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March 29, 2011

Nancy M. Morris
Secretary
U.S. Securities and Exchange Commission
100 F Street, N.E.
Washington, D.C. 20549-0609

Re: File No. SR-C2-2011-08

Dear Ms. Norris:

The International Securities Exchange, LLC ("ISE") appreciates the opportunity to comment on the above referenced proposal ("Proposal") of the C2 Options Exchange ("C2").[1] C2 seeks approval to trade options on the Standard & Poor's 500 Index ("S&P 500") that have very minor differences from the options on the S&P 500 options currently traded on the Chicago Board Options Exchange ("CBOE"). Both C2 and CBOE are subsidiaries of CBOE Holdings, Inc. ("CBOE Holdings"). Specifically, the C2 options will have an exercise settlement value based on the index value derived from the closing prices of component securities ("P.M.-settled"), while the CBOE options (the "SPX options") have an exercise settlement value based on the index value derived from the opening prices of component securities ("A.M.-settled").

The Proposal raises a number of very significant public policy and legal concerns. Of most importance, the minor differences between the C2 and CBOE S&P 500 options are designed to ensure that the two options are not fungible, circumventing protection from trade throughs and creating confusion between products. In addition, the differences C2 is proposing in its version of the S&P 500 options raise significant investor protection issues. Moreover, this proposal reintroduces P.M. settlement at a time when fragmentation of liquidity has created even greater volatility at the end of the trading day. Finally, and as a general matter, we believe that the Proposal would exacerbate the harm investors suffer when exchanges enter into exclusive index options licensing agreements. For these reasons, the proposal is anti-competitive and harmful to investors, and therefore inconsistent with the Securities Exchange Act of 1934 ("the Act"). We urge the Commission to disapprove the Proposal.

[1] Release No. 3464011 (March 2, 2011), 76 F.R. 12775 (March 8, 2011) (the "Release").

- **The Proposal is designed to circumvent the protections in the national market system that the Commission has implemented to protect investors**

SPX options are, by far, the most actively-traded listed index options product, accounting for almost 60 percent of all index options trading.[2] While the CBOE trades all multiply-traded options on its hybrid trading system, where members can compete electronically with the traders on the floor of the CBOE, the CBOE trades the SPX options primarily on its floor, with very limited electronic participation.[3] The CBOE so limits the trading of SPX options solely to restrict electronic competition. By proposing a version of the S&P 500 option for C2 that is not fungible with the SPX options, CBOE Holdings can continue to trade S&P 500 options on the floor without having to accommodate the more narrow quotes that are likely to exist on C2's electronic market. But, in reality, the difference between the two contracts that keep them non-fungible is a sham: the only difference is that there is a 6.5 hour time difference between the expiration of otherwise identical options contracts.

Allowing the CBOE to list P.M.-settled S&P 500 options on its C2 exchange – which contracts are otherwise identical with SPX options – would make a mockery of Section 11A of the Act. In 1975, Congress determined that linking markets: would foster efficiency; would enhance competition; would increase the information available to brokers, dealers, and investors; would facilitate the offsetting of investors' orders; and would contribute to the best execution of investors' orders.[4] As such, Congress directed the Commission, through the enactment of Section 11A, to facilitate the establishment of a national market system ("NMS"), which the Commission and the various exchanges have together designed to achieve the objectives of efficient, competitive, fair, and orderly markets that are in the public interest and that protect investors.[5]

Since 1975, the Commission has adhered to these guiding objectives in its regulation of the NMS, which are essential to meeting the investment needs of the public.[6] The exchanges trading listed options have incorporated these objectives into two Commission-approved NMS plans for options. The first plan became operational in 2002 and included a requirement that exchanges avoid trading through better priced quotations on other exchanges, as well as a mechanism by which exchanges could seek satisfaction if an order was traded through.[7] In 2009, the options exchanges implemented a new NMS plan that specifically requires that each exchange prevent trading through better priced quotations displayed on other options exchanges.[8]

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[2] Average daily volume over the past 12 months ending March 25, 2011 was approximately 680,000 contracts in SPX, out of a total of approximately 1,150,000 contracts for all index options.
[3] While CBOE member may use the "Hybrid 3.0" system for SPX options, there is virtually no electronic interaction between market participants nor does the system allow for competitive quoting.
[4] *See* Section 11A(a)(1)(D) of the Exchange Act, 15 U.S.C. 78k-1(a)(1)(D).
[5] Release No. 34-51808 (June 9, 2005), 70 FR 37496 (June 29, 2005) ("NMS Adopting Release").
[6] *Id.* at 37497.
[7] Release No. 34-43086 (July 28, 2000), 65 FR 48023 (August 4, 2000).
[8] Release No. 3460405 (July 30, 2009), 74 FR 39362 (August 6, 2009).

The C2 Proposal to trade S&P options that are only slightly different than the SPX options is specifically designed to establish two monopolies in S&P 500 options, one floor-based and one electronic, that would avoid the application of the options plan's limitation on trade throughs. By leveraging the fact that it has registered two separate national securities exchanges, CBOE Holdings seeks to protect its monopoly pricing power on the CBOE and to create the ultimate two-tiered market for S&P options. Institutional market participants that seek either to cross pre-arranged trades on the floor, or that seek accumulated liquidity at wider spreads on the floor, will be able to trade SPX options without interacting with the orders and quotes on C2. Market participants who have publically displayed better prices on C2 thus will be traded-through, denying them the opportunity to interact with the institutional liquidity on the CBOE floor. This blatant disregard of the NMS would harm investors and would be in direct violation of Section 11A of the Exchange Act.

- **The Proposal is harmful to investors by fragmenting the market and creating confusion between products**

As discussed, the proposed P.M.-settled S&P 500 options are almost identical to the CBOE's SPX options. In fact, the pricing models for these two products will be identical until shortly before expiration, creating significant confusion for investors who may well not understand the subtle nuances between the products. C2 attempts to dismiss this concern by referencing the previous listing of both A.M.-settled S&P 500 options (the "NSX") and SPX options between 1987 and 1992. However, the options markets and regulatory framework were very different at that time, when there were very few multiply-traded options. The Commission has applied much more substantial standards and requirements on the options exchanges as the options market has matured and grown.

In this respect, the Commission staff now scrutinizes new product proposals by options exchanges against a wide range of policy concerns never considered in the early 1990s. For example, in 2010 the ISE proposed to list options on the Deutscher Aktien Index ("DAX")[9] and to also list "mini-DAX" index options that are 1/10 of the value of the DAX option. The purpose behind our DAX and mini-DAX index option proposal was to make DAX index options available to institutional investors, while also offering a contract that was more accessible to retail investors. However, the Commission staff rejected our proposal based on concerns that listing both contracts would fragment the market for DAX options by creating parallel markets for the same product, one professional and one for retail investors. This was even though the products would have been easily distinguishable based on the vastly different prices at which they would have been traded.

Contrast that with CBOE's proposal to trade both A.M. and P.M.-settled S&P 500 options, where the products are nearly indistinguishable and where the subtlety of A.M.-settled vs. P.M.-settled options will be completely lost on investors. Indeed, near

[9] The DAX is a blue chip stock market index consisting of the 30 major German companies trading on the Frankfurt Stock Exchange.

expiration, market professionals may find opportunities to take advantage of non-professional investors who do not appreciate the small pricing differences between the contracts. Moreover, ISE's proposed listing of two easily-distinguishable DAX options involved new products with no existing volume, while the C2 Proposal would split the existing liquidity in a product with significant customer participation. If the Commission had concerns regarding market fragmentation and investor confusion for a new product with no volume, then surely the bifurcation of the market for an existing product is of great concern. For these reasons, the Proposal is contrary to current Commission regulatory policy regarding how the Act applies to the listing of derivative products.

- **The Proposal is harmful to investors by reintroducing P.M. settlement in S&P 500 options**

The proposed P.M.-settled options also risk undermining the operation of fair and orderly financial markets. The reason index options moved from P.M. to A.M.-settlement was to address market volatility. All index options initially had settlement values based on closing prices. However, having numerous derivative instruments settling on the same closing values led to such extreme market volatility that the Commission urged the exchanges to move to settlement based on opening prices, where markets had better-established mechanisms for finding equilibrium prices.[10] The concern was especially acute on so-called triple- or quadruple-witching days, when market participants used the closing values to price individual stock options, index options, index futures, and futures on options. Specifically to address these concerns the CBOE moved SPX options to be A.M.-settled.[11]

Trivializing that history, C2 states that the reasons for moving to A.M.-settlement "are no longer relevant in today's market."[12] The C2 attempts to support that position by arguing that the markets for the underlying securities are more dispersed now, that there are now more refined closing crossing procedures, and that trading now is predominantly electronic, which provides "the ability to smooth out openings and closings...."[13] Of course, if these arguments had any validity, CBOE would propose to move SPX options back to a P.M. settlement. But that is not the goal of this Proposal. Rather, the goal is for CBOE Holdings to justify having different settlement values so that non-fungible S&P 500 index options can be traded on its two registered exchanges.

