

**Submission for the purpose of the**  
**US Securities and Exchange Commission's roundtable on tick sizes**  
**(5 February 2013)**

**I. Tick size regimes in the European Union: the general background**

1. As from today, the tick size regimes that have developed throughout the different European trading venues are not fully harmonised. As a matter of fact, there is currently no common legal framework prescribing any harmonised rules in relation thereto. An initiative was nonetheless taken in 2009 by the Federation of European Securities Exchanges (FESE)<sup>1</sup> in order to stop the race to extra-granularity (the so-called "tick size war"). Under this initiative, four common tick size tables were proposed<sup>2</sup>. However, these tables are not prescriptive.
2. Pursuant to the European Commission's proposal<sup>3</sup> dated 20 October 2011 for a directive on markets in financial instruments (usually referred to as MiFID II<sup>4</sup>), tick sizes shall be regulated under European Union (EU) law. Indeed, pursuant to Article 51(3) of the aforementioned MiFID II proposal, regulated markets shall be required by EU Member States "*to have in place effective systems, procedures and arrangements to ensure that algorithmic trading systems cannot create or contribute to disorderly trading conditions on the market including systems [...] to limit the minimum tick size that may be executed on the market*". The final text of the MiFID II proposal shall only be known once the trilogues currently taking place between the European Commission, the Council of the European Union and the European Parliament<sup>5</sup> come to an end (which is expected to be in the course of 2013).
3. Subject to the outcome of the aforementioned trilogues, the European Securities and Markets Authority (ESMA) shall either elaborate delegated acts to the European Commission or regulatory technical standards<sup>6</sup>.

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<sup>1</sup> Which is the professional body of the operators of the European regulated markets.

<sup>2</sup> Further to FESE's negotiations with the Association for Financial Markets in Europe (AFME – formerly the London Investment Banking Association (LIBA)) and four multilateral trading facilities (MTFs – namely BATS, Chi-x, NASDAQ Europe and Turquoise), and further to market consultation. Please note that BATS and Chi-x have since merged to become BATS Chi-X Europe, and that NASDAQ OMX has since closed its pan-European Equity MTF.

<sup>3</sup> COM(2011) 656 final – 2011/0298 (COD).

<sup>4</sup> The purpose of MiFID II is to repeal Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments (MiFID).

<sup>5</sup> It is noteworthy that the European Parliament's version (adopted on 26 October 2012) also provides for a specific Article which extends the scope of tick size tables (notably to all shares, and to depositary receipts, exchange traded funds, certificates and any other similar financial instruments), provides for a calibration of tick sizes not only according to price but also to the liquidity profile of the financial instrument in different markets and the bid-ask spread, and also provides for the elaboration of draft technical standards by ESMA to specify minimum tick sizes or tick size regimes.

<sup>6</sup> In particular, in order to specify minimum tick sizes or tick size regimes for specific shares, depositary receipts, exchange-traded funds, certificates and other similar financial instruments where this is necessary to ensure the orderly functioning of markets, in consideration of the conditions relating to the calibration and the appropriateness of the tick size regimes, and the price, spreads and depth of liquidity of the instruments.

