

# LiquidMetrix

Best Execution, Quantified



## How important is the Primary Market?

Short Article LM0006

1 March 2011



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### Key Points

- During the week of 21-25 February 2011 there were two primary exchange outages, Borsa Italiana on the 22 February 2011 and LSE on the 25 February 2011.
- In this short article we analyse the execution quality on the MTFs while the primary market was unavailable.
- During the LSE outage the MTFs offered some liquidity / spreads.
- Spread / liquidity at the start of the day were poor. However MTF spreads / depths improved between 08:00 and 11:00.
- By 12 noon trading volumes on the MTFs were around 20% of normal.
- Once it was expected that LSE would re-start at 12:15 there was a sharp reduction in volumes and liquidity on all MTFs.
- After the LSE re-start spreads and depths returned to their normal values both on LSE and the MTFs.
- In contrast, during the Milan outage, spreads and liquidity on the MTFs were very poor. There was minimal trading.

### Background

During the week of February 21-25, 2011, there were technical outages that lead to trading suspensions on the primary markets for Milan (Tuesday, 22nd February 2011) and London (Friday, 25th February 2011). Both outages started at or soon after market open and lasted for several hours.

In this article we examine the outage minute by minute. In particular we will explore:

- What was the quality of the liquidity (spreads, depths on book) on the MTFs whilst the primary venues were 'out'.
- To what extent was there significant trading volume on the MTFs?
- How did the different MTFs compare in terms of bid-offer spreads, liquidity and trading volume during the outage.
- Within the period of the outage, were there significant changes to spreads and liquidity on the MTFs minute by minute.
- What was the effect of the announcement by the primary market that trading would be re-started?
- What was the pattern in spreads, liquidity and trading on the MTFs in the time between this announcement and the uncrossing of the re-start auction?

All the results here are created on the basis of analysing full depth, millisecond time-stamped, order by order books reconstructed for the MTFs and the primary markets (once they re-started) over the entire trading days of 22 and 25th February 2011.

We concentrate primarily on the London market outage and at the end of the article compare briefly with the events on Milan.

### Technical Details of the Outages

#### Milan (22 February 2011)

The outage lasted from start of day until 14:30 UK time.

**London (25 February 2011)**

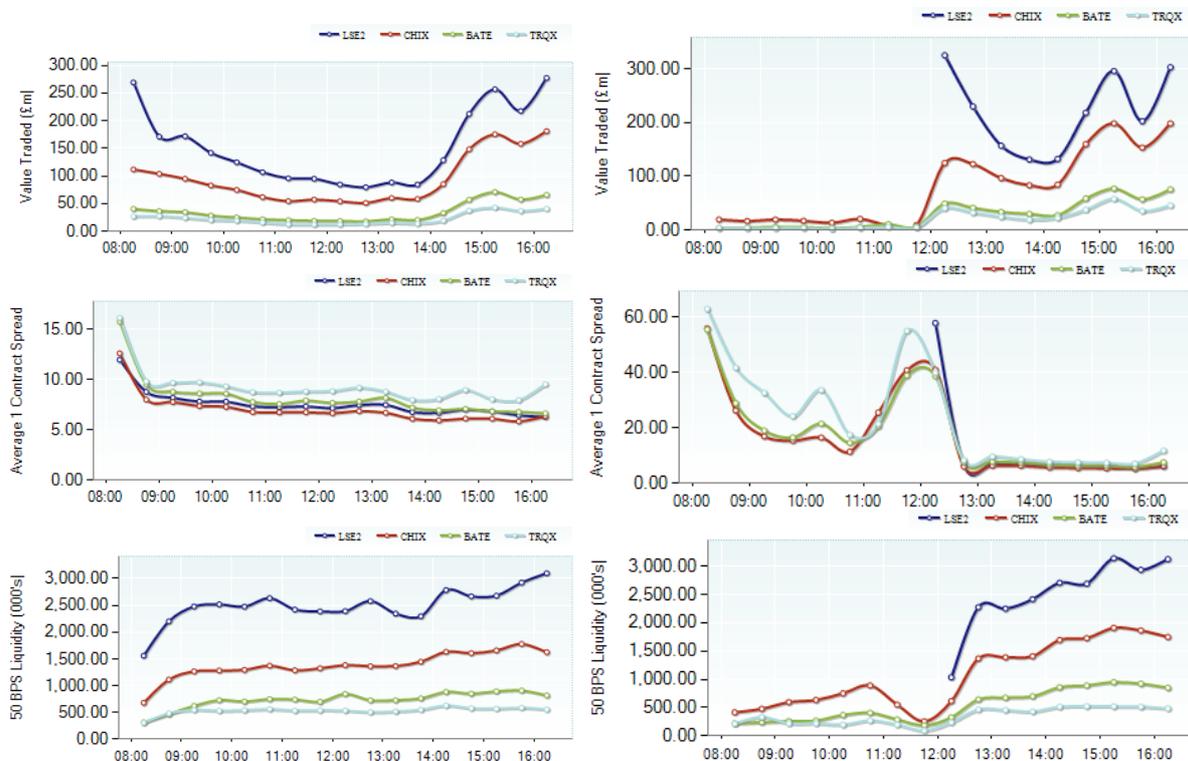
The outage started just after the uncrossing of the opening auction at approximately 08:04 and lasted until approximately 11:30 (UK time). From 11:30 to 12:15, instruments were in 'call auction' state. The uncrossing of the call auctions were held at 12:15.