Moreover, the reasons C2 gives to justify the move back to the discredited P.M. settlement do not stand up to scrutiny. While trading in the underlying equity securities certainly is somewhat more dispersed than it was 20 years ago, such dispersion is often a mirage. As exemplified by the so-called "flash crash" of May 6, 2010, in times of market distress liquidity can quickly disappear on numerous markets, with market

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[10] *See* Letter dated June 13, 1986, from Shirley Hollis, Secretary, Commission, to the then-presidents and chairmen of the various registered markets.
[11] *See* Release No. 34-30944 (July 22, 1992), 57 F.R. 33376 (July 28, 1992) (File No. SR-CBOE-92-09).
[12] Release at 12776. Ironically, the Proposal states that because stocks are multiply traded and order flow is predominantly electronic, the ability to smooth out openings and closings in equity securities has been greatly enhanced.
[13] *Id.*

participants flocking to the same liquidity centers, most likely the traditional primary, or listing, markets. But perhaps most disingenuous is C2's claim that electronic trading can smooth out the price-setting process. Recent history indicates that the exact opposite may be true, making a return to P.M.-settlement especially dangerous at the present time.

We need not review all recent regulatory events to dispel C2's one-paragraph "everything is now all right" justification to a return to P.M. settlements. The Commission is well aware of the issues related to high frequency trading ("HFT"), algorithmic trading, the lessening importance of traditional market makers, and dispersed – and often ephemeral – liquidity. Indeed, a quote from the findings of a recent report of a Joint CFTC-SEC Advisory Committee summarizes these concerns:

> In the present environment, where high frequency and algorithmic trading predominate and where exchange competition has essentially eliminated rule-based market maker obligations, liquidity problems are an inherent difficulty that must be addressed. Indeed, even in the absence of extraordinary market events, limit order books can quickly empty and prices can crash simply due to the speed and numbers of orders flowing into the market and due to the ability to instantly cancel orders. Liquidity in a high-speed world is not a given: market design and market structure must ensure that liquidity provisions arises continuously in a highly fragmented, highly interconnected trading environment.[14]

As these findings make clear, liquidity can be a problem "even in the absence of extraordinary market events." Yet C2 now proposes the reintroduction of what has proven over time to be an extraordinary market event: the triple witch. Masking its proposal as a pilot does not ameliorate the problem. We saw what triple witch wrought in the past, and the Commission spear-headed efforts to address those structural problems. Contrary to C2's conclusory statements, those structural problems still exist. Indeed, one of the most significant initiatives undertaken to mitigate the chance of suffering another "flash crash" was to institute trading pauses on individual securities, but such trading pauses do not apply in the last 25 minutes of trading.[15] Permitting S&P options to be based on closing settlement prices would threaten to undermine the Commission's efforts to bolster our national market structure, and re-introduce the potential for extreme market volatility at expiration. The Proposal is precisely what the current market does not need – even on a pilot basis.

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[14] Recommendations Regarding Regulatory Responses to the Market Events of May 6, 2010; Summary Report of the Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues, February 18, 2011.

[15] In June 2010, as a result of coordinated effort between the SEC, the exchanges and FINRA, a framework for market-wide, stock-by-stock circuit-breaker rules and protocols was established and implemented on a pilot basis. Under these pilot rules (the "Pause"), a single stock circuit breaker is triggered if the price of a security changes by ten percent or more within a rolling five-minute period between 9:45 a.m. and 3:35 p.m. If triggered, all markets pause trading in the security for at least five minutes and then the primary listing market employs its standard auction process to determine the opening print after the five-minute pause period. *Id.* at footnote 1.

- **The Proposal is inconsistent with Commission position limit requirements**

C2 proposes that there not be any position limits on its new P.M.-settled S&P 500 options. This runs afoul of the current Commission position limit requirements. While the Commission allowed CBOE to remove all position limits for S&P 500 options in 2001,[16] the Commission staff has since adopted a policy that applies the Dutt-Harris model to determine the appropriate position limits for all new index options products.[17] Using this model, the Commission staff has imposed much stricter position limits on new options products over the last few years. The application of the Dutt-Harris model would not permit the total absence of position limits for the P.M.-settled S&P 500 options[18] and the Commission should require the application of the Dutt-Harris model to these new products.

We understand that the Commission staff considers options products existing prior to the application of the Dutt-Harris model as "grandfathered." This creates the unfortunate situation where new products are put at a competitive disadvantage to older products that have more relaxed position limits. Nevertheless, this is the policy framework within which all of the options exchanges have been working when introducing new index options products. CBOE Holdings cannot have it both ways, by claiming that these options are grandfathered by SPX precedent when convenient (for position limits), and then claiming that they are different products when that argument is convenient (to permit the creation of non-fungible products for trade-through purposes).

If the P.M.-settled options are a new product distinguishable from the A.M.-settled options, then it would be anti-competitive for the Commission to deviate from its application of the Dutt-Harris model. If, on the other hand, the P.M.-settled options are considered grandfathered from the application of the Dutt-Harris model because they are essentially the same product as the A.M.-settled options, then the Commission should require that the C2 options be structured the same as SPX options, with the application of full trade-through and other national market system rules.

- **The Proposal raises significant public policy issues regarding exclusive listings of options that the Commission must address before the Proposal can proceed**

SPX options trade exclusively on the CBOE pursuant to an exclusive licensing agreement with Standard & Poor's. This agreement has prevented other options exchanges from listing such options, thus denying investors the benefits of competition. Furthermore, CBOE's monopoly in the product imposes significant harm to investors. Specifically, CBOE charges fees for trading SPX options that are much greater than the fees for multiply listed options.[19] In addition, the quotes in SPX options are much wider

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[16] *See* Release No. 44994 (October 26, 2002), 66 F.R. 55722 (November 2, 2001).

[17] Dutt, H.R. and Harris, L.E. (2005), Position Limits for Cash-Settled Derivative Contracts, Journal of Futures Markets, Vol. 25, No. 10, 945-965 (attached hereto as Exhibit 1).

[18] *Id.* at 960 (Table II).

[19] On the CBOE, customers pay $ 0.54 per contract for SPX options with a premium equal to or greater than $1 and $0.45 per contract for SPX options with a premium greater than $1, and either $0.50 or $0.40

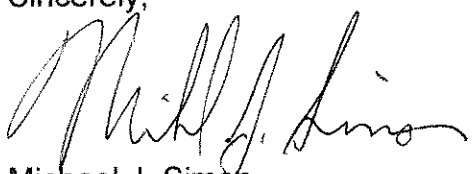
than they would be if there was competition from other exchanges.[20] Moreover, the CBOE is able to use the monopolistic revenue stream from these options to subsidize other products, specifically by lowering its fees in products where there is competition.

The ISE long has fought to introduce competition in the S&P 500 options and other exclusively traded options, including the filing of a petition for rule making with the Commission in 2002[21] and through litigation.[22] This Proposal, which attempts to preserve the CBOE's monopoly by contorting the structure of the S&P options, further demonstrates the public policy issues with exclusive licenses. The Commission can address these issues most effectively by taking action, as proposed in our Petition, to phase-out the harmful effects of exclusive licenses.

* * *

For the forgoing reasons, we urge the Commission to disapprove the C2 proposal to list P.M.-settled S&P 500 options. If you have any questions on our comments, or if we can be of further help to the Commission on this matter, please do not hesitate to contact us.

Sincerely,



Michael J. Simon
Secretary

cc: Robert Cook, Director, Division of Trading and Markets
James Brigagliano, Deputy Director, Division of Trading and Markets
Heather Seidel, Associate Director, Division of Trading and Markets

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for certain other exclusively listed index options (rates include $0.10 surcharge). CBOE charges customers $0.18 for all other index options (most of which are not subject to a surcharge). Note also that CBOE market makers pay a single rate for all index options at the lowest standard rate which is subject to a sliding scale that lowers the effective rate based on their volume levels. Fee Schedule as of March 1, 2011 (available at www.cboe.com/publish/feeschedule/CBOEFeeSchedule.pdf)

[20] *See* http://www.sec.gov/rules/petitions/petn4-469.htm (attached hereto as Exhibit 2).

[21] *Id.*

[22] Case 1:07-cv-00623, Chicago Board Options Exchange, Incorporated v. International Securities Exchange, LLC, Northern District of Illinois.

Exhibit 1

POSITION LIMITS FOR CASH-SETTLED DERIVATIVE CONTRACTS

HANS R. DUTT*
LAWRENCE E. HARRIS

Cash settlement of derivative contracts makes them susceptible to manipulation by traders who expect to close large positions upon final settlement. Cash settlement also increases underlying volatility when hedgers unwind their hedges if they have no incentives to control their trading costs. Limits on the positions that traders can carry into final settlement can be used to mitigate associated economic inefficiencies when surveillance is insufficient. This article develops a model that regulators can use to set these limits that is based upon microstructure theory. The empirical findings indicate that existing position limits are largely inconsistent with

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those suggested by the model. © 2005 Wiley Periodicals, Inc. Jrl Fut Mark 25:945–965, 2005

INTRODUCTION

Although several scholars have argued that cash settlement may increase the risk of market manipulation, until recently, the theoretical problems arising from potential cash settlement manipulation has been considered minor, as evidenced by the lack of academic interest in this area. The reason for this may arise from the fact that most exchange-traded derivative index contracts that are cash settled are broad-based, and each of the underlying components typically possesses ample liquidity. Thus, manipulation of the underlying components would likely be extremely costly to the would-be manipulator.

