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NYSE Euronext Response to IOSCO Report – Regulatory Issues Raised by the Impact of Technological Changes on Market Integrity and Efficiency

NYSE Euronext is a leading global operator of financial markets and a provider of innovative trading technologies. NYSE Euronext's exchanges in Europe and the United States provide for the trading of cash equities, bonds, futures, options, and other exchange-traded products. We provide the following introductory comments before answering the questions posed in the consultation overleaf.

1.1 NYSE Euronext believes that high frequency trading (HFT) on average helps lower spreads, decrease costs, and lower volatility, and operates in a transparent market
In a fragmented market, high frequency traders play a valuable role in tightening spreads, contributing to price discovery, and ensuring that prices are coherent between competing platforms. This type of trading strategy is simply arbitrage between marketplaces given a common set of transparent market information and it may occur at high or low speed. Trading strategies, as with all things over-time, improve in their effectiveness with technology. That said, it is not the trading strategy of arbitrage that is new, rather it is the need for a comprehensive view of all activity. In Europe, this highlights the importance of the upcoming review of the Market Abuse Directive ("MAD") which is key to ensuring investor protection across fragmented order books in the EU.

1.2 At the same time, controls on HFT should be implemented. However, these should be located at the level of the authorised firms through whom high frequency traders access the exchanges and have their business cleared, instead of requiring high frequency traders themselves to be authorised solely as a result of such activity.

In addition, specific risk controls should be put in place by firms engaged in automated trading and identical levels of control should be applied to firms offering sponsored access to HFT firms, a model already adopted in the United States (in practice, most large exchanges have operated circuit breakers for many years). However, such controls should be applied across all venues, be they Regulated Markets (RM), Multilateral Trading Facilities (MTF), Organised Trading Facilities (OTF – proposed by the European Commission in its consultation on the review of the Markets in Financial instruments Directive - MiFID[1]), Alternative Trading Systems (ATS) and Electronic Communication Networks (ECN) to ensure a level playing field and investor protection.

1.3 In its Public Consultation on the MiFID review, the European Commission suggested obliging HFT firms to undertake market making obligations. NYSE Euronext believes this would dissuade them from trading in the first place, negatively affecting liquidity in the marketplace. A further proposal to introduce a minimum resting time in the order book is not only unworkable, but would have a dramatically negative effect on price formation, widening spreads, as traders would be exposed to risks during the resting time in the order book.

1.4 Finally, there is no clear and generally accepted definition of HFT. It is not practical to base a definition of HFT on solely the attributes listed below as a firm falling within one or several of the categories could include any investor and many larger brokers taking in order flow from any source in a collective manner. As a result, we see difficulty in introducing regulation covering only those firms deemed to be creating potentially harmful effects on the market. Any attempt to go beyond the suggestions we make is likely to have more negative than positive impacts on market liquidity and stability.

[1] European Commission, Directorate General Internal Market and Services, Public Consultation, Review of the Markets in Financial Instruments Directive (MiFID), 8 December 2010.

Attributes of HFT include:

- co-location vs. non-co-location,
- members seeking low latency,
- members seeking transparency,
- members seeking market data,
- members committing own capital for trading,
- members using computers and algorithms to determine the price of the order,
- members changing their order price after sensing a change to market conditions (FX, trade in same industry stock, stock trading ahead, oil prices, etc)

Q2 What are your views on the suggestion that proprietary trading firms (including HFT firms) that are not currently subject to registration/authorisation by a regulator should be required to obtain such a registration/authorisation? Are there specific regulatory requirements you believe such firms should face?
To what extent do your answers differ if the proprietary trading firm accesses the market as the customer of an intermediary firm through DEA (i.e. under that intermediary's trading rules/codes) rather than as a direct member of the market itself?

NYSE Euronext believes that market access controls on proprietary traders should be implemented. However, any controls should be at the level of the authorised firms through whom proprietary and high frequency traders access the exchanges and have their business cleared, instead of requiring high frequency traders themselves to be authorised solely as a result of such activity.