Problems were first identified with market data feeds leading to the suspension of continuous trading. A detailed timeline of communication from LSE to the market can be seen here:

<http://liveservice.londonstockexchange.com/en/incidents/archived/85-friday-25022011-075443>

**London Outage: Basic Patterns for the day 25 February 2011**

The three graphs below are half hourly charts showing trading volumes, 'at-touch' bid-offer spreads and 50BPS liquidity (amount of volume on book within 50BPS of mid) averaged over all FTSE-100 stocks. On the left we show the 'normal' profile based on the average statistics for the preceding week. On the right we show the profile on the day of the outage.



**'Normal' volume, spreads, 50BPS liquidity  
(21 -24 Feb 2011)**

**'Outage' volume, spreads 50BPS liquidity  
(25 Feb 2011)**

Screenshots from LiquidMetrix WorkStation

Initial points to note:

- Trading volumes for all venues are much lower than 'normal' until 12:15.
- The spreads on the MTFs were initially more than quadruple the 'normal' average spread for FTSE-100 stocks (over 40BPS). Spreads improved over the morning until around 11:00AM where they were down to 10-15 BPS before again widening sharply in the period leading up to the LSE re-start and call auction un-crossing.

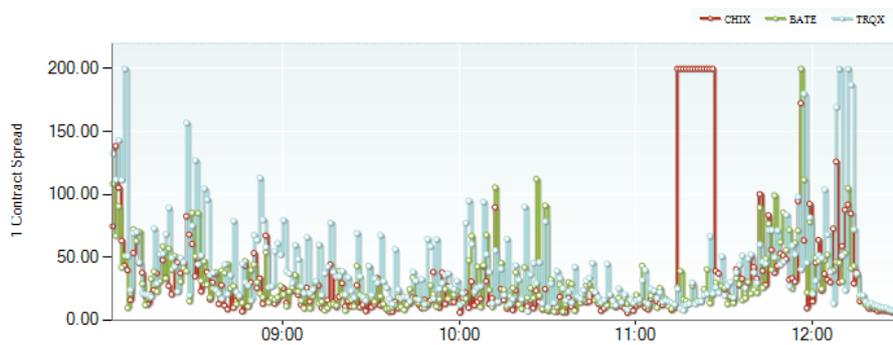
- A similar pattern can be seen for BPS liquidity (depth on book); initially poor in the first hour or two, improving up to 11:00AM and then collapsing prior to the LSE re-start. At 11 o'clock, CHIX had about two thirds of its normal on-book liquidity.

At a high level, trading on the MTFs was far from normal during the period of the LSE outage both in terms of volumes traded and the pre-trade liquidity measures of on book spreads and depths. However, in contrast with some earlier outages (see our previous LiquidMetrix article on the November 2009 LSE outage for instance), *some meaningful trading did still occur on the MTFs.*

