

## Euronext Monthly Market Quality Statistics

12/2015

### Market Quality indicators

|                              | Market Centre            | CAC 40        | AEX-Index     | BEL 20        | PSI 20        | Blue Chips <sup>1</sup> | Domestic SMEs <sup>2</sup> |
|------------------------------|--------------------------|---------------|---------------|---------------|---------------|-------------------------|----------------------------|
| Presence time at EBO (%)     | Euronext                 | <b>85%</b>    | <b>82%</b>    | <b>78%</b>    | <b>82%</b>    | <b>82%</b>              | <b>85%</b>                 |
|                              | MTF AVERAGE <sup>3</sup> | <b>44%</b>    | <b>38%</b>    | <b>36%</b>    | <b>28%</b>    | <b>37%</b>              | <b>30%</b>                 |
|                              | BATS EUROPE              | 34%           | 24%           | 27%           | 23%           | 27%                     | 21%                        |
|                              | CHI-X                    | 68%           | 67%           | 69%           | 46%           | 62%                     | 48%                        |
|                              | EQUIDUCT                 | 9%            | 5%            | 2%            | 0%            | 5%                      | 7%                         |
|                              | TURQUOISE                | 67%           | 57%           | 46%           | 44%           | 55%                     | 44%                        |
| EBO with greatest size (%)   | Euronext                 | <b>52%</b>    | <b>42%</b>    | <b>36%</b>    | <b>49%</b>    | <b>45%</b>              | <b>64%</b>                 |
|                              | MTF AVERAGE <sup>3</sup> | <b>1%</b>     | <b>2%</b>     | <b>2%</b>     | <b>2%</b>     | <b>2%</b>               | <b>2%</b>                  |
|                              | BATS EUROPE              | 0%            | 0%            | 0%            | 1%            | 0%                      | 0%                         |
|                              | CHI-X                    | 3%            | 4%            | 8%            | 3%            | 4%                      | 4%                         |
|                              | EQUIDUCT                 | 0%            | 0%            | 0%            | 0%            | 0%                      | 0%                         |
|                              | TURQUOISE                | 1%            | 2%            | 2%            | 2%            | 2%                      | 2%                         |
| EBO Setter (%)               | Euronext                 | <b>70%</b>    | <b>63%</b>    | <b>56%</b>    | <b>66%</b>    | <b>64%</b>              | <b>71%</b>                 |
|                              | MTF AVERAGE <sup>3</sup> | <b>7%</b>     | <b>8%</b>     | <b>10%</b>    | <b>7%</b>     | <b>8%</b>               | <b>7%</b>                  |
|                              | BATS EUROPE              | 2%            | 2%            | 4%            | 4%            | 3%                      | 2%                         |
|                              | CHI-X                    | 15%           | 19%           | 27%           | 14%           | 18%                     | 15%                        |
|                              | EQUIDUCT                 | 1%            | 1%            | 0%            | 0%            | 1%                      | 2%                         |
|                              | TURQUOISE                | 10%           | 11%           | 9%            | 11%           | 11%                     | 10%                        |
| Spread (bps)                 | Euronext                 | <b>4.72</b>   | <b>5.54</b>   | <b>6.78</b>   | <b>20.46</b>  | <b>5.67</b>             |                            |
|                              | MTF AVERAGE <sup>3</sup> | <b>11.88</b>  | <b>13.71</b>  | <b>18.04</b>  | <b>163.57</b> | <b>14.87</b>            |                            |
|                              | BATS EUROPE              | 9.43          | 11.77         | 10.67         | 33.31         | 11.40                   |                            |
|                              | CHI-X                    | 6.09          | 6.75          | 7.95          | 20.23         | 7.00                    |                            |
|                              | EQUIDUCT                 | 26.07         | 29.76         | 43.52         | 574.56        | 33.96                   |                            |
|                              | TURQUOISE                | 5.92          | 6.57          | 10.03         | 26.17         | 7.13                    |                            |
| Displayed Market Depth (EUR) | Euronext                 | <b>56 749</b> | <b>54 626</b> | <b>59 063</b> | <b>22 994</b> | <b>54 803</b>           |                            |
|                              | MTF AVERAGE <sup>3</sup> | <b>17 822</b> | <b>19 603</b> | <b>22 164</b> | <b>9 106</b>  | <b>18 487</b>           |                            |
|                              | BATS EUROPE              | 15 721        | 16 623        | 25 026        | 7 497         | 16 805                  |                            |
|                              | CHI-X                    | 23 439        | 25 094        | 28 369        | 9 273         | 23 885                  |                            |
|                              | EQUIDUCT                 | 14 567        | 16 362        | 14 492        | 11 617        | 14 978                  |                            |
|                              | TURQUOISE                | 17 559        | 20 333        | 20 768        | 8 036         | 18 279                  |                            |
| Volatility (%)               | MARKET <sup>4</sup>      | <b>18%</b>    | <b>15%</b>    |               |               |                         |                            |