In addition, specific risk controls should be put in place by firms engaged in automated trading and identical levels of control should be applied to firms offering sponsored access to HFT firms (in practice, most large exchanges have operated circuit breakers for many years). However, such controls should be applied across all venues to ensure a level playing field and investor protection.

Although NYSE Euronext believes that any potential for systemically risky activities of high frequency traders is already covered by the fact that their trades are guaranteed by clearing members/CCPs, perceptions of risk can play an important role in establishing confidence in financial markets. Controls on the potential risks posed by algorithmic or other technology-driven trading activity are of course essential, but these are most appropriately located at the level of the authorised firms through whom high frequency traders access the exchanges and have their business cleared. It would be excessive regulation to require high frequency traders of whatever scale of activity to be authorised, if the only expectation is that it would regulate the taking of risk on the market.

This approach reflects the Recommendations on Risk Management made in April 2010 by the Futures Industry Association Market Access Working Group[2]. In the European cash markets, although variations exist in the application of HFT, NYSE Euronext notes that the Market Abuse Directive (MAD) covers both the authorised firms and the firms to which they offer clearing services. NYSE Euronext would welcome a harmonised approach to the application of MAD across all trading venues in Europe.

Q3 What recommendations, if any, would you propose to strengthen the regulatory requirements around pre- and post-trade risk controls? In particular, what measures, if any, do you think regulators should introduce that relate specifically to the use of and risks posed by algorithmic trading and/or HFT?

NYSE Euronext agrees that appropriate specific risk controls should be put in place by firms engaged in automated trading and that parallel identical levels of control should be applied to firms offering

[2] http://www.futuresindustry.org/downloads/Market_Access-6.pdf

sponsored access to HFT firms. Again, the FIA Market Access Risk Management Recommendations provide a positive framework for the operation of risk controls[3].

Q4 To what extent do you believe the use of trading control mechanisms such as circuit breakers and limit-up/limit-down systems by trading venues should be mandated? If you believe they should be mandated, should venue operators be permitted to design their own controls or should they be harmonised/coordinated across venues (including between interrelated instruments such as a derivative and its underlying)?

NYSE Euronext closely monitors all orders and transactions. The Exchange has the authority to temporarily halt trading in any security or set a limit on price fluctuations if it is deemed to be in the interest of the market. Trading may be halted in several ways:

- A trading suspension, on behalf of issuers or regulators, is executed by the Exchange with an official notice; and
- A trading reservation, or temporary halts for when it is momentarily impossible to match buy and sell orders within the allowed range.

In order to perform these reservations or suspensions, static and dynamic thresholds have been implemented on some of our markets.

> **Static thresholds**: Static thresholds are set at 10% above and below the reference price. At the opening of the trading session, the static reference price is the last traded price, which is in general the previous day's close adjusted for dividends paid and other corporate actions, or the last indicative price posted.
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> **Dynamic thresholds**: Dynamic thresholds apply to continuous trading only. They are designed to cap volatility within the range established by static thresholds. Each traded price becomes the dynamic reference price used to set upper and lower limits on the next traded price.

It is essential for the integrity of markets that trading venues have in place strong active price formation risk controls. Many exchanges operate circuit breakers for cash equities and these are appropriate in respect of transferable securities which are traded across competing venues. Such requirements should be applied across all venues, be they RMs, MTFs, OTFs, ECNs or ATSs trading those products, in order to ensure a level playing field and investor protection. However, individual markets should not be prevented from establishing more restrictive controls if desired.

Alternative forms of appropriate pricing risk controls, in the form of dynamic price limits, are operated by many exchanges in respect of listed futures and options. Unlike transferable securities, such products are issued by a specific exchange or a central clearing agency. Dynamic price limits operate to ensure a continuous price formation process and to minimise the scope for price dislocation or substantive errors in the pricing of orders submitted to the trade matching engine. Indeed, dynamic price limits generally and frequently protect member firms and the market as a whole from keying errors in respect of price that inevitably occur from time to time in an automated market.