Prior to 2001, trading of narrow-based and single-stock futures contracts was banned. Further, options contracts on individual shares were physically settled. However, with the passage of the Commodity Futures Modernization Act of 2000, the ban on single-stock futures and narrowed-based index instruments was lifted, and the legislation provided that settlement could be either in physical delivery or the cash value of the underlying. Hence, it is now possible to trade a single-stock or narrow-based cash-settled derivative instrument. Consequently, the once primarily theoretical concern of manipulation of cash-settled instruments has now become a practical problem from a regulatory perspective.

Two mechanisms to control the risk of market manipulation are surveillance and position limits. Position limits are extensively used in the financial markets, conceptually to control risk of market manipulation. Kyle (1984) develops a model that suggests that position limits can be effective in limiting market manipulation in futures contracts that specify physical settlement. Consistent with this model, the Commodity Exchange Act provides that speculative position limits be directly applied to agricultural commodity futures. Single-share options with physical settlement have also established position limits. Broad-based cash-settled futures and options indexes also trade with position limits. The extensive use of position limits suggests that there is a perception that they offer protection against market manipulation. Although position limits can theoretically address manipulation problems, the mechanism by which exchanges and regulators have set position limit levels has not been clearly articulated. The extant academic literature provides virtually no support for the current setting of position limits.

USEFULNESS OF POSITION LIMITS

The cash-settlement mechanism used for final settlement of certain derivative instruments has the potential for adding significant uncertainty to holding positions in those instruments. This uncertainty can reduce economic efficiency by making the instruments unattractive to hedgers. The cash settlement mechanism introduces uncertainty by increasing opportunities of market manipulation and decreasing incentives to control trading costs. These problems can be mitigated, in part, through thoughtful application of position limits.

Cash-settled derivative contracts are susceptible to manipulation. Manipulative traders may profit by taking large positions in the contract and manipulating the underlying cash settlement price. Whether such manipulations would be profitable depends on whether the costs of moving prices in the underlying markets are less than the benefits of more favorable cash settlements.

Although manipulations simply transfer wealth from the manipulated to the manipulators, the possibility of such transfers can reduce economic efficiency. For example, risk-averse traders who would transact in an environment free from manipulation might transact less if they believed that they could lose to manipulators. This would result in deadweight losses.

Even when the settlements of cash-settled contracts are not purposefully manipulated, the settlement mechanism may increase underlying volatility when hedgers unwind their hedges if they have no incentives to control their trading costs. This generally is the case when hedgers trade out of their positions at the same prices that determine the final cash-settlement price. The resulting price uncertainty may reduce trading by risk-averse traders and thus produce deadweight losses.

When agents establish positions in derivatives contracts, they expect that the associated benefits and liabilities will depend only upon the free-market movements of the underlying security price(s). Trading to manipulate prices is illegal, presumably because policy makers are reluctant to allow third parties to alter the distribution of these benefits and liabilities. Thus, property rights to unmanipulated prices are clearly defined. According to the Coase theorem, when property rights are clearly defined, and transaction and enforcement costs are zero, the costs and benefits transactions will be internalized and transactions will be economically efficient. However, since the costs of enforcing laws against manipulation of derivative securities are not trivial, externalities may result. In particular, externalities will arise when traders forgo trading

opportunities because they fear that the contract will be manipulated against them.

Many scholars have recognized the cash-settlement manipulation problem, but few have formally addressed it. The lack of interest may be due to the fact that, until recently, most U.S. exchange-traded cash-settled derivative contracts were based on broad indices of very liquid stocks. Manipulation of such instruments require very large trades that are costly to make and easy to detect through conventional surveillance.

The prospects for manipulation increased substantially with the passage of the Commodity Futures Modernization Act of 2000 (Act). The Act authorized trading in single-stock futures and narrow-based index instruments,[1] and the Act specifically permitted cash settlement.[2] These new instruments will not necessarily have liquid underlying securities. Further, all else equal, fewer numbers of securities will be easier to manipulate than larger numbers. Because many such contracts probably will eventually trade,[3] regulators need to consider mechanisms that would reduce these uncertainties and thereby enhance economic efficiency.

Markets reduce risk of market manipulation through the use of surveillance (plus litigation) and position limits. If manipulations were easily identified, increasing surveillance efforts would be sufficient to reduce manipulations by increasing the probability of detection and subsequent prosecution with regard to the narrow-based derivative contracts. Successful prosecution of manipulation, however, is difficult, because prosecutors must prove manipulative intent (scienter). Manipulators may avoid liability by offering plausible alternative explanations for their trading in the underlying securities. The most plausible such alternative is that they traded the underlying securities before expiration to ensure that they would not lose their economic positions in the underlying risks when the contracts expired. Because this explanation generally is plausible, surveillance coupled with prosecution may not provide an adequate safeguard against true manipulations.

Position limits directly limit manipulation by limiting the size of derivative positions that would benefit from manipulative practices. Position limits can potentially improve economic efficiency by reducing manipulation in a less costly manner than surveillance alone. However,

[1]The Shad-Johnson Accord, enacted into law as part of the Futures Trading Act of 1982, previously prohibited all exchange-based trading in single-stock futures and narrow-based index options and futures.

[2]Single-stock futures have long traded in other countries—most successfully in Australia and Spain, but all such contracts (of which the authors are aware) have been physically settled.

[3]In June of 2003, the OneChicago security futures exchange launched 15 Dow Jones Microsector index contracts. CBOE and the CME have shown interest in launching these contracts as well.

they can be set too high or too low. If position limits are too restrictive, that is, they are too low, they will hamper trading on balance. On the other hand, if they are not restrictive enough, because enforcement plus prosecution is insufficient to adequately curtail manipulation, trading will be hampered as well. Thus, there is some level of position limit that will promote economically efficient trading.

Although position limits are frequently used to control the risk of manipulation, how markets and regulators set these position limits on cash-settled contracts is not well understood.[4] With no underlying principles to guide the setting of these position limits, they are apt to be inappropriately set and result in economic inefficiency.

This article considers how markets and regulators should derive optimal positions limits in principle. Unfortunately, a proper solution to the problem requires information that is not available to regulators or anyone else. As an alternative, a mechanism by which regulators can set position limits based on the liquidity in the underlying instruments and their tolerance for price changes caused by manipulators is suggested. These position limits are called *prudent position limits*. This article derives prudent position limits for cash-settled index contracts, of which single-stock futures contracts are a special case.

The purpose of this study is twofold. First, existing position limits are examined to determine whether they are consistent with the model. Results indicate that existing limits are not correlated with the limits suggested by this model. These results suggest that markets and their regulators should take a closer look at the underlying economic rationale for the levels at which they currently set their position limits to ensure that the limits adequately protect markets from manipulation and that inconsistent position limits do not produce competitive advantages and disadvantages among contracts. Second, it is demonstrated how regulators can use this model to implement position limits in practice. The implementation depends upon qualitative and quantitative assumptions about which reasonable arguments may be made. Regardless of what assumptions are used, the model produces consistent position limits that are derived from economic principles. In this respect, the model represents a significant advance over present methods of determining position limits. The study concludes with a discussion of the policy issues associated with settlement position limits.

[4]For example, CBOE rule 24.4A, which applies to industry sector position limits, establishes a default position limit of 31,500 contracts unless conditions are met to reduce the limit. In terms of averages over the previous 30 days, if any one index component accounts for more than 20% of the index or any five components comprise more than 50% of the index, the position limit is reduced to 24,000. If any one of the index component's previous 30-day average exceeds 30% of the index value, the position limit will reduce to 18,000.

DIFFICULTY IN DIFFERENTIATING BETWEEN MANIPULATIVE AND LEGITIMATE TRADES

Position limits become a useful tool for controlling manipulation when surveillance coupled with prosecution is inadequate. Surveillance and prosecution will be inadequate when it is extremely difficult to distinguish between manipulative activities and legitimate ones. For example, traders who carry positions to final settlement should expect to settle at a price that reflects their decision to take cash settlement. The positions that they close at final settlement presumably would have been less expensive to close had they traded out earlier. Because a demand for final settlement is a demand for instant liquidity, traders should expect that such settlement would be costly.

A simple example illustrates this issue. Suppose that a buyer arranges to purchase a narrow-index futures contract from a dealer who intends to offset a short contract position by buying the underlying stocks. The price that the dealer quotes will reflect the costs that he or she expects to incur when establishing his or her hedge. The buyer therefore will pay the dealer a premium over fair price for liquidity. Now suppose that the buyer decides to take cash settlement of his contracts when they expire. Cash settlement will force the dealer to sell stocks to remove the hedge. To minimize risk, the dealer would like to sell those stocks at the same prices upon which the final cash settlement will be based. If the buyer is not also buying the underlying stocks at the same time, the dealer's sales will depress the final settlement price. The depressed stock prices are transaction costs that the dealer must bear in the underlying stocks to unwind his or her positions. These costs will be offset by the depressed final settlement price, which will favor the dealer's short contract position in the final cash settlement. If the buyer does not understand the cause of the depressed final settlement price, he or she may conclude that it was manipulated to his disadvantage. A poorly informed regulator might come to the same conclusion.

