June 2023 EMEA Market Structure Monthly

MICROSTRUCTURE OBSERVATIONS

• In June 2023, the average daily volume in EMEA equities increased to €38.1B, 11% higher than the previous month, but 23% below June 2022's volume.

• The median quote size at the European Best Bid and Offer (EBBO) in June 2023 decreased for STOXX 50 by 12% and decreased for STOXX 600 by 2% during the intraday trading period (08:30 to 16:00 GMT) compared to the previous month.

• Median quoted spreads at the EBBO did not change significantly in June 2023 compared to the previous month. STOXX50 decreased 3% MoM and similarly STOXX 600 symbol spreads decreased 3% MoM during the intraday trading period.

• Volatility levels decreased slightly in June 2023compared to the previous month, with STOXX 50 volatility little changed MoM and STOXX 600 volatility decreased 2% MoM during intraday trading.

• The market share distribution between venue types changed significantly in June 2023 compared to the previous month due to the triple witching at the end of June. Primary lit and MTF market share decreased 3.4% and 2.1% respectively MoM while Primary Auctions increased 5.7% MoM. Frequent Batch Auctions ("FBA") venues' market share did not change, and Dark venues' market share decreased 0.1% relative to the previous month

• Block market share between venues changed in June 2023 compared to the prior month, with POSIT gaining 3%, Liquidnet losing 3%, Turquoise gaining 1%, and Cboe losing 1%. There was little change in Dark market share distribution in June 2023 compared to previous month.

• In June 2023, closing auction volume increased materially as a percentage of the daily volume relative to the prior month; STOXX50 closing auction volume was up 3.2% to 32.5% and STOXX600 was up 3.7% to 34.3%.

EMEA MARKET STRUCTURE NEWS

Euronext Sells Its Stake in London Clearing House to London Stock Exchange Group

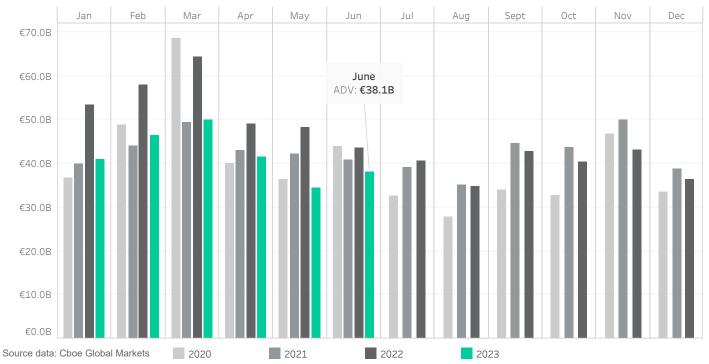
LSEG (London Stock Exchange Group) announced that through its majority ownership of LCH Group it has agreed to acquire Euronext's 11.1% stake in LCH SA, the French subsidiary of LCH Group for a total cash consideration of EUR 111 million. Completion of the transaction will see LCH Group take full ownership of LCH SA. The transaction is being funded from existing cash resources and is expected to close in early July 2023

The European Council Agreed with the European Parliament on Market Data Transparency

The European Council has reached a provisional agreement with the European Parliament on changes to the EU's trading rules that would establish EU level consolidated tapes for different asset classes. The agreement makes no mention of what the tape will include other than that it will include key information such as the price of instruments and the volume and time of transactions.

The European Council Agreed to Ban Payment For Order Flow

The European Council reached a provisional agreement with the European Parliament on Payment For Order Flow (PFOF). The agreement introduces a "general ban" on PFOF with a compromise for a member state where PFOF is currently allowed (e.g. Germany) to offer firms in its jurisdiction an exemption. However, this will be phased out by 30 June 2026.

