on the Cboe Cboe Options was calculated for both SPXW M/W/F series and SPY M/W/F series. The Effective Spread of SPY options was adjusted by x10 to scale it with the Effective Spread of SPXW options for the same reason mentioned above. Below shows the formula for Effective Spread:

$$\text{Effective Spread} = \text{Abs} \left(\text{Order Execution Price} - \frac{(\text{National Best Bid} + \text{National Best Offer})}{2} \right) \times 2$$

Time Range

Data was compared between the pre-intervention period and the post-intervention period. The post-intervention data was collected for the time range from May 11, 2022 to July 10, 2022 (two calendar months following the introduction of Thursdays expirations), and the pre-intervention time range from January 3, 2022 to March 4, 2022 (two calendar months). The Cboe Options believes the selection of pre-intervention time range has similar market conditions to the post-intervention period that the two time periods share comparable market volatility levels

Table 1: SPXW & SPY Quoted Spread Trend

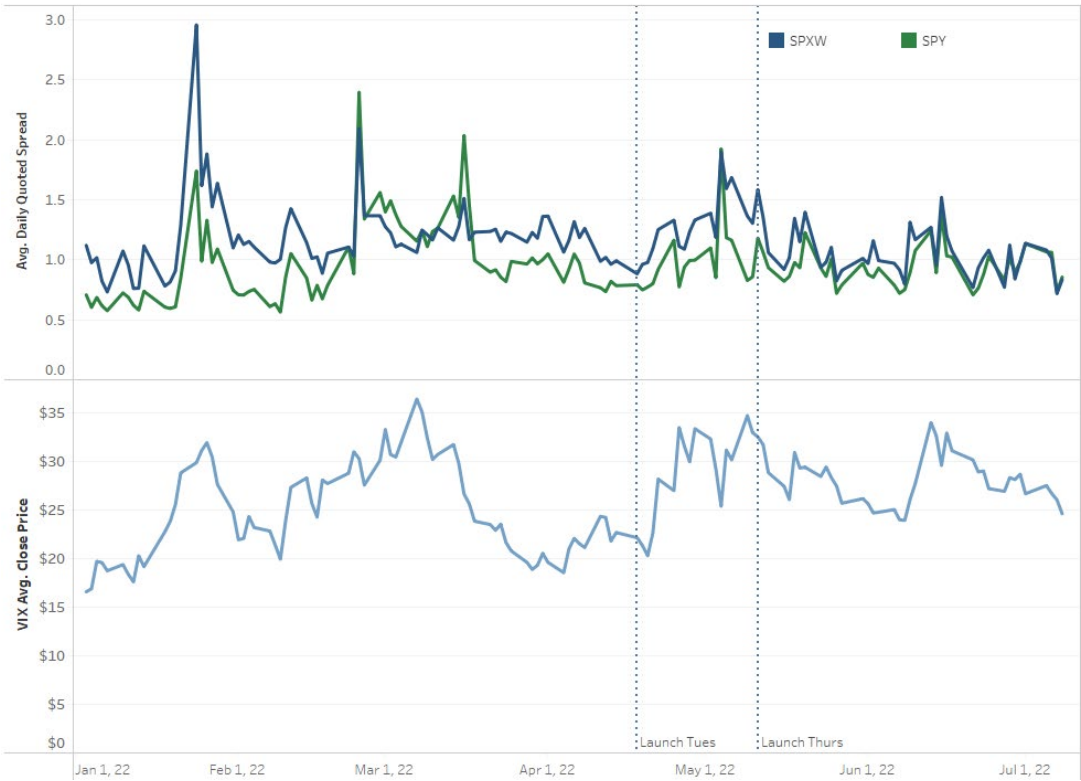
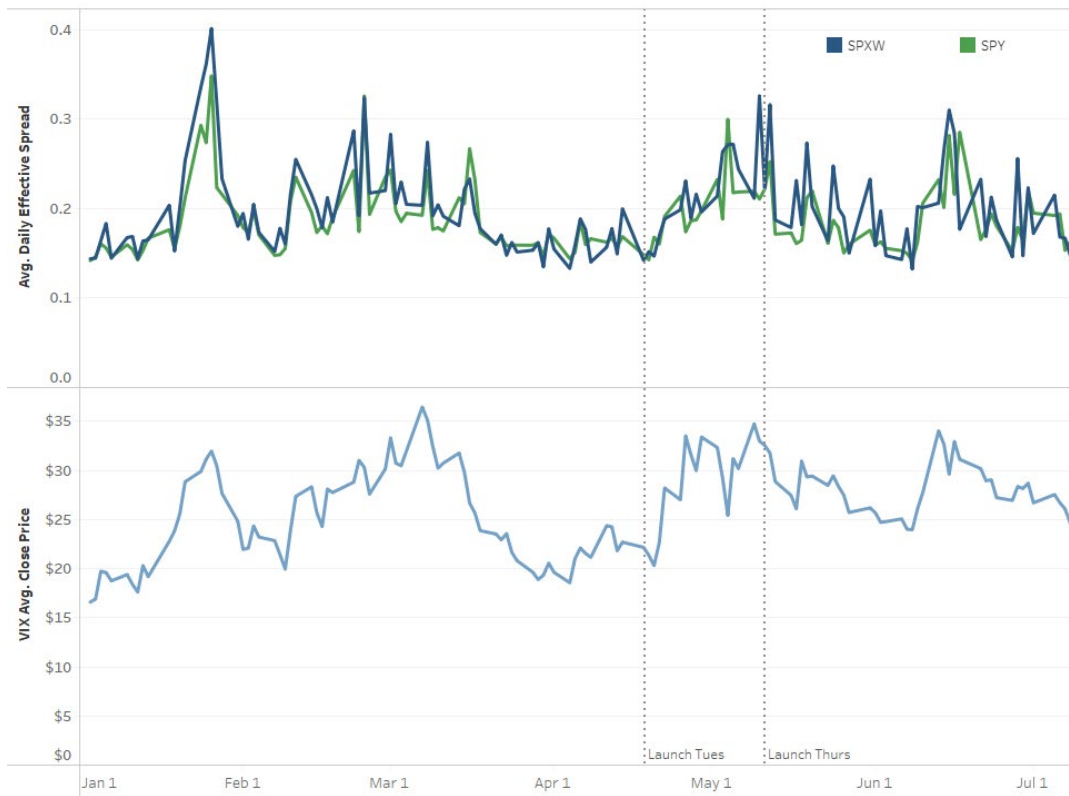