## Drilling Down

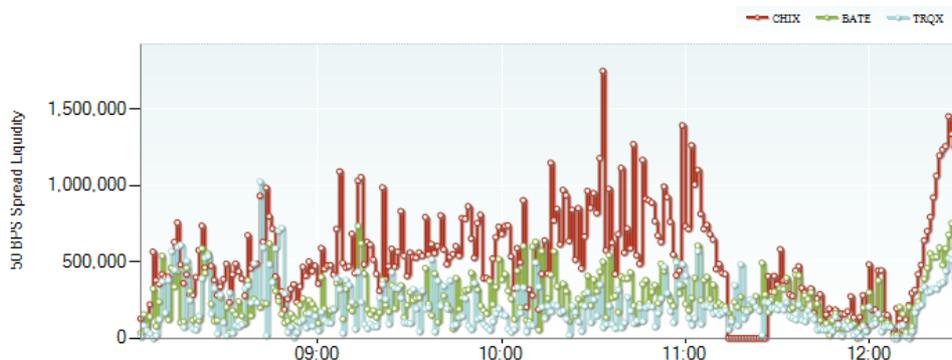
If we now 'zoom into' the period of the outage and look at the three main MTFs (BATS, CHIX and TRQX), with statistics calculated tick by tick for the FTSE 100 stocks and aggregated into 30 second 'bins', we can see in greater detail what was happening on the MTFs during the period of the outage.

**Spreads:** Spreads are very high at the beginning of trading before settling down around 9 am. There is considerable 'volatility' indicating that bids and offers are being quickly 'shuffled', especially on BATS and Turquoise. The period between 10:45 and 11:15 is relatively calm with reasonable spreads maintained. Just before 11:15, spreads on CHIX spike (see later note on this).

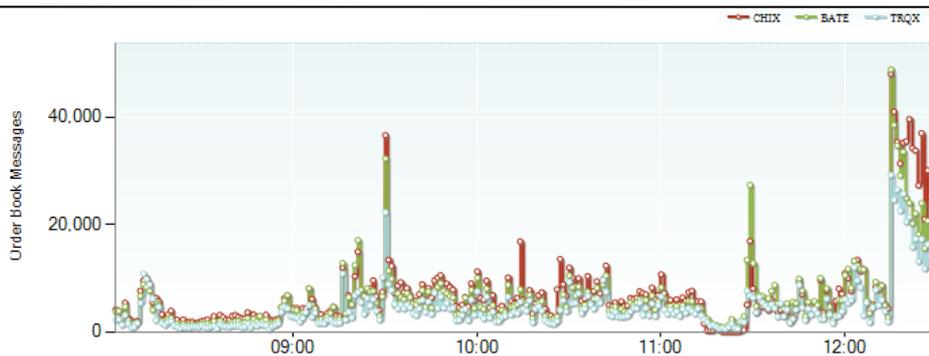


Spreads

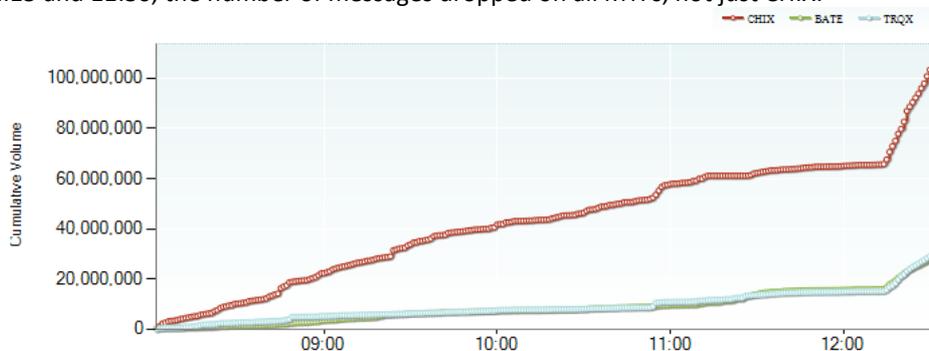
**50 BPS Liquidity:** similar to spreads, liquidity improves slowly between 8am and 11am. Liquidity on CHIX drops to almost 0 for 15 minutes at 11:15. Liquidity drops again virtually to almost zero on all MTFs just before 12:15 when the LSE market resumes continues trading.