ENHANCED VOLATILITY CREATED WITH CASH SETTLEMENT

Position limits also can be useful in controlling transitory volatility associated with cash settlement. Because this is unrelated to manipulation, surveillance cannot address the issue. The problem arises because hedged traders, such as the dealer in this example, have no incentive to control their transaction costs when unwinding their hedges, because their contract positions will be settled at a final settlement price that is based on

their cash trade prices. At best, such traders will not exercise as much care when arranging their cash trades as they otherwise would. At worst, such traders will try to arrange poor trades with confederates with whom they will explicitly or implicitly split the resulting profits. In either case, the settlement mechanism will create undesirable transitory volatility, and unnecessary transaction costs for those traders demanding settlement.

RELATED LITERATURE

Jones (1982) argues that derivative contracts should have cash-settlement terms when physical delivery is costly. Derivative contracts based on broad equity indices are generally regarded as prohibitively expensive to settle physically and therefore use cash settlement.

Jones (1982), Garbade and Silber (1983), Cornell (1997), and others observe that a necessary condition for a successful cash-settled contract is that the underlying cash price accurately reflects the asset's true value at settlement. Manipulation therefore can damage a cash-settled contract market. Kumar and Seppi (1992) and Cornell observe that contracts based on illiquid instruments are subject to market manipulation, and thus make poor choices for cash settlement.

Gastineau (1992), Telser (1993), and Grossman (1993) question the wisdom of imposing position limits to address the manipulation problem. Gastineau and Telser suggest that surveillance should be the primary manner to protect against market manipulation. Grossman argues that position limits on financial futures can force trading to foreign markets and to substitute markets. These articles, however, do not provide empirical results in support of their conclusions.

Kyle (1984) develops a theoretical model of futures-market manipulation and concludes that effective position limits can reduce market manipulation. Kumar and Seppi (1992) also suggest that position limits would effectively curtail market manipulation in their two-period asymmetric information model of cash-settled futures contracts. Both articles argue that cash settlement makes market corners infeasible in futures markets. They note, however, that cash settlement simply transfers the manipulation problem to the cash market.

OPTIMAL POSITION LIMITS

The derivation of an optimal position limit for a market would require that the benefits to legitimate traders of having large positions be traded off against the costs of tolerating market manipulations of a given size. The benefits depend on the legitimate trading problems that traders use

the market to solve. The costs are mostly due to losses that manipulators impose upon legitimate current and potential traders and, to a lesser extent, upon the economy, by making prices less informative. The benefits cannot be estimated easily, because not much is known about the trading problems that traders solve. The costs are easier to estimate and therefore are the primary subject of this article.

Although markets and regulators cannot easily estimate the benefits associated with large position limits, they generally can form prudent opinions about the maximum absolute price change that they will tolerate due to manipulation. Presumably this maximum reflects whatever they know about the legitimate value of large positions. If this value is high, they will tolerate greater manipulative price changes than if the value is low. The analysis therefore proceeds from the assumption that regulators can specify a maximum tolerable absolute price change due to manipulation. The maximum permitted position consistent with this assumption is derived, and the resulting quantity is labeled the *prudent position limit*, in reflection of the wisdom that hopefully underlies the regulator's opinion.

PRUDENT POSITION LIMITS

For a given contract position size, the optimal aggregate size of the manipulative trades in the underlying security is determined by characterizing the response of the underlying price to the manipulative trades. Then the difference between the benefit and the costs that the manipulator perceives is maximized. The benefit is the profit that the manipulator earns in the contract from manipulating the cash settlement. The cost is the transaction cost that the manipulator incurs trading the underlying instrument. The manipulator maximizes the difference—the net benefit—by determining the optimal aggregate size to trade in the underlying market.

Based on widely accepted market microstructure theory, a linear function is assumed for the price function.[5] The benefits of the manipulation therefore increase in direct proportion to the aggregate size of the manipulative trades. The costs of manipulation, however, increase at a faster rate: As the manipulator trades, the manipulator trades at prices that are further and further away from the proper value of the underlying instrument. The cost of the manipulation is the product of the manipulative trade volume times the price impact of the trading. Because the price impact of the trading depends on the manipulative trades, the cost

[5]Kyle (1985) provides the seminal analysis in support of the linear price response function.

of the trading is proportional to the square of the total manipulative trades. As some point, therefore, the additional cost of the manipulation becomes equal to the additional benefit of the manipulation, and the manipulator stops trading.

The original contract position determines the aggregate size of the manipulative trades, which determines the change in the price due to the manipulation. Given an assumed manipulative price change tolerance, this relation is inverted to obtain the prudent position limit.

The results are derived under the assumption that the underlying instrument is an index. Contracts on single securities are a special case of this analysis. The model applies to both futures and options, because in-the-money options contracts always have deltas of 1 upon final settlement.

The analysis begins by deriving the optimal manipulative strategy for a given index. Let a generally defined index I, consisting of n underlying components, be denoted by

$$I = \frac{\sum_{i=1}^{n} x_i P_i}{D} \tag{1}$$

where x_i and P_i are, respectively, the share factor and price associated with the ith underlying index component, and D is a constant index divisor. The formula for determining the share factors depends on whether the index is capitalization, price, share, or equal dollar weighted.[6]

The value of a contract calling for the cash settlement of m times the value of the index is mI. Let θ be the number of contracts that the trader holds. The notional value Z of the trader's contract position is

$$Z = \theta m I = \frac{\theta m}{D} \sum_{i=1}^{n} x_i P_i \tag{2}$$

It is assumed that the market price P_i deviates from its true value V_i in proportion to Q_i, the aggregate quantity that the manipulator trades in the underlying market:

$$P_i = V_i + \lambda_i Q_i \tag{3}$$

where λ_i is a measure of the illiquidity of the underlying market.

It is assumed that the manipulator trades in the opening auction in the underlying market when the settlement price is determined.[7] It is

[6]For a capitalization (or value) weighed index, x_i represents the outstanding shares of the ith component. For a price-weighted index, x_i equals 1 for all i. For an equal-dollar weighted index, the index designer initially sets x_i so that $P_i x_i = P_j x_j$ (for all i and j; $i \neq j$). For a share-weighted index, the index designer assigns an arbitrary value (number of shares) to x_i.

[7]Most U.S. cash-settled equity index futures and options contracts settle to a special opening quotation based on the opening prices of the index constituents.

also assumed that price will immediately revert to V_i following the manipulation.[8] Accordingly, the total cost of the manipulation, assuming a per-share commission rate of c_i, is

$$C_i = (V_i + \lambda_i Q_i)Q_i + c_i Q_i - V_i Q_i = \lambda_i Q_i^2 + c_i Q_i \tag{4}$$

so that the total cost to manipulate the underlying index is

$$C = \sum_{i=1}^{n} (\lambda_i Q_i^2 + c_i Q_i) \tag{5}$$

Combining (2) and (3) gives the net profit from the manipulation:

$$\prod = Z - C = \frac{\theta m}{D} \sum_{i=1}^{n} x_i (V_i + \lambda_i Q_i) - \sum_{i=1}^{n} (\lambda_i Q_i^2 + c_i Q_i) \tag{6}$$

Maximizing this expression with respect to Q_i yields

$$Q_i = \frac{\theta m}{2D} x_i - \frac{c_i}{2\lambda_i}, \qquad \text{for all } i \tag{7}$$

as the profit-maximizing quantities required to optimally manipulate the index.[9]

Substituting this expression into (3) gives the percentage price change due to the manipulation:

$$\frac{P_i - V_i}{V_i} = \frac{\lambda_i \theta m x_i}{2DV_i} - \frac{c_i}{2V_i} \tag{8}$$

For equity index contracts, it is useful to restate this expression in terms of the elasticity of price with respect to the fraction of all outstanding shares S_i traded by the manipulator. Let

$$\varepsilon_i = \frac{\lambda_i Q_i / V_i}{Q_i / S_i} = \frac{\lambda_i S_i}{V_i}, \qquad \text{so that } \lambda_i = \frac{\varepsilon_i V_i}{S_i} \tag{9}$$

Substituting this expression into (8) yields

$$\frac{P_i - V_i}{V_i} = \frac{\theta m x_i \varepsilon_i}{2DS_i} - \frac{c_i}{2V_i} \tag{10}$$

[8]Any relaxation of this assumption would result in lower position limits.

[9]If the manipulative trades were arranged in a continuous market rather than in a single price call market auction, the cost function in (4) will involve a summation over all the trades. In principle, the trader could minimize the cost by trading continuously, in which case the summation would become an integral and (7) would be exactly the same, except that the constant 2 would not appear in the denominator. With these assumptions, the derived assumptions, the derived position limits would be smaller.

The price tolerance criterion that will define the position limits must be specified. For index contracts, three alternative specifications are initially considered. The first alternative requires that the absolute percentage price change be no more than $k\%$ for every stock in the index, the second alternative requires that the absolute percentage index price change be no more than $k\%$, and the third alternative requires that the absolute capitalization weighted average percentage price change for the index stocks be no more than $k\%$. The first criterion focuses on each underlying constituent market. It will produce the smallest position limits. The second criterion focuses exclusively on the underlying index, and the third represents a compromise between the other two alternatives.

The third criterion is used for two reasons: First, by weighting the constituent price changes by the underlying capitalization, it weights the underlying securities by an obvious measure of their importance in the economy. Second, this criterion is proportional to the theoretical measure of disequilibrium economic cost based on standard results in welfare economics. Analyses of the other two criteria are straightforward and produce qualitatively similar results.