NYSE Euronext's systems continuously generate price limits in real-time, and reject orders submitted outside the limits (i.e. bids at a price above the "limit bid" and offers at a price below the "limit offer"). For futures, the price limits in the most active contract month (the "blue month") operate on the basis of a number of ticks either side of the Price Limit Reference Price, which is based on the last traded price and subsequent offers below/bids above that price. For all other contract months, price limits operate on the basis of a number of ticks either side of the fair value for that month, with the fair value level being calculated by the system in real-time from outright and implied spread prices available in the market. By taking their lead from the most liquid "blue" contract month, the price limits in the other months remain up to date, and therefore do not interrupt normal trading. The number of ticks (or

[3] http://www.futuresindustry.org/downloads/Market_Access-6.pdf

"price limit spread") is configurable by contract month, and can be adjusted as necessary to reflect market conditions (e.g. widened ahead of a major economic announcement, such as the announcement of the monthly decision of the Bank of England's Monetary Policy Committee about the level of interest rates).

For options, NYSE Euronext calculates a theoretical fair value price for each series. The fair value will generate a spread, the range of which is determined from the applicable option delta value. The spread range is then employed by the Trading Engine as the price limit for the option series concerned. Orders entered at price levels outside the price limits will be automatically prevented from trading by the system and the relevant trader will be notified immediately that the order has been rejected. Dynamic price limits (as preventive measures) are complemented by NYSE Euronext's ability to take remedial action, where necessary: NYSE Euronext is unequivocal in exercising its powers to invalidate trades where, in extremis, such action is necessary to restore an orderly market or correct a material price distortion.

Furthermore, it is important that the IT platforms of trading venues be robust and able to handle the large number of message traffic generated by HFT. Again, in practice, it is in the commercial interest of the trading platform to have in place strong backup systems and sufficient capacity. However, all venues should be held to identical standards of resiliency by regulators and identical circuit breaker rules. In fragmented markets, market-wide circuit breakers and limit-up/limit-down rules are critical to re-aggregating liquidity in highly volatile periods and preventing price dislocations in the new high-speed trading world where liquidity can be fleeting and order books can quickly empty. If the rules are not the same, trading could continue on certain platforms without adequate price controls. This type of cross platform arbitrage could lead in turn to sharp price deviations such as those observed on 6 May 2010 in the United States.

Q5 To what extent do you believe market maker schemes offered by trading venues should be subject to mandatory minimum criteria? Should the criteria be determined by the trading venue alone? To what extent do you agree with the suggestion that the use of stub quotes should be prohibited?

In both the cash and derivatives markets, there are defined regimes for market makers which involve consistent obligated risking of capital (even during volatile markets) and as a result there is an asymmetry in the mechanism for matching orders that treat market makers differently than the average member firm in the competition on the order book. This balance of obligations and opportunity is key to the smooth functioning of the markets in times of both high and low activity.
We understand that the abrupt withdrawal, in the short term, of any sizable liquidity from the order book, whether it be high frequency or otherwise, in a security may have a disruptive effect on the security. However, obliging HFT firms to respect market making obligations would dissuade them from trading in the first place, negatively affecting liquidity, potentially widening spreads and ultimately increasing implicit transaction costs in the market place.

In United States, stub quotes were eliminated in December 2010 when the U.S. exchanges instituted a market making quoting requirement. The exchange rules require market makers quote within 8% of NBBO for S&P 500/Russell 1000, and within 20% before 9:45 and after 3:45. For all other stocks, market makers must quote within 30% of NBBO for all other stocks. We do support additional market maker obligations for certain privileges but these should be left to the discretion of market operators.

Q6 Do you have suggestions for improvements to regulators' surveillance capabilities with respect to the markets and modern trading techniques? Please elaborate.
Who should bear the cost of investing in such capabilities and the cost of operating and supervising the markets in order to ensure fairness among market participants? Please elaborate.

Market surveillance is crucial for investor protection and NYSE Euronext dedicates substantial resources to maintaining a fair and orderly market.