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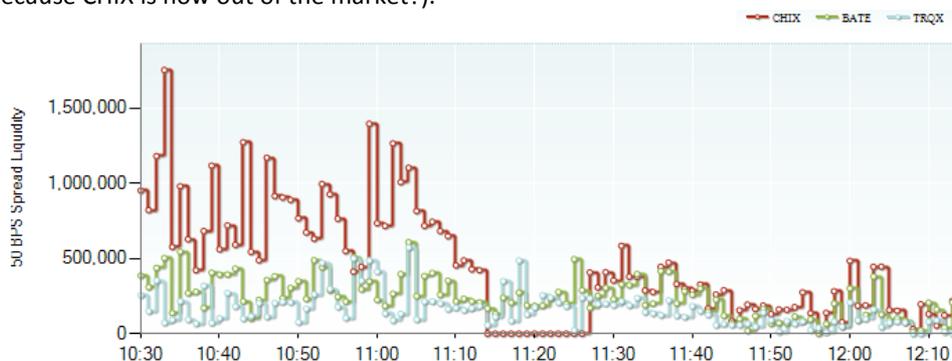
**Order Book Messages:** This chart shows the number of order book events being disseminated by the MTFs during the outage. This illustrates how quiet the market was between 8am and 9am. After 9am, the number of messages increased indicating that more participants posted quotes. Another interesting feature is that between 11:15 and 11:30, the number of messages dropped on all MTFs, not just CHIX.



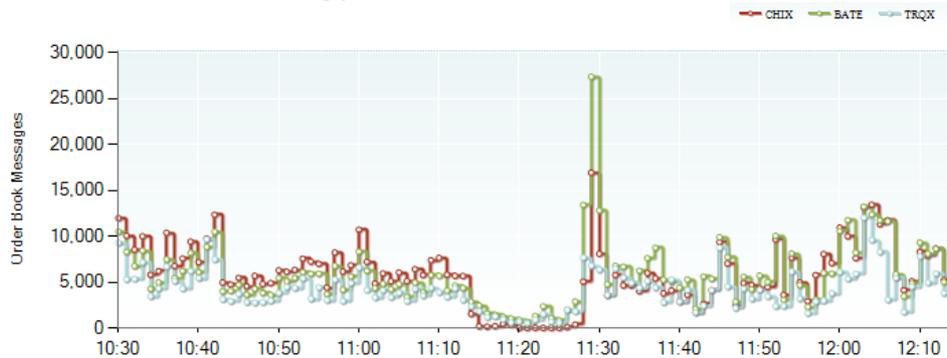
**Cumulative Volume:** This chart shows the cumulative value traded on the MTFs during the outage. CHIX had more volume traded than the other two MTFs, probably as a result of better liquidity. By 11am, CHIX had traded approximately 5 times more than either BATS or Turquoise. This is a larger multiple than normal for FTSE 100 stocks. Volumes on BATS and Turquoise were very similar during this time - ordinarily BATS has an advantage. Most of Turquoise's over-performance was due to higher volume during the first hour of the trading day.

### Time Leading up to the LSE Restart

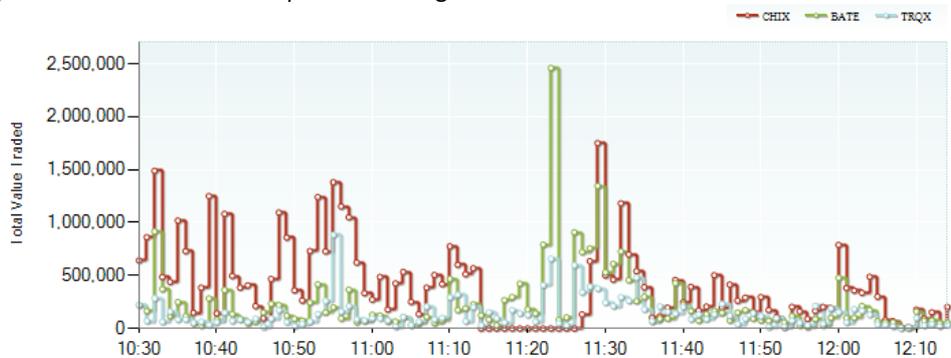
The LSE website announced that trading would be re-started at 11:26. The charts below zoom into this period (10:30 -12:15). An important point to note is that at 11:14, LSE sent a market 'HALT' message. This had an immediate impact, especially on CHIX, where trading volumes, spreads and depths collapsed to near zero (over 200BPS for spread). This state held on CHIX for approximately 15 minutes before trading resumed. Interestingly, this pattern is not observed on BATS. Although there is an initial drop in volumes and liquidity coinciding with the sharp drop on CHIX, if anything, trading volumes on BATS pick up for the rest of the period (possibly because CHIX is now out of the market?).



At 11:15, volume in the CHIX order book drops to virtually zero in response to the LSE Halt message. Order books on the other two MTFs are seemingly unaffected.