To derive the results, let $\omega_i = \frac{S_i V_i}{\sum_{j=1}^{n} S_j V_j}$ be the capitalization value weight of the ith stock in index I. Ignoring absolute-value signs, the third criterion is

$$\sum_{i=1}^{n} \omega_i \frac{P_i - V_i}{V_i} = \sum_{i=1}^{n} \omega_i \left[\frac{\theta m x_i \varepsilon_i}{2DS_i} - \frac{c_i}{2V_i} \right] < k \tag{11}$$

so that the prudent position limit is

$$\theta < \frac{2Dk}{m \sum_{i=1}^{n} \omega_i (x_i \varepsilon_i / S_i)} + \frac{D \sum_{i=1}^{n} \omega_i (c_i / V_i)}{m \sum_{i=1}^{n} \omega_i (x_i \varepsilon_i / S_i)} \tag{12}$$

Because the per-share commission c_i is generally small relative to V_i, the second term, in practice, does not matter much. Thus the prudent position limit can be calculated as

$$\theta < \frac{2Dk}{m \sum_{i=1}^{n} \omega_i (x_i \varepsilon_i / S_i)} \tag{13}$$

If the index is a value-weighted index so that $x_i = S_i$ and all ε_i are constant, this expression reduces to

$$\theta < \frac{2Dk}{m\varepsilon} \tag{14}$$

These results are intuitively appealing: The greater the contract multiplier m, the larger is the contract and the greater are the incentives to manipulate the underlying instruments for a given contract position size. The prudent position limit therefore decreases with m. The elasticity ε_i measures illiquidity in the ith underlying security. When it is large, manipulators do not need to trade much to affect underlying prices. The prudent position limit therefore decreases with ε_i. An increase in the index divisor D decreases the cash value of the index, which permits larger position limits. Finally, the prudent position limit must obviously increase with the regulator's price-change tolerance k.

CONSISTENCY OF CURRENT POSITION LIMITS

To provide a rough characterization of whether regulators have set position limits on a consistent basis, the implied ratio k/ε was computed from the position limits currently used on a set of cash-settled index contracts. Forty-seven cash-settled index contracts defined on U.S. stocks traded in U.S. markets were examined. These contracts included four broad-based futures contracts trading on the Chicago Mercantile Exchange and three broad-based cash-settled contracts trading on the Chicago Board of Options Exchange. The remaining contracts are sector-option indexes with smaller numbers of constituent securities that trade on the CBOE, the Philadelphia Stock Exchange, and the American Stock Exchange.

The implied k/ε ratio varies over just under two orders of magnitude (Table I). The variation is large not only across regulators and markets, but also among contracts traded in the same market under the supervision of the same regulator. The large variation in these ratios may suggest that position limits have not been set on an economically consistent basis across index contracts.[10,11]

To further illustrate these results, the correlation across contracts between position limits suggested by the present model and those actually used in the markets was examined. To compute the limits, a value of 3% was assigned to k. Further, based upon an analysis explained in the following section, a value of 150 was assigned to ε, producing a k/ε ratio

[10]The variation may reflect variation in the strength of surveillance and enforcement programs.

[11]The ratios derived obtained from different contracts defined over the same underlying indices are most interesting. The CBOE ratios for its Nasdaq 100, S&P 500, and Russell 2000 option contracts are smaller than the ratios for the corresponding futures contracts that trade at the Chicago Mercantile Exchange. In principle, these ratios should be the same. The CME ratio is exactly five times higher than the CBOE ratio for the Nasdaq 100 contract, and exactly twice as high for the S&P 500 and Russell 2000 contracts. These round numbers are a consequence of the round multipliers and position limits that the markets use for their contracts.

TABLE I

Estimates of Implied k/ε Ratios Across Selected Derivative Cash Settled Index Contracts*

Index name	*Ticker*	*Index value*	*Type*	*Constituents*	*Multiplier*	*Divisor*	k/ε
Chicago Mercantile Exchange—index futures							
S&P Midcap 400[1]	MD	423.95	Value	400	500	1600099529	0.000781
Nasdaq 100[1]	ND	1008.35	Value	100	100	1184264307	0.000211
Russell 2000[1]	RL	379	Value	1971	500	1976548177	0.000632
S&P 500[1]	SP	894.74	Value	500	250	9131361257	0.000274
Chicago Board of Options Exchange—index options							
Dow Jones Transportation[2]	DTX	213.53	Price	20	100	2.079424	0.004480
Dow Jones Utility Average[2]	DUX	183.66	Price	15	100	1.7170558	0.002570
Dow Jones Internet Comm.[2]	ECM	35.33	Value	15	100	303970433.5	0.001279
GSTI Hardware Index[2]	GHA	125.55	Value	18	100	291.8061	0.000590
GSTI Internet Index[2]	GIN	67.1	Value	15	100	306.7312	0.001002
CBOE Gold Index[2]	GOX	51.53	Equal Dollar	10	100	1634.4244	0.001738
GSTI Software Index[2]	GSO	89.32	Value	43	100	1252.0738	0.000353
CBOE Internet Index[2]	INX	61.64	Equal Dollar	13	100	1593.5061	0.000585
CBOE Mexican Index[2]	MEX	62.27	Equal Dollar	10	100	1589.0826	0.003425
Morgan Stanley Retail Index[2]	MVR	83.18	Equal Dollar	38	100	1063.908	0.000252
Nasdaq 100[1]	NDX	1008.35	Value	100	100	1184264307	0.001056
Russell 2000[1]	RUT	379	Value	1971	100	1976548177	0.001265
S&P 500[1]	SPX	894.74	Value	500	100	9131361257	0.000548
CBOE Technology[2]	TXX	301.19	Price	30	100	1.5957753	0.000509
Philadelphia Stock Exchange—index options							
KBW Bank Sector[3]	BKX	738.01	Value	24	100	1088325000	0.001103
Computer Boxmake[4]	BMX	78.61	Price	10	100	2.986923	0.000085
Defense Sector[3]	DFX	157.92	Equal Dollar	17	100	1098000	0.000675
Internet Sector[3]	DOT	88.65	Equal Dollar	25	100	3240994.4	0.000187
Forest & Paper Products[3]	FPP	253	Price	13	100	1.2759938	0.006246
Housing Sector[3]	HGX	209.17	Value	22	100	272342099	0.005783
Oil Services Sector[3]	OSX	79.73	Price	15	100	5.086414	0.001587
OTC Prime Sector[3]	OTX	125.27	Price	15	100	2.042986	0.000206
Drug Sector[3]	RXS	176.4	Value	15	100	6943985000	0.000173
Semiconductor[3]	SOX	295.64	Price	17	100	0.9722665	0.001932
Utility Sector[3]	UTY	233.24	Value	20	100	685094000	0.002299
Gold and Silve[3]	XAU	65.19	Value	11	100	640443000	0.001874

(*Continued*)

TABLE I (*Continued*)

Estimates of Implied k/ε Ratios Across Selected Derivative Cash Settled Index Contracts

Index name	*Ticker*	*Index value*	*Type*	*Constituents*	*Multiplier*	*Divisor*	k/ε
American Stock Exchange—index options							
Amex Biotechnology[5]	BTK	326.86	Equal Dollar	17	100	750.278952	0.004735
Morgan Stanley Consumer[5]	CMR	467.38	Equal Dollar	30	100	50514.5592	0.000413
Morgan Stanley Commodity[5]	CRX	226.86	Equal Dollar	20	100	99495.34542	0.002144
Credit Suisse First Boston Tech.[5]	CTN	126.62	Equal Dollar	75	100	481006.4652	0.000169
Morgan Stanley Cyclical[5]	CYC	428.72	Equal Dollar	30	100	49591.49436	0.000986
Amex Disk Drive[5]	DDX	74.21	Equal Dollar	10	100	39362.04856	0.009093
Amex Defense Index[5]	DFI	484.64	Equal Dollar	15	100	300.3981294	0.009382
Amex Pharmaceutical[5]	DRG	291.16	Value	15	100	3522382590	0.000464
Deutsche Bank Energy Index[5]	DXE	352.28	Equal Dollar	30	100	12026.95034	0.001430
Interactive Week Internet[5]	IIX	84.89	CAP	45	100	3638154915	0.000483
Morgan Stanley Internet[5]	MOX	8.17	Equal Dollar	23	100	25722.78653	0.000029
Morgan Stanley Technology[5]	MSH	292.28	Equal Dollar	35	100	100548.8234	0.000912
Amex Airline Index[5]	XAL	31.48	Equal Dollar	10	100	1862.997157	0.004019
Amex Securities Broker/Dealer[5]	XBD	382.28	Equal Dollar	12	100	1655.649962	0.004296
Amex Computer Technology Index[5]	XCI	518.47	Value	30	100	1923241591	0.000718
Amex Natural Gas Index[5]	XNG	158.22	Equal Dollar	15	100	1048.650481	0.004378
Amex Oil Index[5]	XOI	422.32	Price	13	100	1.190389307	0.002290

Note. Date Sources: [1]11/08/02 (DataStream); [2]10/11/02 (CBOE); [3]11/14/02 (Phlx); [4]11/06/02 (Phlx); [5]2/18/2003 (Amex).

