November 2011

High-frequency trading in volatile markets – an examination

Market turbulence in combination with unusually high volatility often puts high-frequency trading in the spotlight. It is widely assumed that price volatility would be significantly reduced if high-speed trading did not exist.

Several research institutions have recently examined high-frequency trading and published extensive studies on the topic. Two examples of particular interest are a study published in Britain by the Government Office for Science in September 2011 called "The Future of Computer Trading in Financial Markets", and a study by the Frankfurt-based Goethe University from April 2011 entitled "High-Frequency Trading". The key message of both studies is that high-frequency trading actually increases liquidity and improves market quality.

Eurex Exchange has examined how accurate the findings of these studies are

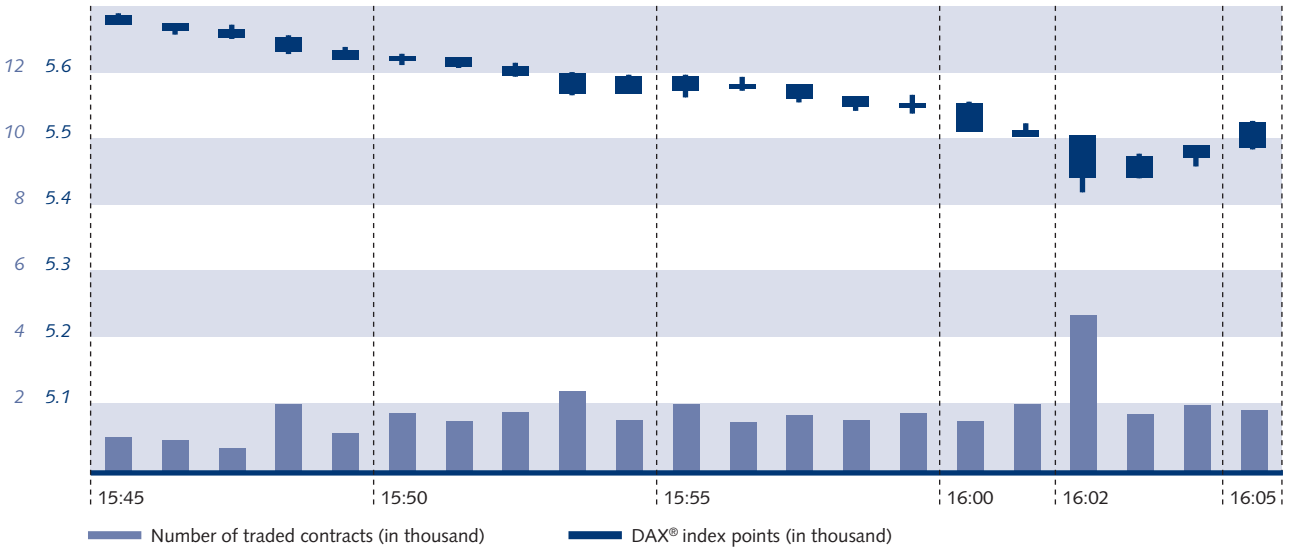
As the operator of one of the leading global derivatives markets, the studies relate to Eurex Exchange's guiding principles of transparency, fair price determination and orderly trading. These principles apply to all Eurex market participants, regardless of the trading technology and the type of access used.

The market activity on August 25, 2011, was used as the basis for the research. On this day, the performance of DAX® Futures (FDAX), which track the underlying DAX® Index of 30 leading German blue chip stocks, made the headlines. On that day, in the span of 17 minutes, DAX® Futures fell by more than four percent and then rose again in the following four minutes by two percent. Rumors circulating in the market afterwards drew attention to the potential role of high-frequency traders in the contract's dramatic move. The analysis generated some interesting results.

First, the fall in the price of DAX® Futures was triggered by high-volume discretionary orders totaling around 6,000 contracts, which were entered into the Eurex trading system by institutional buy side clients as sell orders in smaller tranches.

As shown in Figure 1, the price drop was not triggered by an illiquid market situation. In fact, the high volume orders were processed with small price increments. Average turnover increased during this period to more than 1,700 contracts per minute, far higher than the monthly average of just under 300 contracts per minute. At the peak, as many as 4,700 contracts per minute were traded – a clear sign of a highly liquid order book.