Order book messages sent out by the market data feeds of the MTFs during the 11:15 to 11:30 period are interesting. Messages on CHIX fall virtually to zero but the messages on Turquoise and BATS also drop significantly. All venues then show a spike of messages around 11:30.



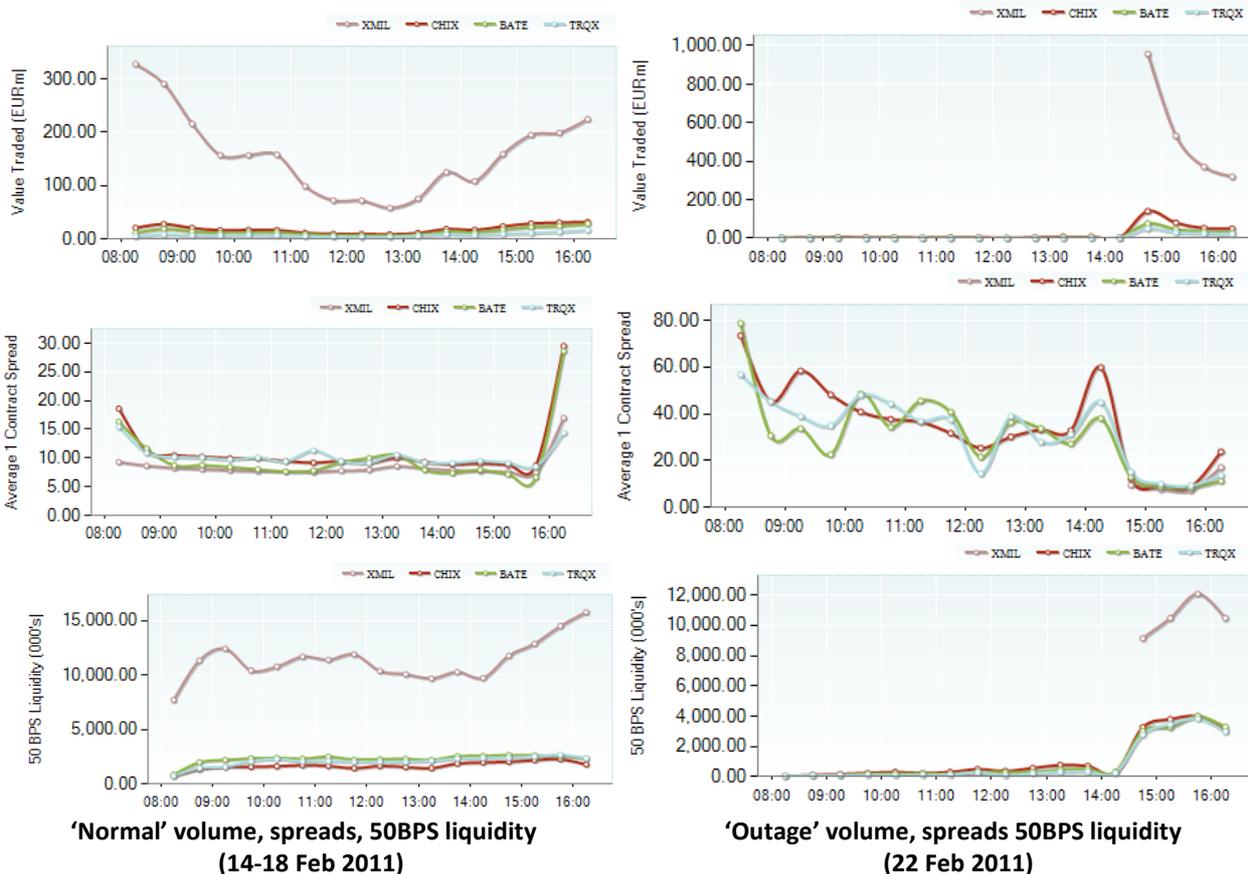
In terms of actual trading activity, no trades occurred on CHIX. Trading did continue on BATS and Turquoise with BATS handling more trades during the period, possibly due to CHIX being unavailable.