*The k/ε ratio is based on a default position limit size of 25,000 that would have been implemented under original CME rules. After accounting estimates from the prudent position limit model, the CME established a position limit of 10,000 on this contract resulting in a k/ε ratio that is close to 0.0002.

of 0.0002. These parameter values determine the level of the position limits for all contracts but have no effect on the relative limits among contracts. The actual positions limits and those produced by the current model appear in Table II.

The overall correlation coefficient is 0.13 (p value of 0.37). Separately, the correlation coefficient for AMEX contracts is 0.08 (p value of 0.95). The correlation coefficient for the PHLX contracts is negative but statistically insignificant (–0.12 with a p value of 0.72). The CBOE contract correlation is 0.75 and statistically significant (p value of 0.002). An examination of a scatter plot, however, indicated this correlation is entirely due to the CBOE S&P 500 options contract that has—and should have—very large position limits. When this outlier is removed, the CBOE correlation coefficient dropped to 0.19 (p value of 0.52), and the correlation coefficient across all markets dropped to 0.08 (p value of 0.60). The low correlation, both within and across exchanges, indicates that essentially no positive relation exists between the position limits implied by the model and those in actual use.

IMPLEMENTING THE MODEL IN PRACTICE

For a given index contract, the shares outstanding S_i, the share factors x_i, and the contract multiplier m are known. Regulators can take several approaches to specify the price-change tolerance k and the illiquidity elasticity ε_i. Under the first approach, the regulator assumes all are equal and then estimates the ratio k/ε from the position limits currently used on cash-settled index contracts.[12] Given the cross-contract variation in k/ε documented in Table I, this approach is problematic in practice.

Another approach is for the regulator to explicitly specify k and separately estimate ε_i from data or from practical experience.[13] Alternatively, the regulator could explicitly specify k and apply a constant illiquidity elasticity $\varepsilon_i = \varepsilon$ across stocks. The simplicity of the latter approach would make it preferable to the former if it produced similar position limits.

To investigate these latter two alternatives, estimates were obtained of per-share price impact costs of immediately trading 10,000 shares from ITG, Inc. for the constituents of several of the smaller indices

[12]Because the elasticities are measured with respect to the total number of shares outstanding, to a first approximation, the assumption that all stocks are equally illiquid is reasonable.

[13]For example, regulators can easily derive the elasticities from the estimated transaction cost prediction models that ITG, Goldman Sachs, and others provide to their clients.

TABLE II

Prudent Position Limits for Selected Cash-Settled Derivative Index Contracts Assuming $\varepsilon = 150$ and $k = 3\%$*

Index name	*Ticker*	*Index value*	*Constituents*	*Multiplier*	*Divisor*	*Current position limit*	*Prudent position limit*
Chicago Mercantile Exchange—index futures							
S&P Midcap 400[1]	MD	423.95	400	500	1600099529	5,000	1,280
Nasdaq 100[1]	ND	1008.35	100	100	1184264307	5,000	4,737
Russell 2000[1]	RL	379	1971	500	1976548177	5,000	1,581
S&P 500[1]	SP	894.74	500	250	9131361257	20,000	14,610
Chicago Board of Options Exchange—index options							
Dow Jones Transportation[2]	DTX	213.53	20	100	2.079424	31,500	1,406
Dow Jones Utility Average[2]	DUX	183.66	15	100	1.7170558	31,500	2,451
Dow Jones Internet Comm[2]	ECM	35.33	15	100	303970433.5	31,500	4,925
GSTI Hardware Index[2]	GHA	125.55	18	100	291.8061	24,000	8,134
GSTI Internet Index[2]	GIN	67.1	15	100	306.7312	31,500	6,285
CBOE Gold Index[2]	GOX	51.53	10	100	1634.4244	24,000	2,762
GSTI Software Index[2]	GSO	89.32	43	100	1252.0738	31,500	17,870
CBOE Internet Index[2]	INX	61.64	13	100	1593.5061	31,500	10,768
CBOE Mexican Index[2]	MEX	62.27	10	100	1589.0826	24,000	1,402
Morgan Stanley Retail Index[2]	MVR	83.18	38	100	1063.908	31,500	25,020
Nasdaq 100[1]	NDX	1008.35	100	100	1184264307	25,000	4,737
Russell 2000[1]	RUT	379	1971	100	1976548177	50,000	7,906
S&P 500[1]	SPX	894.74	500	100	9131361257	100,000	36,525
CBOE Technology[2]	TXX	301.19	30	100	1.5957753	31,500	12,368
Philadelphia Stock Exchange—index options							
KBW Bank Sector [3]	BKX	738.01	24	100	1088325000	24,000	4,353
Computer Boxmaker[4]	BMX	78.61	10	100	2.986923	5,500	12,964
Defense Sector[3]	DFX	157.92	17	100	1098000	31,500	9,329
Internet Sector[3]	DOT	88.65	25	100	3240994.4	31,500	33,712
Forest & Paper Products[3]	FPP	253	13	100	1.2759938	24,000	768
Housing Sector[3]	HGX	209.17	22	100	272342099	31,500	1,089
Oil Services Sector[3]	OSX	79.73	15	100	5.086414	31,500	3,971

OTC Prime Sector[3]	OTX	125.27	15	100	2.042986	24,000	23,306
Drug Sector[3]	RXS	176.4	15	100	6943985000	24,000	27,776
Semiconductor[3]	SOX	295.64	17	100	0.9722665	31,500	3,261
Utility Sector[3]	UTY	233.24	20	100	685094000	31,500	2,740
Gold and Silver[3]	XAU	65.19	11	100	640443000	24,000	2,562
American Stock Exchange—index options							
Amex Biotechnology[5]	BTK	326.86	17	100	750.278952	31,500	1,330
Morgan Stanley Consumer[5]	CMR	467.38	30	100	50514.5592	25,000	12,114
Morgan Stanley Commodity[5]	CRX	226.86	20	100	99495.34542	31,500	2,938
Credit Suisse First Boston Tech.[5]	CTN	126.62	75	100	481006.4652	31,500	37,294
Morgan Stanley Cyclical[5]	CYC	428.72	30	100	49591.49436	25,000	5,071
Amex Disk Drive[5]	DDX	74.21	10	100	39362.04856	31,500	693
Amex Defense Index[5]	DFI	484.64	15	100	300.3981294	31,500	671
Amex Pharmaceutical[5]	DRG	291.16	15	100	3522382590	24,000	10,339
Deutsche Bank Energy Index[5]	DXE	352.28	30	100	12026.95034	31,500	4,406
Interactive Week Internet[5]	IIX	84.89	45	100	3638154915	31,500	13,057
Morgan Stanley Internet[5]	MOX	8.17	23	100	25722.78653	31,500	218,422
Morgan Stanley Technology[5]	MSH	292.28	35	100	100548.8234	63,000	13,822
Amex Airline Index[5]	XAL	31.48	10	100	1862.997157	31,500	1,568
Amex Securities Broker/Dealer[5]	XBD	382.28	12	100	1655.649962	31,500	1,466
Amex Computer Technology Index[5]	XCI	518.47	30	100	1923241591	24,000	6,689
Amex Natural Gas Index[5]	XNG	158.22	15	100	1048.650481	31,500	1,439
Amex Oil Index[5]	XOI	422.32	13	100	1.190389307	31,500	2,751

Note. Date Sources: [1]11/08/02 (DataStream); [2]10/11/02 (CBOE); [3]11/14/02 (Phlx); [4]11/06/02 (Phlx); [5]2/18/2003 (Amex).

*The k/ε ratio is based on a default position limit size of 25,000 that would have been implemented under original CME rules. After accounting estimates from the prudent position limit model, the CME established a position limit of 10,000 on this contract, resulting in a k/ε ratio that is close to 0.0002.

TABLE III
Illiquidity Elasticity Estimates Derived from Goldman and ITG Models
Immediate Trade of 10,000 Shares 27 Individual Stocks

	Mean	*Median*	*Fifth percentile*	*Twenty-fifth percentile*	*Seventy-fifth percentile*	*Ninety-fifth percentile*
ITG	140	106	27	45	210	383
Goldman	337	319	40	117	460	752

traded on the Chicago Board of Trade.[14] The mean and median ITG illiquidity elasticities are 115 and 38, respectively. Per-share price impact costs of immediately trading 10,000 shares from Goldman Sachs for a limited sample of 27 stocks were also obtained. With this sample, the ITG per-share price impact estimates could be compared with those produced by the Goldman model directly. The results (Table III) show that the Goldman price impact estimates are about three times greater than those for the same stocks produced by ITG. The difference may be due to the methods that ITG and Goldman use to estimate their models. ITG estimates its model from trades and quotes, and Goldman estimates its model from actual orders. When using trades and quotes to estimate the price impacts of large trades, the analyst does not know what orders were split into multiple trades. Accordingly, the ITG model may underestimate the price impacts associated with large trades. Alternatively, as a specialist in high value-added services, Goldman may receive more difficult orders to execute than does ITG, which would explain why its transaction cost estimates are higher. Given the uncertainty, a constant illiquidity elasticity of 150 appears reasonable.