## II. Preliminary proposal for a new tick size regime

4. In the context of the future elaboration of MiFID II, the *Autorité des marchés financiers* (AMF) has developed a new tick size regime approach in the EU. The AMF has shared its proposed approach (Proposal) with many interested parties and in particular, with other national competent authorities (securities regulators) in the EU, representatives of trade associations such as the Association for Financial Markets in Europe (AFME) and the Association for French Financial Markets (AMAFI), academics and scientists (notably at roundtables organised by ESMA, at conferences such as the Intermarket Surveillance Group (ISG)'s fall 2012 conference), the AMF's Markets & Exchanges Consultative Commission (whose members are mainly representatives of investment firms, legal firms, and of the regulated market), ESMA and representatives of trading venues including members of FESE. The AMF's Proposal has received encouraging comments on the part of the regulators, the market operators and participants that it has consulted on a preliminary basis.
5. The Proposal is **based on both the price and the liquidity** (whereas the FESE tick size tables are determined according to the share price). In fact, for the purpose of efficiency, it is considered that a tick size should govern a homogeneous class of stocks: therefore, the share price itself is not enough to appropriately cluster the different stocks by "optimal tick size". And the liquidity appears to be a relevant criterion to refine the clustering. Hence, pursuant to the Proposal<sup>7</sup>, the liquidity has to be taken into account and the level of granularity of the table has to be proportionate. The Proposal therefore provides for a two dimensional tick size regime, the first dimension being the price and the second being the number of transactions per day<sup>8</sup>. It results from the Proposal that the more liquid the share, the thinner the spread, and therefore the smaller the tick size.
6. Pursuant to the Proposal, the optimal tick size is therefore the result of **the trade-off between constraining the spread to allow liquidity to aggregate without increasing viscosity**:
  - ▶ **The tick size must be small enough to avoid increasing viscosity.** Too big, a tick size can discourage investors from placing orders at the best bid/offer prices as the queuing time at these limits becomes longer, which in turn increases the implementation risk.

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<sup>7</sup> For further details, please see the attached presentation "Tick Size: the "Nouveau Régime"", dated October 2012.

<sup>8</sup> It is noteworthy that the turnover could also be another relevant indicator of liquidity, but as the table has the price on the  $x$  axis, using the turnover (Average Traded Size \* Price \* Number of Transactions) on the  $y$  axis would use the price twice. For further details, please also see the attached document "New tick size proposal: the average number of transactions per day is the best proxy for liquidity".

The consequences of a smaller tick size are as follows<sup>9</sup>: a smaller tick size influences the lifetime and the rate of execution of the orders. As it decreases the cost to place a higher bid, it decreases the probability of being executed at best price<sup>10</sup>, it urges market participants to modify their orders more frequently and **the median lifetime of cancelled/modified orders is nearly halved** from 3.3 seconds to 1.9 seconds. Moreover it significantly **decreases the execution rate of orders** from 5.5% for the 0.005€ tick size to 2.6% for the 0.001€ tick size.

A smaller tick size, expressing the spread as a larger number of ticks, increases the room to overbid, and reduces the cost of overbidding. After the opening auction, the beginning of the trading day is usually characterized by large spreads and the order book becomes a playing field for high frequency traders (HFT). The number of “manipulative” orders with an extremely short lifetime (less than 600  $\mu$ s) dangerously increases before 9:15 AM compared to the rest of the day. Therefore a large spread (expressed as a number of ticks) may lead to noise in the order book, in particular **noise generated through escalation by cheap overbidding**.

Using the distribution of the lifetime of the orders, the market participants can be divided into three categories, HFT, Mixed (global brokers with a strong HFT activity) and the “Rest-of-the-World” (RotW), mainly agency brokers. That split, combined to changes in the lifetime of orders, execution rate of orders and number of orders sent per tick, shows different interactions amongst the participants and improved predation done by the HFT when the tick size is smaller. As a result, the smaller tick size seems to **discourage market participants to post orders** in the order book.

All investors are not equally impacted by the change in tick size. **HFT activity increases when the tick size decreases**. The smaller tick size dramatically reduces the proportion of orders sent by RotW participants, from 4% to 1%. The smaller tick size also significantly changes the proportion of the volumes traded by RotW participants from 19% to 9%, as HFT participants find more opportunities to intermediate for profit non HFT transactions.

**Amongst HFTs, strategy may change when the tick size decreases**. While some HFTs adapt very well to a change in tick size, some are subjected to a simple scale effect and some don't take the change in tick size into account. Logically, orders of agency traders are more impacted in the “HFT predation zone”, for their orders with a lifetime below one second.

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<sup>9</sup> To estimate the impact of a small tick size on market microstructure, the AMF focused on three liquid stocks (Axa, France Telecom and Veolia Environnement) that traded around 10€ and had **intraday changes** of tick size over a three months period (April to June 2012) on Nyse Euronext. The study is based on over 30 million orders (time stamped to the microsecond) on these three stocks over this period, roughly half of which traded under 10€ (tick size 0.001€) and the other half of which traded at 10€ or above (tick size 0.005€).