In Europe in the post-trade area the global Compliance Division of NYSE Euronext has a team of people dedicated to performing audits, investigations and T+1 monitoring (in the U.S. this activity has

been outsourced to FINRA since May 2010). In addition, NYSE Euronext also has a team dedicated to front-line operations and real-time surveillance of the markets it operates.

NYSE Euronext uses both in-house and third party solutions to monitor its markets, which generate specific alerts to detect market manipulation such as order book layering. Furthermore, there are counters for the number of orders and trades.

In addition, NYSE Euronext has developed a number of reports that seek to identify particular types of abuse such as front running and wash trades. Such reports are configured such that repetitive, small scale incidents can be identified.

With an increasing volume of orders and trades in a more fragmented market NYSE Euronext considers that market authorities should have adapted IT systems for market surveillance. To facilitate the surveillance and communication, we would recommend market regulators have the same standards and similar IT protocol. A solution to reducing the investment costs would be for market regulators to have the same systems. Particularly in the United States, we believe consolidated market surveillance of all venues (exchanges, ATSs, dark pools) is critical in fragmented market environments and would give regulators a full picture of the market. However, any costs imposed on the industry to build a consolidated audit trail should be shared among all market participants based on trading activity.

Q8 Have the appropriate steps been taken to limit or manage conflicts of interest that arise where an investment firm simultaneously conducts client-serving activities and proprietary trading or a trading participant is also a shareholder in a venue on which it trades? If you believe conflicts management is inadequate, please explain how this manifests itself and any recommendation you have for how conflicts management could be improved.

Regulated markets are required to prevent conflicts of interests between their owners or operators and the sound functioning of the market and investment firms are required to prevent conflicts of interests between themselves and their clients. However, where investment firms are unable to prevent such a conflict, they are simply required to disclose that risk to their clients. In Europe, when investment firms operate an MTF, their intermediation function is regulated with regards to the prevention of conflicts of interest whereas their exchange function has been left unregulated.

When a single firm combines activities such as (i) the operation of a multilateral facility; (ii) the provision of client flow to that facility; (iii) the provision of own account flow to that facility; (iv) the monitoring of the market integrity of the same platform; (v) and is a shareholder in that platform, there is clear scope for conflicts of interest.

Furthermore, MTFs must be required to have in place more specific arrangements to identify and manage conflicts of interest, arrangements and systems to identify and mitigate risks to its operations and arrangements for the sound management of the technical operations of the system (including effective contingency arrangements to deal with risks of system disruptions).

In an environment where execution venues are chosen by intermediaries, and where intermediaries are also shareholders of MTFs, full transparency and disclosure should apply to avoid conflicts of interest. We would suggest that either:

- user-shareholders of platforms publicly disclose on a monthly basis the volumes routed to the platforms in which they have a shareholding; and
- user-owned MTFs publicly disclose on a regular basis the number of investigations conducted and sanctions taken on the platform; or
- limits are placed on the ownership of platforms by users.

Q9 Do you think existing laws and rules on market abuse and disorderly trading cover computer generated orders and are relevant in today's market environment?

The powers of competent authorities would certainly benefit from a systematic harmonisation of rules at a pan-European level to avoid regulatory arbitrage. NYSE Euronext believes that legislative loopholes should be avoided in order to ensure effective regulation across Europe. The scope of suspicious transactions reports should certainly be extended to suspicious orders and suspicious OTC transactions in order to avoid regulatory arbitrage.

Q10 Are there any strategies employed by HFT firms that raise particular concerns? If so, how would you recommend that regulators address them?

It is not unusual for HFT firms to employ more than one algorithmic model when trading a particular financial instrument. Whilst these models run independently of each other, and are based on different trading decisions, it is inevitable that from time to time these models will submit orders which coincidentally match with each other. This type of activity would not ordinarily be viewed as abusive. However, if the conflicting algorithms match against each other and the intent of the executing firms is to cause price or volume aberrations, then such activity could be construed as abusive on the basis that it creates a false and misleading impressions as to price/volume. It is evident, therefore, that the interaction of algorithmic models run by the same HFT firm has the potential to raise supervisory concerns. This must be judged on a case-by-case basis: the judgement on whether it constitutes market manipulation will depend a number of factors.