Table 2: SPXW & SPY Effective Spread Trend

Note: Tables 1 and 2 only show paired SPXW & SPY series with the strike price +/- 3% to the spot price and DTE within 27 days.

Grouping of Samples

In order to make fair comparisons between the symbols possessing similar characteristics, the analysis matched each SPXW and SPY pair by the same moneyness and days to expirations (“DTE”) group. For example, an in-the-money SPXW call option that expired on April 28, 2022 was compared to the matching SPY call option expiring on the same Expiration Day with the same (notionally adjusted) strike price as the SPXW option; the series of contracts having similar moneyness to the end of day index level of the underlying and the DTE of the trading day will be grouped together. Fixing moneyness and DTE ensures the pairs in each trade day have similar characteristics. The analysis included all SPXW and SPY paired contracts with the strike price

+/- 3% to the spot price and DTE within 27 days. Tables 3 through 6 provide the summary information of the matched pair data by DTE and moneyness group before and after the intervention.

Table 3: SPXW & SPY Series Quoted Spread Summary Stats (All ITM contracts)

Dte (group)	Trade Dat..	ITM 1-3%				ITM 0-1%			
		Avg. Daily Bid-Ask Spread		Number of Paired Symbols		Avg. Daily Bid-Ask Spread		Number of Paired Symbols	
		SPXW	SPY	SPXW	SPY	SPXW	SPY	SPXW	SPY
0-3	Pre	1.904	1.152	1,209	1,209	0.798	0.480	559	559
	Post	1.804	0.940	1,280	1,280	0.641	0.450	617	617
4-7	Pre	2.421	0.743	1,073	1,073	0.753	0.361	528	528
	Post	1.894	0.772	1,123	1,123	0.536	0.363	559	559
8-11	Pre	1.802	0.769	1,056	1,056	0.638	0.428	516	516
	Post	1.411	0.885	1,096	1,096	0.510	0.425	550	550
12-15	Pre	1.564	0.751	1,141	1,141	0.670	0.453	560	560
	Post	1.204	0.919	1,143	1,143	0.535	0.454	606	606
16-19	Pre	1.376	0.725	1,018	1,018	0.674	0.460	505	505
	Post	0.968	1.018	974	974	0.533	0.438	512	512
20-23	Pre	1.412	0.896	1,145	1,145	0.753	0.535	575	575
	Post	0.890	1.150	1,172	1,172	0.577	0.504	620	620
24-27	Pre	1.659	1.185	873	873	0.868	0.672	454	454
	Post	0.875	1.242	955	955	0.660	0.623	526	526

Note: Showing normalized SPY quoted spread (multiplied by 10)

Table 4: SPXW & SPY Series Quoted Spread Summary Stats (All OTM contracts)

Dte (group)	Trade Dat..	OTM 0-1%				OTM 1-3%			
		Avg. Daily Bid-Ask Spread		Number of Paired Symbols		Avg. Daily Bid-Ask Spread		Number of Paired Symbols	
		SPXW	SPY	SPXW	SPY	SPXW	SPY	SPXW	SPY
0-3	Pre	0.325	0.168	525	525	0.190	0.111	1,020	1,020
	Post	0.209	0.131	578	578	0.122	0.101	968	968
4-7	Pre	0.461	0.215	522	522	0.338	0.150	1,067	1,067
	Post	0.320	0.153	557	557	0.209	0.111	1,112	1,112
8-11	Pre	0.479	0.303	518	518	0.392	0.225	1,053	1,053
	Post	0.352	0.199	550	550	0.265	0.129	1,094	1,094
12-15	Pre	0.537	0.349	560	560	0.451	0.274	1,141	1,141
	Post	0.393	0.244	606	606	0.319	0.157	1,143	1,143
16-19	Pre	0.558	0.373	505	505	0.464	0.298	1,018	1,018
	Post	0.409	0.260	512	512	0.340	0.171	974	974
20-23	Pre	0.610	0.423	575	575	0.506	0.345	1,144	1,144
	Post	0.457	0.305	620	620	0.388	0.205	1,172	1,172
24-27	Pre	0.704	0.531	454	454	0.582	0.430	874	874
	Post	0.530	0.400	526	526	0.439	0.271	955	955

Note: Showing normalized SPY quoted spread (multiplied by 10)

Table 5: SPXW & SPY Series Effective Spread Summary Stats (All ITM contracts)

Dte (group)	Trading Dt..	ITM 1-3%				ITM 0-1%			
		Avg. Daily Effective Spread		Number of Paired Symbols		Avg. Daily Effective Spread		Number of Paired Symbols	
		SPXW	SPY	SPXW	SPY	SPXW	SPY	SPXW	SPY
0-3	Pre	0.345	0.257	905	905	0.246	0.182	627	627
	Post	0.392	0.312	825	825	0.242	0.189	521	521
4-7	Pre	0.473	0.333	633	633	0.370	0.238	515	515
	Post	0.434	0.354	565	565	0.348	0.217	417	417
8-11	Pre	0.482	0.426	473	473	0.377	0.264	475	475
	Post	0.469	0.463	486	486	0.394	0.268	372	372
12-15	Pre	0.611	0.552	410	410	0.533	0.339	398	398
	Post	0.589	0.424	339	339	0.447	0.307	327	327
16-19	Pre	0.596	0.481	345	345	0.468	0.303	341	341
	Post	0.949	0.436	218	218	0.490	0.299	231	231
20-23	Pre	0.788	0.656	297	297	0.500	0.523	328	328
	Post	0.532	0.471	244	244	0.482	0.303	281	281
24-27	Pre	0.744	0.585	172	172	0.523	0.386	228	228
	Post	0.790	0.450	132	132	0.710	0.402	164	164