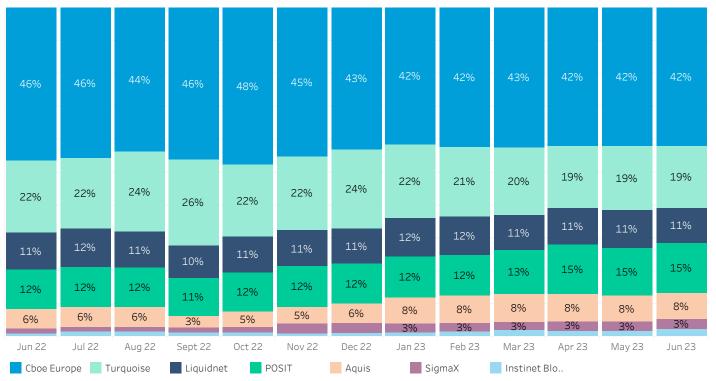


Average Daily Market Volume

Venue Type Market Share

| 40.4% | 41.3% | 40.2% | 38.9% | 40.3% | 39.0% | 37.4% | 38.7% | 38.0% | 38.2% | 37.9% | 38.0% | 34.6% |
|-------------|--------------|------------|---------|----------|--------|----------|--------|--------|--------|--------|--------|--------|
| 21.5% | 23.0% | 22.9% | 23.3% | 25.1% | 23.9% | 22.9% | 24.6% | 24.3% | 24.3% | 23.6% | 23.1% | 21.0% |
| 22.6% | 19.8% | 21.7% | 22.8% | 18.8% | 21.9% | 25.2% | 20.2% | 21.8% | 23.1% | 22.2% | 22.5% | 28.2% |
| 9.7% | 10.4% | 10.1% | 9.5% | 9.9% | 9.7% | 8.7% | 10.5% | 9.9% | 9.5% | 10.6% | 10.1% | 10.0% |
| 5.8% | 5.6% | 5.1% | 5.5% | 5.8% | 5.6% | 5.8% | 6.1% | 6.0% | 4.9% | 5.8% | 6.2% | 6.2% |
| Jun 22 | Jul 22 | Aug 22 | Sept 22 | Oct 22 | Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 |
| Source data | : Cboe Globa | al Markets | Prin | nary 📕 M | TF | Auctions | DARK | FBA | | | | |

European Dark Market Share



Source data: Cboe Global Markets

European Block Market Share

| 31% | 32% | 31% | 33% | 31% | 32% | 32% | 32% | 33% | 31% | 31% | 33% | 32% |
|--------|-------------|---------|---------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| 24% | 25% | 25% | 23% | 24% | 24% | 24% | 25% | 25% | 23% | 24% | 24% | 21% |
| 18% | 17% | 17% | 15% | 16% | 17% | 16% | 17% | 16% | 17% | 19% | 17% | 20% |
| 17% | 16% | 17% | 18% | 16% | 16% | 16% | 16% | 15% | 16% | 13% | 13% | 14% |
| 11% | 11% | 11% | 11% | 12% | 11% | 11% | 10% | 12% | 13% | 13% | 12% | 14% |
| Jun 22 | Jul 22 | Aug 22 | Sept 22 | Oct 22 | Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 |
| | Cboe Europe | e 📕 Liq | uidnet | Posit | | Turquois | e 🔳 | Others | | | | |

Large In Scale values as per defined per symbol by ESMA; Source data: Virtu Financial

Quotesize in Notional USD

| | | 2Q 22 | | 3Q 22 | | | 4Q 22 | | | 1Q 23 | | | 2Q 23 | |
|---------------|----------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | Jun 22 | Jul 22 | Aug 22 | Sept 22 | Oct 22 | Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 |
| 8:00 - 8:30 | Stoxx50 | 21.0K | 16.8K | 19.2K | 18.3K | 18.0K | 23.6K | 25.9K | 29.8K | 32.1K | 27.7K | 31.3K | 29.2K | 26.0K |
| | Stoxx600 | 10.1K | 9.6K | 10.3K | 11.1K | 9.9K | 10.8K | | 13.7K | 14.1K | 14.5K | 15.2K | 14.2K | 13.7K |
| 8:30 - 16:00 | Stoxx50 | 33.9K | 26.0K | 26.6K | 25.8K | 25.1K | 34.3K | 35.4K | 40.6K | 44.2K | 38.5K | 42.1K | 39.2K | 34.6K |
| | Stoxx600 | 12.9K | 11.9K | 12.2K | 13.4K | 11.5K | 13.0K | | 16.7K | 17.4K | 18.1K | 19.1K | 17.9K | 17.7K |
| 16:00 - 16:30 | Stoxx50 | 39.8K | 31.3K | 31.4K | 29.0K | 28.8K | 40.9K | 42.2K | 49.1K | 47.8K | 45.3K | 49.5K | 46.7K | 42.3K |
| | Stoxx600 | 15.4K | 14.6K | 14.7K | 15.0K | 13.8K | 16.6K | | 20.2K | 21.3K | 22.4K | 24.1K | 23.3K | 23.6K |