<sup>10</sup> The execution rate at the touch is 33% less for the 0.001€ tick size than for the 0.005€ tick size. In this regard, it is important to mention that the US national market system rule for equity securities (“Regulation NMS”) that forces a trading venue to automatically reroute an order to another trading venue if and where the latter offers a better price, does not exist in the EU (where investment firms only are responsible for the best execution of clients' orders). As a matter of fact, the Smart Order Routers developed by market participants in the EU have a price component that overrides all other components. As a result, an equivalent tick size may have a different impact on market microstructure in the US and in the EU.

► **The tick size must be big enough to ensure that there is a relevant cost to overbidding.** Excessively granular tick sizes in securities have a detrimental effect to market depth as it is almost cost free to overbid and may discourage liquidity providers from posting orders.

The consequences of a larger tick size are as follows: a larger tick size will **increase queuing** and the **average traded size**. The waiting time necessary for an order to be executed at the “touch” nearly doubles when the tick size increases from 0.001€ to 0.005€, while the average traded size increases by 25%, forcing the HFT market participants to adjust their risk envelop accordingly. The trade-off between the capture of the spread and the implementation risk is changed and thus the **proportion of orders executed when placed at the touch increases**<sup>11</sup>.

A larger tick size will also **increase viscosity**. If the tick size constrains the spread too much, the viscosity added to the order book will **favour OTC trading and reduce liquidity in the Lit order books**. Losing or gaining the spread would then represent an important part of the transaction costs and trading at mid-spread in the Dark would be incentivized.

7. Hence, it results from the above that the optimal tick size should be **a function of the average spread** and should be large enough to constrain the spread and at the same time small enough to keep the transaction costs unaffected. Collected data shows that a spread between 1.4<sup>12</sup> and 2<sup>13</sup> ticks should maintain a **good balance between constraints and transaction costs**. Therefore the optimal tick size should be established as a proportion maintained between 1.4 and 2 average spread<sup>14</sup>.
8. Determination of the new tick size table: The proposed new table clusters the stocks by number of transactions on the primary venue per day and price so that the spread is homogeneous for each cluster. Under the Proposal, **four liquidity bands** have been identified: very liquid (5000 trades/day), fairly liquid (2001 to 5000 trades/day), liquid (500 to 2000 trades/day) and poorly liquid (up to 500 trades/day). Also, **new price levels and tick size levels** have been added so that each increment is maximized to 2.5 times the previous increment (1€, 2€, 5€, 10€, 20€, 50€,…) <sup>15</sup>. The following table was optimised to maintain a spread between 1.4 and 2 ticks over 339 trading days on 123 stocks in the French market:

<sup>11</sup> If a venue offers significant rebates to one category of market participants only it will change the trade-off for that category and increase the proportion of orders from that category in the order book. If that proportion becomes too important, it will force the market participants (who do not benefit from this particular rebate) to fire more aggressive orders and to lose the spread more often.

<sup>12</sup> When the spread is 1.4 ticks it is constrained a little more than half of the time, and constraints increase significantly when the average spread is under 1.4 ticks.

<sup>13</sup> When the spread is 2 ticks or more it is not constrained. Moreover a strong divergence between the transaction costs of HFTs and other market participants can be noticed when the average spread is over 2 ticks.

<sup>14</sup> The analysis of real transaction costs over the 120 stocks subjected to the FESE tick size table confirmed this assumption. A linear regression of the transaction cost over the spread (as a number of ticks) shows that the cost of transaction is a decreasing function of the spread for a spread less than 1.4 ticks and an increasing function of the spread for a spread larger than 2 ticks. Hence increasing the tick (i.e. reducing the spread) for an average spread larger than 2 ticks will reduce the cost of transaction, and decreasing the tick (i.e. enlarging the spread) for an average spread smaller than 1.4 ticks will reduce the cost of transaction.