Source: TAG Audit - Euronext

<sup>1</sup> Blue Chips: Blue Chips are classed as those securities that belong to the AEX-Index, AMX-Index, BEL 20, CAC40, PSI 20, and SBF120 indices.

<sup>2</sup> Domestic SMEs: small and mid-caps. More than 1,000 domestic SMEs are listed and traded on Euronext, of which between 10 and 150 are also traded on BATS Europe, Chi-X, Equiduct, and Turquoise. Due to the wide range in product scope for domestic SMEs, the comparison of indicators across market centres must need to be done cautiously. For example, the average presence time at EBO across MTFs depends on the securities available.

<sup>3</sup> Market: CAC 40 Volatility Index and AEX Volatility Index are closing level of QS0011052139(VCAC) and QS0011052147(VAEX) at end of month

## General Methodology

TAG Audit, an independent and unbiased provider of trade performance and market quality assessment for the securities industry, uses a snapshot methodology to reproduce the European electronic order book by taking the quotes from various venues based on one time stamp. The daily market quality indicator of one security is the simple average of the indicator for each millisecond.

**Currency:** the statistics published in this report are based on the Euro.

**Index:** the market quality indicators for indices or pool of indices are calculated using the same methodology across all the stocks included in those indices, to the millisecond. The market quality indicators are **weighted** by volume traded for the month per venue (since April 2012).

**Blue chips and small & mid-caps:** the statistics on spreads and market depth are weighted by daily volumes for the month, per venue. More specifically, the daily indicators are weighted by the daily security market share on the total monthly volume of the compartments per venue. Blue chips are classed as those securities that belong to the AEX-Index, AMX-Index, BEL 20, CAC 40, PSI 20, and SBF120 indices.

### Market Quality Indicators used:

**Presence time at EBBO (European Best Bid and Offer):** measures the percentage time during the trading session when a venue quotes the best European bid and ask across all venues referenced in TAG. The indicator is the average of the presence time at European best bid and at European best ask.

**Example:** *If Euronext's presence time at EBBO on the CAC 40 is 80%, it means that on average, Euronext quoted the best bid and best ask among all the other European trading venues for 80% of the time for the whole trading day on all stocks in the CAC 40.*

**Quoted spreads in basis points:** measures the difference between best bid and offer on the trading venue. Please note that it is difficult to compare spreads between different trading venues as spreads are highly dependent on the population of stocks, which may be interlinked between venues.

**Market depth:** measures the displayed average amount available in Euro on both sides, bid and ask, iceberg orders excluded.

**Example:** *If Euronext's market depth on AEX is €44,000, it means that market investors can access at least €44,000 on both the bid and ask sides on Euronext for the stocks in the AEX-Index.*

**EBBO with greatest market size:** measures the percentage time during the trading session when a venue has simultaneously the best bid and the best ask (EBBO), with the greatest market depth on both sides. It is thus the best choice that any market can offer.

**Example:** *If Euronext's presence time at EBBO with greatest market size is 36% on the CAC 40, it means that on average, Euronext quoted the best bid and best ask with the highest market depth among all the other trading venues 36% of the time for the whole trading day on all stocks in the CAC 40. Thus, 36% of the time, investors will not find a venue better than Euronext to execute their orders.*

**EBBO Setter:** measures the percentage time during the trading session when a venue is the first one who set the best bid and the best ask (EBBO). The indicator is the average of the presence time at European best bid and at European best ask.

**Example:** *If Euronext's presence time at EBBO Setter is 62% on the CAC 40, it means that on average, Euronext is the first venue who quoted the best bid and best ask among all the other trading venues 62% of the time for the whole trading day on all stocks in the CAC 40.*

**Volatility:** captures implied volatility embedded in the prices of out-of-the-money index call and put options available on the NYSE Liffe European derivatives market. It is calculated in a transparent manner, using only one external parameter, the risk-free interest rate. The volatility has a great impact on the presence time at EBBO and on spreads. If the volatility rises, the presence time at EBBO on all venues will decrease.

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