## Conclusions for the LSE Outage

- The MTFs offered some liquidity/spreads during the outage. However spreads were significantly wider than normal.
- Trading volumes were light. The volumes did correlate quite closely (inversely) with the spreads being offered.
- Spread/ liquidity available at the start of the day was extremely poor.
- There was a definite improvement in spreads/depths and volumes between 08:00 and 11:00 and more trading took place.
- Once it was clear that the LSE would re-start and it announced the re-start auction uncrossing time of 12:15, there was again a sharp reduction in volumes and liquidity.
- The market HALT message sent by LSE at 11:13 seems to have affected one MTF in particular (CHIX), less so on the other two (BATS,TRQX).
- After the LSE re-start, spreads and depths quickly returned to their 'normal' values both on the primary market and the MTFs. Spreads continued to be fairly wide on all markets compared to 'normal' for the first 15 to 30 minutes after the re-start

## Milan Outage: Basic Patterns for the Day 22 February 2011

The three graphs below are half hourly charts showing trading volumes, 'at-touch' bid-offer spreads and 50BPS liquidity (amount of volume on book within 50BPS of mid) averaged over all MIB stocks. On the left we show the 'normal' profile based on the average statistics for the preceding week. On the right we show the profile on the day of the outage (Tuesday, 22 February 2011).

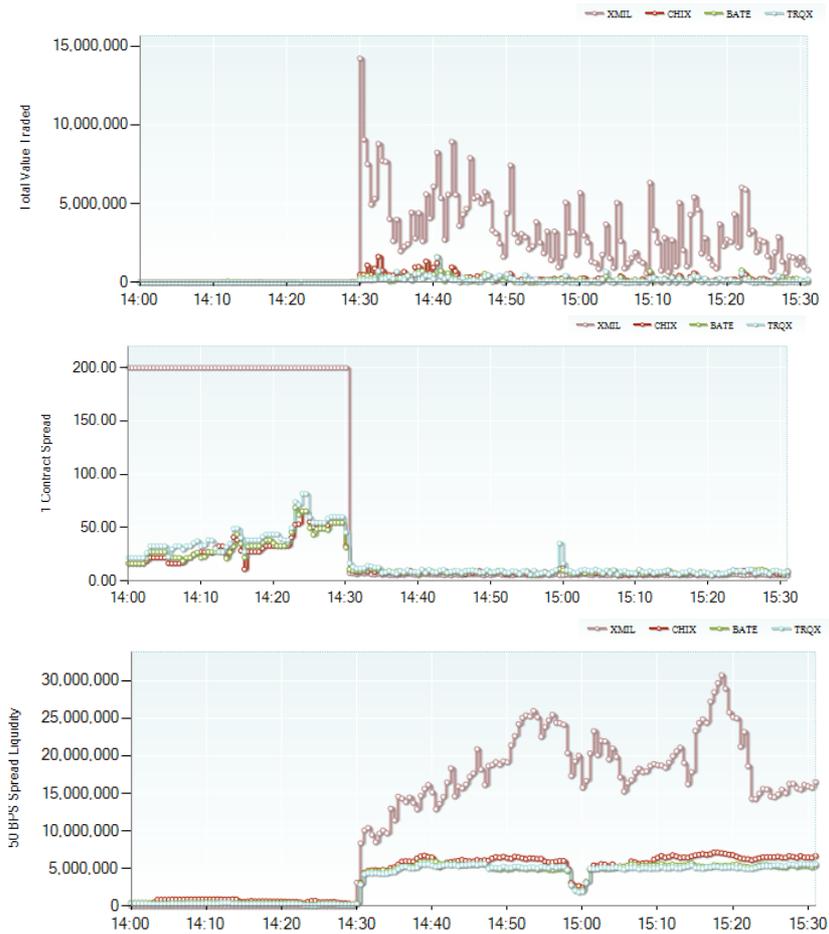


Screenshots from LiquidMetrix WorkStation

Initial points to note:

- MTF trading volumes during the outage were minimal and only started again after Milan resumed trading at 14:30.
- Spreads on all MTFs were wide during the outage and on book liquidity was extremely low compared to normal on the MTFs.
- Immediately upon restart of Milan, trading volumes, spreads and depths returned to normal.

Focussing on one of the larger stocks traded on Milan (Unicredit SPA) and drilling down to view 30 second statistics for volume, spreads and 50 BPS liquidity for the MTFs and Milan, one can see the abrupt nature of the restart:



### Conclusions for the Milan outage and comparison to the LSE outage

The pattern of trading on the Italian stocks during the Milan outage is clearly very different to that seen on London. There is minimal trading and on-book spreads and liquidity on the MTFs was very poor.