To consider whether assuming a constant elasticity for each stock would materially affect the cross-sectional variation in the position limits, $k = 3\%$ is specified, and two sets of position limits were computed for the smaller cash-settled indices currently traded on CBOE and Philadelphia Stock Exchange.[15] The first set is based on separate elasticities for each stock, which were derived from the ITG estimates. The second set assumes a constant elasticity. A value of 150 was used for reporting purposes, but any assumed constant value will produce the same cross-sectional correlation between the two sets of position limits. The estimated correlation coefficients are 0.90 and 0.79 for CBOE and PHLX,

[14]These contracts included DTX, DUX, ECM, GHA, GIN, GOX, GSO, INX, MEX, MVR, and TXX.
[15]These contracts included BKX, BMX, DFX, DOT, FPP, HGX, OSX, OTX, RXS, SOX, UTY, and XAU.

respectively. These results suggest that simply using a constant elasticity to derive position limits is reasonable.

POLICY IMPLICATIONS

The use of position limits is controversial. Some argue that position limits should not exist. Others argue that they are an important factor in controlling market manipulation. However, these are largely ideological and not economic arguments.

The economic model developed here suggests that position limits should depend upon contract specifications and various market forces. For contracts defined on closely followed portfolios of highly liquid securities, the suggested position limits are so large that these contracts need not have position limits in practice. In contrast, contracts based on narrow indices of illiquid securities may benefit from the imposition of position limits, especially if the contracts are widely traded by uninformed risk-averse traders and if reliable surveillance procedures are expensive to implement.

Regulators must also consider the costs position limits impose upon legitimate uses of contract markets. These costs are trivial in futures markets, because the position limits need only apply to final settlement, and because legitimate traders can always roll into the next month or trade out before settlement. The primary purpose of the settlement mechanism in any futures markets is to ensure that contract pricing closely tracks underlying values by allowing anyone who is not satisfied with the pricing to opt for final settlement. Although denial of access to this mechanism can create manipulation problems at the date the position limit becomes effective, it only affects traders to the extent that their positions exceed the position limit, and then only if they have allowed themselves to get squeezed against the limit. Because large traders are generally knowledgeable enough to avoid such squeezes, and because regulatory authorities can intervene in the event such activity takes place, reasonable settlement position limits are unlikely to impose much restraint on the legitimate uses of cash-settled futures markets.

The same result holds for cash-settled options with one caveat. Upon final settlement, an in-the-money option contract is essentially the same as a futures contract. However, because the contract may not be in the money as it approaches settlement, and because some contracts in-the-money go out-of-the-money as settlement approaches, a binding position limit may prevent traders from obtaining full benefit from the nonlinear distribution associated with options contracts. These arguments suggest that options contracts should be physically settled if the position

limits necessary to protect a cash settlement mechanism would bind legitimate contract uses.

CONCLUSION

Markets and regulators use position limits to help control trading practices that may unnecessarily increase transitory volatility in cash-settled derivative contracts. The need for position limits is particularly acute in the case of narrow-based cash-settled derivative contracts. This study presents a simple model for how limits may be set for index derivative contracts. The model takes into account the structure of the index, the liquidity in the underlying instruments, and the tolerance of the regulator for manipulative price changes. Evidence from existing contract position limits suggest that existing limits are not strongly related to these fundamental economic factors.[16]

The use of position limits is necessary to the degree that surveillance and subsequent prosecution are inadequate to control the manipulation of cash-settled derivative contracts. Although position limits can help control this potential problem, especially for contracts defined on illiquid assets, strong surveillance and enforcement programs are still necessary. For example, regulators must surveil markets to ensure that manipulators do not exercise common control over different positions that in aggregate exceed the limit. This issue can be especially difficult to address when traders can take positions in different contracts that are defined over the same underlying instruments, if those contracts can be cash settled at the same time.[17]

In principle, position limits need only apply during the period when cash settlement takes place. Traders could have larger positions if they were required to divest themselves of them before cash settlement.[18] In contract markets where traders commonly roll their positions into the next contract before the near contract expires, position limits need not constrain the ability of traders to solve legitimate trading problems.

[16]The narrow index futures contracts introduced in June of 2003 by OneChicago are subject position limits. It is expected the CBOE will soon follow with similar options contracts. These limits were set by the Commodity Futures Trading Commission in consultation with the Securities and Exchange Commission and are consistent those that the methods in this article would suggest. This article grew out of the authors' participation in discussions about the economically appropriate size of the position limits to be applied to these contracts.

[17]These considerations suggest that it is in the public interest to ensure that competing contracts settle at different times.

[18]It may be prudent to impose the position limits over some short period—perhaps 5 days—before the cash settlement to avoid costs that traders would incur if they had to plan for the contingency.

In practice, position limits need not apply to broad-based index derivative contracts that are cash settled because they are composed of highly liquid and well-followed securities. Behind this assertion is an assumption that surveillance would be more effective detecting manipulation of highly liquid underlying securities. This is based on the premise that it would require very high trading volume to manipulate such securities and would consequently be more easily detectable and prosecutable. However, even if position limits were applied to these broad-based contracts, they would relatively high under these model assumptions.

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Exhibit 2

U.S. Securities and Exchange Commission

Request for Rulemaking to Amend Rule 19c-5 Regarding Certain Options Exchange Licensing Arrangements

October November 1, 2002

Mr. Jonathan G. Katz
Secretary
Securities and Exchange Commission
450 Fifth Street, N.W.
Washington, D.C. 20549

Re: Competition in the Options Markets; Petition for Rulemaking

Dear Mr. Katz:

The International Securities Exchange, Inc. ("ISE") petitions the Commission to amend Rule 19c-5 (the "Rule") under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), to remove the last bastion of anticompetitive listing practices in the options markets. Specifically, we request that the Commission adopt the attached amendments to the Rule to prohibit an options exchange from being a party to exclusive or preferential licensing arrangements with respect to index option products and options overlying other instruments, including options on securities whose value is based on an index. We believe that prohibiting such license arrangements will enhance competition in the market and will result in significant benefits for the investing public.

The Benefits of Multiple Trading

The Commission adopted the Rule in 1989, when there was only limited multiple trading. The lack of multiple trading was due both to (i) an "allocation plan" that permitted the options exchanges to list options on exchange-traded securities on an exclusive basis, and (ii) trading patterns that generally resulted in the trading of options on over-the-counter ("OTC") securities solely on the one exchange that captured the majority of the order flow, although not officially sanctioned by any rule.

The Rule prohibited the options exchanges from establishing any rule or practice limiting multiple trading. The Commission cited the following policy reasons for adopting this new regulation:

- Market participants should be able to select the marketplace of their choice;
- Multiple trading could lead to an improvement in market quality;
- Investors could directly benefit from multiple trading by paying reduced transaction costs; and
- Multiple trading, to the limited extent it then existed, had spurred options exchanges to offer enhanced services and to increase execution quality.

It took more than 10 years from the adoption of the Rule for the four then-existing options exchanges to engage in wide-scale multiple trading. This occurred only following the announcement in November of 1998 of our intent to register as an options exchange and to engage in multiple trading of the most-actively traded options. By August of 1999, all the remaining barriers to multiple trading had crumbled and open competition had begun in the options markets.

In reviewing the results of full-scale multiple trading, perhaps the only surprise is that the Commission actually underestimated the benefits of such trading. Competition over the last two years has resulted in fundamental and far-reaching changes to the options markets, all to the benefit of the investing public:

- Reduced fees for customers: One of the most dramatic effects of multiple trading has been the changed economics in the industry. Prior to multiple trading, exchanges imposed significantly higher per-contract trading costs on customer orders than on market maker orders. With the advent of multiple trading the exchanges quickly eliminated *all* customer trading fees in competitively-traded products, while raising professional trading charges. The resulting savings allowed broker-dealers to discount commissions to investors, leading to significant savings.
- *Improved market quality:* Increased competition has led to narrower quotation spreads. Our entry into the market also helped spur the growth of disseminating the size of quotations (discussed below), which in turn has led to competition to provide deeper markets for investors.
- *Improved market data:* Prior to multiple trading, the Options Price Reporting Authority ("OPRA") disseminated non-firm quotations, without size, and was experiencing severe capacity constraints. Upon our announcement that we would be disseminating size, the other exchanges quickly established a priority that OPRA accommodate the dissemination of quotation size and increase its capacity. The Commission itself added the requirement that quotes be firm. In the two short years of multiple trading of options, market data has evolved from indicative, non-firm quotes of a single market, to competitive, firm quotes with size.
- *Technological enhancements:* The 19c-5 Release noted that the limited multiple trading prior to adoption of the Rule had led the exchanges to improve technology and to enhance the services they offered. There have been even more dramatic changes since the beginning of full-scale multiple trading. Most importantly, multiple trading permitted our entry into the market, providing market participants with the first fully-electronic options exchange as an alternative to the floor-based exchanges. In turn, this gave rise to competing electronic trading alternatives, such as CBOEdirect. All options exchanges now are continuously reviewing their trading systems to offer members more convenient and attractive trading platforms.
- *Development of an Intermarket Linkage:* A significant issue the Commission addressed when adopting the Rule was whether to condition multiple trading on the development of an intermarket linkage. The Commission ultimately determined to move forward with multiple trading notwithstanding the lack of a linkage. However, with

the ultimate success of multiple trading, it soon became apparent that the options exchanges would need to take steps to help ensure that customers receive best execution of their orders. Thus, the Commission issued an order requiring the exchanges to develop a linkage, and the exchanges have moved steadily to implement that linkage.