Spread Bps

| 8:00 - 8:30 | Stoxx50 | 5.3 | 5.8 | 4.9 | 5.2 | 5.2 | 4.7 | 4.7 | 4.7 | 4.5 | 5.0 | 5.4 | 5.5 | 5.3 |
|---------------|----------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Stoxx600 | 9.4 | 10.3 | 9.1 | 9.4 | 9.8 | 9.0 | | 8.3 | 7.7 | 8.4 | 8.3 | 8.4 | 8.0 |
| 8:30 - 16:00 | Stoxx50 | 3.4 | 3.6 | 3.2 | 3.5 | 3.4 | 3.1 | 3.1 | 3.2 | 3.0 | 3.3 | 3.4 | 3.4 | 3.3 |
| | Stoxx600 | 5.9 | 6.3 | 5.4 | 5.9 | 6.0 | | 5.1 | 4.9 | 4.9 | 5.4 | 5.1 | 5.1 | 5.0 |
| 16:00 - 16:30 | Stoxx50 | 2.8 | 3.0 | 2.7 | 2.9 | | 2.6 | 2.8 | 2.8 | 2.6 | 2.9 | 3.1 | 3.1 | 3.1 |
| | Stoxx600 | 4.8 | 5.1 | | 4.8 | 4.9 | 4.3 | 4.4 | 4.1 | 4.2 | 4.6 | 4.5 | 4.5 | 4.5 |

One Minute Volatility Bps

| 8:00 - 8:30 | Stoxx50 | 16.3 | 21.5 | 14.2 | 17.1 | 16.9 | 13.4 | 11.5 | 11.6 | 12.4 | 14.1 | 12.3 | 12.4 | 11.3 |
|---------------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Stoxx600 | 15.6 | 17.8 | 13.8 | 16.9 | 17.4 | 14.8 | 12.2 | 12.0 | 11.4 | | 11.7 | 11.1 | 10.2 |
| 8:30 - 16:00 | Stoxx50 | 7.6 | 10.2 | 6.6 | 8.7 | 8.1 | | 5.0 | 5.4 | 5.5 | 6.9 | 5.5 | 5.1 | 5.1 |
| | Stoxx600 | 6.8 | 7.7 | | 7.4 | 7.6 | 6.0 | 5.0 | 4.9 | 4.9 | 6.0 | 4.8 | 4.6 | 4.5 |
| 16:00 - 16:30 |) Stoxx50 | 8.1 | 9.2 | 6.9 | 8.5 | 8.5 | | 5.5 | 5.6 | 5.7 | 6.6 | 5.9 | 5.7 | 5.7 |
| | Stoxx600 | 6.5 | 6.8 | 5.4 | 6.8 | 7.0 | 5.4 | 4.8 | 4.6 | 4.7 | | 4.5 | 4.5 | 4.4 |

Percent ADV by Time of Day

| Open | Stoxx50 | 0.9% | 0.7% | 0.7% | 0.7% | 0.7% | 0.7% | 0.9% | 1.1% | 1.0% | 1.0% | 1.0% | 1.0% | 1.1% |
|---------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Stoxx600 | | 0.4% | 0.4% | 0.4% | 0.3% | 0.4% | 0.4% | 0.6% | 0.6% | 0.6% | 0.6% | 0.5% | 0.6% |
| | | | | | | | | | | | | | | |
| 8:00 - 8:30 | Stoxx50 | 11.8% | 17.0% | 10.9% | 11.5% | 11.6% | 10.1% | 7.1% | 6.4% | 5.9% | 4.8% | 2.9% | 3.4% | 3.3% |
| | Stoxx600 | 6.1% | | 7.2% | 7.9% | 7.8% | 7.4% | 6.5% | 8.8% | 8.3% | 6.3% | 6.5% | 6.6% | 5.7% |
| 16:00 - 16:30 | Stoxx50 | 16.2% | 16.1% | 12.3% | 11.0% | 12.2% | 10.2% | | 5.5% | 3.3% | 4.2% | 2.0% | 2.8% | 2.9% |
| | Stoxx600 | 12.1% | 12.7% | 13.7% | 12.9% | 12.2% | 11.8% | 11.0% | | 13.3% | 13.2% | 13.3% | 13.9% | 14.0% |
| | | | | | | | | | | | | | | |
| Close | Stoxx50 | 25.4% | 24.3% | 22.2% | 20.4% | 18.1% | 19.4% | 23.5% | 23.1% | 25.7% | 27.4% | 26.7% | 29.3% | 32.5% |
| | Stoxx600 | 26.3% | 23.2% | 21.3% | 20.5% | 18.3% | 18.6% | 21.5% | | 26.8% | 29.7% | 29.8% | 30.6% | 34.3% |

Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP Source data: Virtu Financial

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