<sup>15</sup> The results would be similar if the levels 1, 2.5, 5, 10, 25, 50, ... were to be used.

Number of transactions per day	FESE table 4																	
	<0.5	0.5 - <1	1 - <2	2 - <5	5 - <10	10 - <20	20 - <50	50 - <100	100 - <200	200 - <500	500 - <1000	1000 - <2000	2000 - <5000	5000 - <10000	10000 - <20000	20000 - <50000	>50000	
	0.001				0.005			0.01		0.05								
>5000	0.0001	0.0002	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5	1	2	5	10	20	
2001 - 5000	0.0002	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5	1	2	5	10	20	50	
501 - 2000	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	
0 - 500	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	200	

Note: For very liquid stocks the tick size table only partially modifies the FESE table 4

9. Implementation of the proposed new tick size table on European stocks: Applying this table to the Euro Stoxx600 stocks will reduce the overall median spread from 2.31 ticks to 1.57 ticks, and will reduce the standard deviation of the median spread from 1.76 to 0.49.
10. Advantages of the proposed new tick size table: It is believed that the proposed new tick size table has several merits to the benefit of market participants (including market operators and investors) and national competent authorities (for the purpose of their supervisory mission).

In particular, it should be **easy to implement** notably as all stocks already belong to a liquidity band. Also, the proposed new tick size levels and the related increments resemble the levels used for common cash money (e.g., bank notes and coins of 2 cents, 20 cents, 2 euros, 20 euros, 200 euros<sup>16</sup>) with which market participants are familiar as such levels are based on an intuitive understanding.

Moreover, the proposed new tick size table should be **quite easy to adjust** (by simply moving the liquidity bands up or down). Also, the dynamic calibration on which the proposed new tick size table is based makes it of a **predictable nature for market participants** (notably with regard to the automatic process for band changes pursuant to which when a stock remains twenty consecutive trading days within a liquidity band, then that new band is used). As a result, adjustments no longer need to be made through the price<sup>17</sup>.

Another advantage is that the proposed new tick size table allows to **systematically maintain a control sample**, that-is-to-say a sample of unaffected stocks which allows to compare objectively the changes made to market microstructure. It is highlighted that no other method to adjust market microstructure provides for such control sample. For all these reasons, the proposed new tick size table therefore appears to be a straightforward and appropriate way to harmonise tick sizes across all European trading venues.

<sup>16</sup> This is also the case for quarters (1/4<sup>th</sup> of US dollars).

<sup>17</sup> Notably, if the bands are not constraining enough then the bands can be moved upward, and if the bands are too constraining then the bands can be moved downward. Also a yearly revision process of the liquidity bands is provided.

11. By way of conclusion, it is believed that the tick size Proposal that is presented in this paper is an appropriate and relevant tool for the purpose of the fair and orderly functioning of financial markets and of their integrity. However, it is worth mentioning that this Proposal does not purport to be exclusive and can be combined with other tools. Indeed, the AMF has also identified other possible tools which could prove relevant for the same purpose. For the purpose of illustration, the AMF supports the invoicing of modifications and cancellations of orders in proportion to their lifetime, which allows to calibrate the market structure by using both time and price<sup>18</sup>. Needless to say, for this last tool to be efficient, it obviously has to apply to all trading venues without any distinction.

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For further details with regard to the AMF's Proposal, please see the attached documents:

- "Tick Size: the "Nouveau Régime"" (October 2012)
- "New tick size regime proposal: the average number of transactions per day is the best proxy for liquidity".

Any question in relation to this document and its two attachments may be submitted to Philippe Guillot, Executive Director in charge of Markets, AMF:  
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*This submission is intended only for the US Securities and Exchange Commission. Its sole purpose is to contribute to the roundtable on tick sizes that is organised by the US Securities and Exchange Commission on 5 February 2013. It shall therefore not be used for any other purpose. Notably, it shall not be retransmitted / disseminated / relied upon by persons or entities other than the intended recipient.*

<sup>18</sup> A contemplated option is to provide for different fees according to the orders' lifetime.