NYSE Euronext considers quote stuffing (or virtual orders or fleeting orders) to be necessarilyas abusive in nature as the primary purpose of the activity is to create uncertainty for other participants and slow their trading processes. Any strategy that is designed to give a false and misleading impression through the submission of fleeting/virtual orders should be considered abusive.

Conversely, ping orders and momentum ignition strategies are not necessarily abusive in nature. As such, each such case must be assessed against a range of factors when determining whether the actual behavior constitutes market manipulation. For ping orders, one needs to consider what the real intention is to trade or to create a print. For momentum ignition, factors it is important to consider may include whether the activity leads to significant changes in the price of the financial instrument, particularly compared to the "normal" trading range of the financial instrument, whether the transactions lead to a change in beneficial ownership or risk, whether the activity is concentrated within a short time period and leads to a price change which is subsequently reversed and whether the activity is conducted at around a specific time when reference prices and settlement prices are calculated with that activity having an effect on the prices.

Taking the above non-exhaustive factors into account an example of when a momentum ignition strategy would be considered market manipulation is where the transactions which start or exacerbate the trend are executed between parties acting in collusion such that, in effect there is no transfer of beneficial ownership or market risk (i.e. the transactions constitute wash trades). Another example is where the objective of submitting "aggressive orders" is to move the price of the financial instrument at a time which is relevant to the calculation of the settlement price of a related option contract such that the perpetrator makes a profit (or avoids a loss) on the options position that he holds.

Q12 Should market operators be required to make their co-location services available on a fair and non-discriminatory basis?

Co-located servers must have fair and non-discriminatory access to the data centers in which the matching engine is situated, otherwise multilateral platforms could be discriminating between their members.

The NYSE Euronext European Liquidity Centre in Basildon, Thurrock and the Mahwah Data Center in Mahwah, NJ, are open to any member or non-member trading firm (please note that only members

are allowed trading access to the production environment). Non-member order flow may only be sent to the markets via a member using the appropriate risk controls.

In addition to trading institutions, vendors in Basildon may also take space within the co-location hall, either to provide services for members / non-members within their racks, or to offer their own service to other firms co-located in their own racks. To qualify for co-location space vendors must be either an authorized Application Service Provider or Market Data Distributor, with the appropriate Service Provider or Market Data Distribution agreements in place.

The obligation to make co-location services available on a fair and non-discriminatory basis has to apply to all co-location providers and not only to market operators.

Q13 Should market operators be required to provide testing environments to enable participants in stress test their algorithms? If so, what kind of minimum requirements are reasonable?

NYSE Euronext has put in place several comprehensive measures to prevent capacity and performance risks:

- An active monitoring of the main applications on key performance indicators;
- A specific step dedicated to performance testing during any new project and to capacity configurations;
- A regular global capacity planning review;
- An escalation procedure in case of performance degradations and or capacity thresholds exceeded; and
- A dedicated team to look after individual and global performance issues.

Participants are responsible for designing controls over their order entry mechanisms, so that they keep an appropriate level of control over the orders routed or transmitted electronically, and the orders processed manually. However, NYSE Euronext has also implemented a number of controls to ensure fair and orderly markets:

- The Participant is responsible for the validation of prices and volumes of each order;
- Certain types of orders must be systematically validated or, failing this, rejected before being presented to the Market, including:
    - Orders that are clearly disproportionate in comparison to the liquidity of the security evaluated on the basis of the normal market's absorption capacity for the security; and
    - Orders with a price which differs significantly from prevailing market prices or which is obviously likely to trigger an excessive price swing or a collar.

In addition, there is a technical limitation in the number of orders that a customer can route to the market. Also, a specific alert has been implemented for market surveillance when a large number of orders are sent by one market member on a single instrument. This alert has been implemented to identify which member has a high activity on one specific instrument, and if potentially the member may be impacted by a potential system malfunction at his level.