The Need for Our Rule Proposal

There is one area in which there remains no multiple trading of options: the trading of index options and similar instruments. Rule 19c-5 does apply to index-based options, and no exchange has adopted a rule or procedure explicitly prohibiting multiple trading of these instruments. However, exclusive licensing arrangements have the same effect. Pursuant to these arrangements, an index developer will enter into an agreement with one exchange and grant that exchange the exclusive right to trade options based on the index. Often these arrangements are structured as licenses for the use of a trademark or service mark with respect to options.

To date, we are not aware of any Commission proceedings or court cases testing the legality of these arrangements. However, anyone attempting to list an index product for which it does not have a license is likely to face a strenuous legal challenge. Moreover, it is impractical even to list these products since The Options Clearing Corporation, the common issuing and clearing entity for standardized options, has told us it would not permit an exchange to list these types of products without a license for fear that it might incur liability.

This lack of competition directly affects investors. While no options exchange charges customers for transactions in equity options, exchanges continue to charge customer fees for trading index options. For example, the Chicago Board Options Exchange ("CBOE") imposes a transaction fee of $.20 per index option contract (other than on the S&P 100 and Mini-Nasdaq 100 indices) if the premium is a dollar or less, and a fee of $.40 per contract if the premium is more than one dollar. For the S&P 100, the fees are $.15 and $.30 per contract, respectively; for the Mini-Nasdaq 100 the fee is $.15 for all contracts. The CBOE also imposes additional index fees of: $.05 per contract as a "trade match" fee; $.04 per contract as a "floor brokerage fee"; and $.25 per contract as a "RAES fee." This results in fees that can reach $.70 *per contract* for automatic executions. For equity options, which are subject to multiple trading and competition, none of these fees apply. Competition would eliminate or greatly reduce these fees imposed on public customers.

In addition to the direct benefit that fee competition will provide, it is equally clear that enhanced competition will reduce spreads and provide investors with better executions. In adopting the Rule, the Commission cited two staff studies using data from the mid-1980's. One study showed that customers saved $25 million due to competition in options on OTC securities in a one-year period; the other study concluded that investors would receive a total savings of $150 million if multiple trading had been extended to all equity options. Since these studies were based on trading volumes now over 15 years old, it is likely that investors today would reap benefits multiple times that of the mid-1980's.

Our Proposed Rule Amendments

We propose two substantive changes to Rule 19c-5. First, immediately upon adoption of the rule amendments an exchange would not be permitted to enter into, or extend, any exclusive index licensing arrangement. Second, an exchange would be prohibited from being a party to any exclusive license arrangement after January 1, 2004. This would provide a transition period during which exchanges could continue operating under existing license agreements, but would not be permitted to extend them. It also would provide a period of time for exchanges and index providers to renegotiate existing licenses for operation in a multiple trading environment.

Our proposal is drafted broadly to address both direct licensing of a product and any similar arrangement where there is a license of a trademark or service mark. The prohibition would apply to index options and other similar products, including options on securities based on indices, such as exchange-traded funds ("ETFs"). The language would prohibit not only exclusive arrangements, but also preferential arrangements. This would require that any licensing agreement provide the same terms and conditions for all options exchanges.

In proposing these rule amendments, our intent is first to restrict, and then to prohibit, any type of contractual relationship that prevents multiple exchanges from licensing index and similar products on the same terms and conditions as are available to another exchange. Our intent is not to harm index providers or limit their ability to achieve a fair return for their development of an index. Rather, our intent is to eliminate a barrier to competition and to benefit investors. Indeed, we believe that enhancing competition in this market will result in increased trading of index and similar products, benefiting all participants in the options markets including the index providers.

* * *

We appreciate the opportunity the Commission provides interested persons to petition for changes to Commission rules. We urge the Commission to take prompt action to propose and adopt these rule amendments as quickly as possible so that investors may begin reaping the benefits of competition in the trading of index option products.

Yours very truly,

David Krell

President and Chief Executive Officer

cc: The HonorableChairman Harvey Pitt
Commissioner Cynthia Glassman
Commissioner Harvey Goldschmidt
Commissioner Paul Atkins
Commissioner Roel Campos
Annette Nazareth

Attachments:

1. Draft of Proposed Amendments, Marked to Show Changes

2. Draft of Proposed Amendments, Unmarked

Attachment 1

Proposed Amendment to Rule 19c-5 Marked to Show Changes from Current Rule

Underlining indicates additions; [brackets] indicate deletions.

240.19c-5. (a) The rules of each national securities exchange that provides a trading market in standardized put or call options shall provide as follows:

[(1) On and after January 22, 1990, but not before, no stated policy, practice, or interpretation of this exchange shall prohibit or condition, or be construed to prohibit or condition or otherwise limit, directly or indirectly, the ability of this exchange to list any stock options

class first listed on an exchange on or after January 22, 1990, because that options class is listed on another options exchange.]

[(2) During the period from January 22, 1990, to January 21, 1991, but not before, no stated policy, practice, or interpretation of this exchange shall prohibit or condition, or be construed to prohibit or condition or otherwise limit, directly or indirectly, the ability of this exchange to list up to ten classes of standardized stock options overlying exchange-list stocks that were listed on another options exchange before January 22, 1990. These ten classes shall be in addition to any options on an exchange-listed stock trading on this exchange that was traded on more than one options exchange before January 22, 1990.]

(1) [(3) On and after January 21, 1991, but not before, no] No stated policy, practice, or interpretation of this exchange shall prohibit or condition, or be construed to prohibit or condition or otherwise limit, directly or indirectly, the ability of this exchange to list any stock options class because that options class is listed on another options exchange.

(2) On or after {insert date of effectiveness of this paragraph}, but not before, no stated policy, practice or interpretation of this exchange shall permit this exchange to enter into or to extend a contractual or other relationship in which this exchange is granted an exclusive or preferential right or license (A) to issue standardized options overlying any instrument, index or other product, including options on securities based upon an index, or (B) to use any trademark, service market or similar right with respect to standardized options overlying any instrument, index or other product, including options on securities based upon an index.

(3) On or after January 1, 2004, but not before, no stated policy, practice or interpretation of this exchange shall permit this exchange to be a party to a contractual or other relationship in which this exchange is granted an exclusive or preferential right or license (A) to issue standardized options overlying any instrument, index or other product, including options on securities based upon an index, or (B) to use any trademark, service market or similar right with respect to standardized options overlying any instrument, index or other product, including options on securities based upon an index.

[(b) For purposes of paragraph (a)(2) of this Rule, if any options class is delisted from an options exchange as a result of a merger of the equity security underlying the option or a failure of the underlying security to satisfy that exchange's options listing standards, then the exchange is permitted to select a replacement option from among those standardized options overlying exchange-listed stocks that were listed on another options exchange before January 22, 1990.]

[(c)] (b) For purposes of this Rule, the term "exchange" shall mean a national securities exchange, registered as such with the Commission pursuant to Section 6 of the Securities Exchange Act of 1934, as amended.

[(d)] (c) For purposes of this the term "standardized option: shall have the same meaning as that term is defined in Rule 9b-1 under the Securities Exchange Act of 1934, as amended, 17 C.F.R. §240.9b-1.

[(e)] (d) For purposes of this Rule, the term "options class" shall have the same meaning as that term is defined in Rule 9b-1 under the Securities Exchange Act of 1934, as amended, 17 C.F.R. §240.9b-1.

Attachment 2

Rule 19c-5, as Proposed to be Amended (Unmarked)

240.19c-5. (a) The rules of each national securities exchange that provides a trading market in standardized put or call options shall provide as follows:

(1) No stated policy, practice, or interpretation of this exchange

shall prohibit or condition, or be construed to prohibit or condition or otherwise limit, directly or indirectly, the ability of this to list any stock options class because that options class is listed on another options exchange.

(2) On or after {insert date of effectiveness of this paragraph}, but not before, no stated policy, practice or interpretation of this exchange shall permit this exchange to enter into or to extend a contractual or other relationship in which this exchange is granted an exclusive or preferential right or license (A) to issue standardized options overlying any instrument, index or other product, including options on securities based upon an index, or (B) to use any trademark, service market or similar right with respect to standardized options overlying any instrument, index or other product, including options on securities based upon an index.

(3) On or after January 1, 2004, but not before, no stated policy, practice or interpretation of this exchange shall permit this exchange to be a party to a contractual or other relationship in which this exchange is granted an exclusive or preferential right or license (A) to issue standardized options overlying any instrument, index or other product, including options on securities based upon an index, or (B) to use any trademark, service market or similar right with respect to standardized options overlying any instrument, index or other product, including options on securities based upon an index.

(b) For purposes of this Rule, the term "exchange" shall mean a national

securities exchange, registered as such with the Commission pursuant to Section 6 of the Securities Exchange Act of 1934, as amended.

(c) For purposes of this the term "standardized option: shall have the same meaning as that term is defined in Rule 9b-1 under the Securities Exchange Act of 1934, as amended, 17 C.F.R. §240.9b-1.

(d) For purposes of this Rule, the term "options class" shall have the same meaning as that term is defined in Rule 9b-1 under the Securities Exchange Act of 1934, as amended, 17 C.F.R. §240.9b-1.

http://www.sec.gov/rules/petitions/petn4-469.htm

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