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HFT likely to make Japanese debut in 2010

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The Tokyo Stock Exchange will launch its new Arrowhead trading system in January 2010. By shortening order response time to milliseconds, Arrowhead has the potential to bring high-frequency trading (HFT), widely prevalent in the US and other overseas markets, to Japan also. Arrowhead should improve market liquidity and pricing efficiency.

Arrowhead's advent

In January 2010, the Tokyo Stock Exchange (TSE) will launch Arrowhead, its new trading system for equities and convertible bonds. Arrowhead is most notably distinguished by a major improvement in order processing speed. Order response time will be reduced from several seconds to 10 milliseconds (0.01 second) or less.

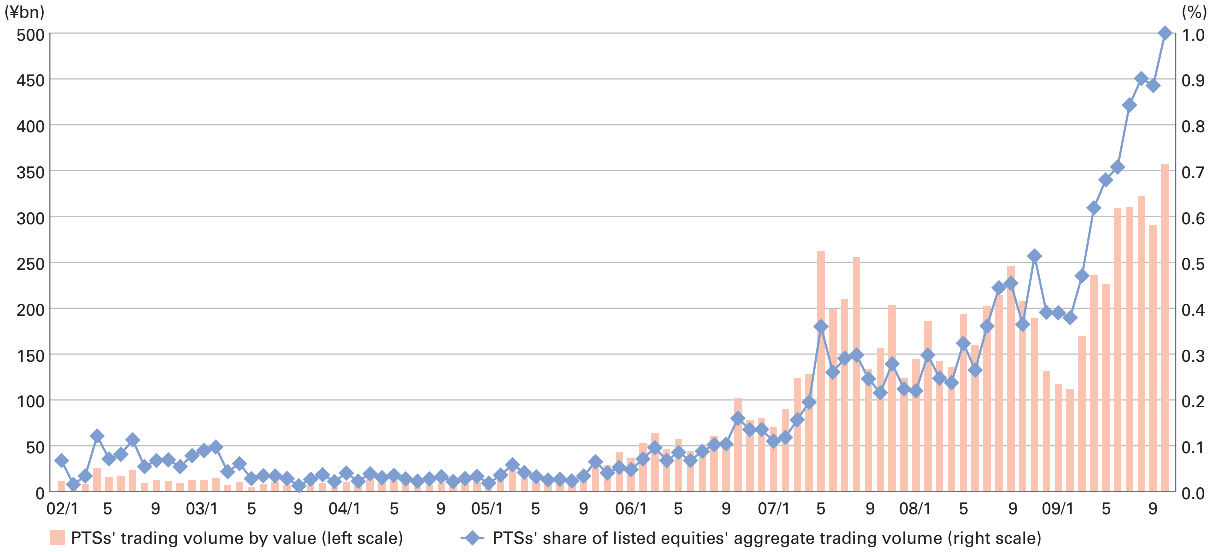
Order processing times on the order of milliseconds are already very common at US and European major exchanges and electronic trading venues (e.g., automated trading systems, electronic communication networks, multilateral trading facilities). Once Arrowhead is operative, the TSE will finally have a trading system that conforms to global standards, befitting its status as Japan's predominant equity market.

Speed upgrade will enable HFT

What will the improvement in the TSE's order processing speed mean in practical terms? First, the TSE will be able to process large volumes of orders virtually instantaneously. The new system will consequently facilitate the disaggregation of large orders into many small orders. Such disaggregation will help reduce large orders' market impact (large price movements).

In the US equity market, any given stock is traded on multiple venues (exchanges and/or electronic trading systems). Orders are often routed by algorithm to the venue deemed able to execute the order at the best price as of the moment of order placement. If the order fails to execute, it is immediately canceled and rerouted to another venue.

Exhibit. Domestic listed equities' trading volume via PTSs



Source: NRI, based on Japan Securities Dealers Association data

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This trading method dates back to the early 2000s. Previously, it was commonly known as algorithmic trading but recently is often called high frequency trading (HFT). High-frequency routing of orders back and forth between trading venues capable of processing orders in milliseconds enables traders to execute trades at better prices and to arbitrage price differences between venues.

As HFT grew in prevalence, the number of equity trade executions burgeoned in the US. On the NYSE, for example, the average number of trades executed daily has soared from 671,000 in 1999 to 9,367,000 in July 2009. Market liquidity has undeniably improved over this timeframe, even after the major changes in market structure and the roster of listed companies between 1999 and 2009 are taken into account,.

In Japan, a 1998 amendment of the Securities and Exchange Act (subsequently renamed the Financial Instruments and Exchange Act) repealed a general rule requiring equity trading to be concentrated on securities exchanges and legalized private trading systems (PTSs) and off-exchange trading by securities brokerages acting as a principal to execute large orders for customers. Although PTSs' equity trading volume has been growing as shown in the accompanying graph, PTSs collectively account for a mere 1% of total equity market volume.

PTSs' small market share partly reflects that many Japanese PTSs were established as trading venues for individual investors and are therefore not used much by institutional investors. It is also partly attributable to generally low awareness of best execution among Japanese institutional investors. Another major contributing factor, however, is that HFT and other such trading methods were unfeasible due to the slow order processing speeds at the TSE, where market liquidity is concentrated.

With the advent of Arrowhead, HFT may debut in Japan in 2010. Competition among PTSs, Arrowhead, the Osaka Securities Exchange, and other venues should lead to improvement in overall market liquidity and efficiency.

Future challenges

However, concerns remain. The TSE has experienced a series of major trading system problems in recent years. In November 2005 the TSE suffered a major system failure. The following month, its trading system failed to cancel an erroneous sell order in J-Com Holdings' stock in a timely manner. In January 2006, the TSE shortened trading hours in response to heavy selling triggered by the Livedoor scandal.

The lessons learned from such past troubles will of course be incorporated into the new system's software and hardware designs, but trading system problems cannot always be averted with computer technology alone. Major system problems can also stem from institutional design deficiencies and human judgment errors not directly related to computer systems.

Additionally, when order processing speed increases, conventional trading techniques such as daytraders' practice of timing their trades by monitoring the status of the displayed order book are likely to cease to be effective. If investors fail to fully recognize changes in market structure and the significance of such changes, the new trading system's advent could lead to reduced market participation by individual investors.

To maximally capitalize on the new system's potential, the TSE should strengthen itself organizationally and conduct educational activities targeted at investors.

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