Note: Showing normalized SPY effective spread (multiplied by 10)

Table 6: SPXW & SPY Series Effective Spread Summary Stats (All OTM contracts)

Dte (group)	Trading Dt..	OTM 0-1%				OTM 1-3%			
		Avg. Daily Effective Spread		Number of Paired Symbols		Avg. Daily Effective Spread		Number of Paired Symbols	
		SPXW	SPY	SPXW	SPY	SPXW	SPY	SPXW	SPY
0-3	Pre	0.171	0.154	631	631	0.144	0.138	1,231	1,231
	Post	0.168	0.150	522	522	0.123	0.129	1,057	1,057
4-7	Pre	0.318	0.198	540	540	0.271	0.167	1,086	1,086
	Post	0.311	0.195	425	425	0.247	0.154	875	875
8-11	Pre	0.347	0.207	516	516	0.296	0.185	1,011	1,011
	Post	0.354	0.230	395	395	0.325	0.185	762	762
12-15	Pre	0.451	0.253	446	446	0.332	0.221	869	869
	Post	0.398	0.268	377	377	0.318	0.227	678	678
16-19	Pre	0.445	0.254	367	367	0.481	0.207	755	755
	Post	0.531	0.264	259	259	0.361	0.217	469	469
20-23	Pre	0.534	0.330	384	384	0.398	0.264	692	692
	Post	0.433	0.273	311	311	0.381	0.221	550	550
24-27	Pre	0.411	0.408	276	276	0.476	0.324	481	481
	Post	0.659	0.296	188	188	0.475	0.258	318	318

Note: Showing normalized SPY effective spread (multiplied by 10)

The DnD Regression Model

A DnD regression model can be expressed as:

$$Y = \beta_0 + \beta_1 \text{ Intervention} + \beta_2 \text{ Time} + \beta_3 \text{ Intervention} \times \text{Time} + \varepsilon$$

This is a linear regression model. Y is the observed value of the targeting market quality indicator before and after treatment. β_0 is the intercept of regression, which is the baseline average for the control group before treatment.

Intervention is a dummy variable (0 or 1) that refers to whether an observation is in the control group or treatment group. Its coefficient (β_1) measures the differences between treatment and control group pre-intervention.

Time is a dummy variable (0 or 1) that specifies the time periods (pre or post treatment) for each observation. Its coefficient (β_2) measures the time trend in control group.

Intervention \times *Time* is an interactive term that takes the multiplication of *Time* and *Intervention* variable for each observation in the regression model. Its coefficient (β_3) will be the

difference in the changes for the treatment group over time due to the introduction of Tuesday/Thursday expirations of the market quality indicator of interest. For example, a positive and statistically significant coefficient for bid-ask spread will suggest a wider quoted spread, or a negative impact on market quality for SPXW options, and vice versa. Finally, the ε is the error term that represents the effects that the model was not able to capture.

III. Correlation Analysis

The Cboe Options conducted two sets of correlation tests regarding bid-ask spread and effective spread between the paired SPXW and SPY series by their moneyness and DTE group during the pre-intervention period. A correlation test measures the strength and direction of association between the treatment and control group, and the values of correlation coefficient range between -1 and $+1$. The relationship between the two variables is considered as a strong correlation when the coefficient equals or greater than 0.75 . Table 7 and Table 8 show the correlation coefficients for bid-ask spread and effective spread, respectively. For example, a coefficient of 0.83 in 0-3 DTE and ITM 1-3% call options group in bid-ask spread suggests a positive and strong correlation between the paired SPXW and SPY series in that group. In other words, these series tend to move in the same direction and in a similar fashion during the pre-intervention period.

In general, Cboe Options observed strong positive correlations between the paired SPXW and SPY series in both market quality indicators during the pre-intervention period. Specifically, the correlations generally get stronger when the series have a shorter DTE and are closer to at-the-money. The results help support the parallel trend assumption under the DnD framework, that the treatment and control group move in similar trends before the intervention. Groups with

strong correlation (coefficient ≥ 0.75) will be selected to perform DnD regressions as those are the most comparable pairs for the DnD analysis.