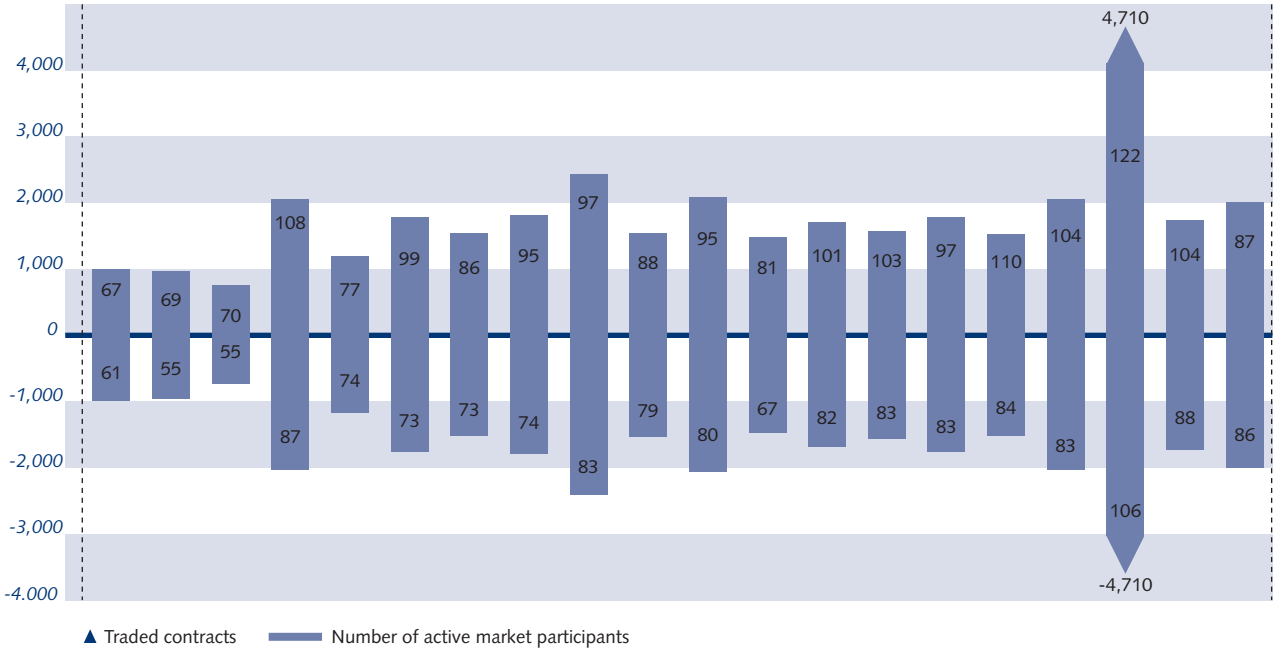
Figure 1: Trading in DAX® Futures on August 25, 2011 (one-minute intervals 15:45–16:05 CET)



Second, the turnover seen in the 20-minute period was generated by the activities of a wide range of trading participants. A total of around 200 different participants acted as buyers during this period (in a falling market), including – but not limited – to high-frequency traders. Around 170 different trading participants acted as sellers. The detailed analysis indicates there were up to 122 different participants acting as buyers and 106 different participants acting as sellers per minute (see Figure 2).

They help process high volume orders in a way that protects the market by placing a rapid succession of small, non-directional buy and sell orders, thus preventing abrupt price movements. It can be demonstrated that participants who employ high-frequency techniques serve as liquidity providers, alongside arbitrage investors and hedgers. The analysis confirms that high volume sell orders found a sufficient number of buyers even in a difficult market environment, allowing them to be executed in just a few minutes.

Figure 2: Number of individual buyers and sellers per minute



Third, the available liquidity was in large parts provided by high-frequency trading firms, as these participants initially absorbed the major sell orders and then passed them on to protect market and price integrity. Eurex Exchange has been observing this trading pattern for quite some time, which is viewed as typical. Moreover, the often assumed acceleration of downward movements through computer-based trading strategies was not observed.

High-frequency traders make a valuable contribution to liquidity

The ad-hoc analysis underlines that during times of market turbulence, regulated markets like Eurex Exchange have consistently made valuable contributions to the fair and orderly readjustment of investment strategies for short, medium and long-term investors thanks to their transparent and reliable market infrastructure. Eurex Exchange offers sufficiently large liquidity pools even in volatile market phases. High-frequency traders also make a valuable contribution here.

Advanced risk management technology brings safer markets

With a view to the increasing market share of automated trading strategies, Eurex Exchange has built various technology-based risk management mechanisms into the Eurex® system, some of which already have been available for a considerable time.

These deal with errors, whether they arise from a mistaken entry ("fat finger"), a panic attack by an inexperienced trader, or an erroneous algorithm. These mechanisms include, among other things, volatility interruptions, real-time risk management and order limits. Volatility interruptions, for example, allow Eurex Exchange to automatically stop trading in individual products in response to unusually large price movements triggered by mistaken entries, stop-order cascades or illiquid market situations. This gives participants the opportunity to readjust their market assessment and order management before trading restarts. A chain reaction, such as that seen in the U.S. "flash crash", is inconceivable at Eurex Exchange.

High-frequency traders alone cannot be blamed for volatile markets and major price fluctuations. At the same time, high-frequency trading should only take place in an appropriate regulatory environment in which benefits and risks are well balanced and sufficient consideration is given to both parameters. Well-defined minimum requirements regarding governing organizations and risk control are particularly important here.

Over-regulation on the other side may encourage participants to evade rules and migrate to less stringently supervised trading venues, thus depriving regulated stock and derivatives exchanges of important liquidity.

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