Table 7: Bid-Ask Spreads Correlation Results

	Money/DTE	0-3	4-7	8-11	12-15	16-19	20-23	24-27
Call Options	ITM 1-3%	0.83	0.75	0.74	0.56	0.43	0.28	0.51
	ITM 0-1%	0.96	0.90	0.91	0.89	0.84	0.76	0.71
	OTM 0-1%	0.96	0.92	0.89	0.92	0.84	0.74	0.84
	OTM 1-3%	0.97	0.94	0.93	0.94	0.93	0.75	0.89
Put Options	ITM 1-3%	0.70	0.62	0.80	0.71	0.55	0.51	0.40
	ITM 0-1%	0.86	0.88	0.89	0.86	0.80	0.69	0.69
	OTM 0-1%	0.91	0.88	0.94	0.93	0.96	0.91	0.84
	OTM 1-3%	0.95	0.96	0.98	0.96	0.98	0.91	0.85

Table 8: Effective Spreads Correlation Results

	Money/DTE	0-3	4-7	8-11	12-15	16-19	20-23	24-27
Call Options	ITM 1-3%	0.56	0.67	0.43	(0.08)	0.46	0.77	0.19
	ITM 0-1%	0.93	0.66	0.83	0.29	0.64	0.56	0.66
	OTM 0-1%	0.85	0.90	0.72	0.77	0.61	0.39	0.31
	OTM 1-3%	0.89	0.85	0.76	0.77	0.77	0.55	0.09
Put Options	ITM 1-3%	0.63	0.57	0.68	0.57	0.46	0.12	0.35
	ITM 0-1%	0.78	0.88	0.79	0.28	0.50	0.55	(0.10)
	OTM 0-1%	0.76	0.77	0.80	0.60	0.60	0.78	0.06

	OTM 1-3%	0.85	0.84	0.90	0.60	0.87	0.65	0.54
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IV. Regression Results

Tables 9 and 10 show the estimated coefficients for the DnD regressions for the market quality indicators between the treatment and control group, together with the p-value in parentheses. The p-value can be used to measure the statistical significance of the coefficient—the confidence that the true value of the coefficient is different than zero. A p-value of 0.1 or lower is considered statistically significant under the regression model. As stated, the regression results only include the groups with strong correlations (with the coefficient ≥ 0.75) during pre-intervention period. As shown in Table 9 below, the regression results are accompanied by a set of asterisks indicating the associated level of significance: * = 10%, ** = 5%, and *** = 1%.

Table 9: Bid-Ask Spread Regression Results

Moneyness/DTE		0-3	4-7	8-11	12-15	16-19	20-23	24-27
Call Options	ITM 1-3%	-						
		0.65***						
		(0.000)						
	ITM 0-1%	-0.17**	-0.10	0.01	0.08	0.02	0.18***	
		(0.020)	(0.153)	(0.856)	(0.155)	(0.681)	(0.001)	
	OTM 0-1%	-0.02	0.04	-0.02	-0.02	-0.04		0.12**
Call Options		(0.534)	(0.236)	(0.415)	(0.494)	(0.310)		(0.025)
	OTM 1-3%	0.00	0.02**	0.00	-0.02	-0.04*		0.08***
		(0.665)	(0.032)	(0.875)	(0.310)	(0.090)		(0.008)

Put Options	ITM 1-3%			-				
				0.94***				
				(0.000)				
	ITM 0-1%	-0.11	-0.10	-0.01	-	0.09		
		(0.178)	(0.160)	(0.832)	0.13**	(0.157)		
					(0.013)			
Call Options	OTM 0-1%	-0.02	0.03	0.05*	-0.01	0.00	0.07*	0.18***
		(0.562)	(0.206)	(0.087)	(0.804)	(0.976)	(0.088)	(0.000)
	OTM 1-3%	0.00	0.03**	0.01	-0.03	-	0.02	0.08***
		(0.671)	(0.011)	(0.611)	(0.192)	0.06**	(0.476)	(0.004)
						(0.043)		

Table 10: Effective Spread Regression Results

Moneyness/DTE		0-3	4-7	8-11	12-15	16-19	20-23	24-27
Call Options	ITM 1-3%		-				0.09	
			0.08***				(0.224)	
			(0.004)					
	ITM 0-1%	-	-0.02	-0.02				0.12
		0.05***	(0.208)	(0.206)				(0.238)
		(0.004)						

		OTM 0-1%	-0.00	-0.01	0.00	-
			(0.932)	(0.518)	(0.735)	0.05***
						(0.007)
		OTM 1-3%	0.00	0.00	0.03***	-0.01 0.02
			(0.717)	(0.909)	(0.001)	(0.705) (0.315)
		ITM 1-3%			0.01	
					(0.811)	
Put Options		ITM 0-1%	-0.03	-0.02	0.05*	
			(0.412)	(0.643)	(0.092)	
		OTM 0-1%	0.03**	0.00	0.00	0.08
			(0.026)	(0.824)	(0.948)	(0.341)
		OTM 1-3%	0.00	-0.01	-0.01	-0.03
			(0.727)	(0.252)	(0.267)	(0.230)

Series with a statistically insignificant p-value (> 0.1) suggests that there is no difference in the spreads during the post-intervention period. In other words, no impact on the market quality can be observed due to the introduction of T/TH expirations. For example, a coefficient of -0.02 in 0-3 DTE and OTM 0-1% call options group in bid-ask spread suggests that, on average, the bid-ask spread for SPXW M/W/F expirations in that group decreased by \$0.02 post-intervention relative to the comparable SPY options. However, a p-value of 0.534 suggests that the decrease is statistically insignificant. In other words, we don't believe there is a change in bid-ask spread in this group between the pre- and post-intervention period.

Overall, Cboe Options believes there is no market quality impact on the M/W/F expirations series due to the introduction of T/TH expirations. The majority of the series in the DnD regression results are statistically insignificant, which showed no impact on the spreads. While a slight increase in the bid-ask spread within the 24-27 DTE group has been observed, Cboe Options believes it doesn't weaken the overall conclusion since these are the least active series with smaller volume.

While Cboe Options's analysis does not prove that the observed improvements in the spreads could necessarily be attributed to the introduction of T/TH expirations instead of other market factors, the above regression results support the overall conclusion that the spreads in existing M/W/F series were not widening following the T/TH expirations.

EXHIBIT 5

(additions are underlined; deletions are [bracketed])

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Rules of Cboe EDGX Exchange, Inc.

* * * * *

Rule 29.11. Terms of Index Options Contracts

(a) General.

(1) – (5) No change.

(6) In addition to A.M.-settled Mini-SPX Index (“XSP”) options approved for trading pursuant to this Rule 29.11, the Exchange may also list XSP options whose exercise settlement value is derived from closing prices on the last trading day prior to expiration (“P.M.-settled”). [P.M.-settled third Friday-of-the-month XSP options may be listed for trading for a pilot period ending May 6, 2024.]

(b) No change.

(c) Procedures for Adding and Deleting Strike Prices. The procedures for adding and deleting strike prices for index options are provided in Rule 19.6 (Series of Options Contracts Open for Trading), as amended by the following:

(1) – (4) No change.

(5) Notwithstanding the above, the strike prices for new and additional series of XSP options will be listed subject to the following:

(A) – (B) No change.

(C) the lowest strike price interval that may be listed for standard XSP option series is \$1, including for long-term option series, and the lowest strike price interval that may be listed for XSP option series under either the Short Term Option Series Program in paragraph (h) or the Nonstandard Expirations [Pilot] Program in paragraph (j) below is \$0.50.

(d) – (i) No change.

(j) Nonstandard Expirations [Pilot] Program

(1) – (2) No change.

[(3) Duration of Nonstandard Expirations Pilot Program. Weeklys and EOMs may be listed for trading for a pilot period ending May 6, 2024.]

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