

# MARKETS IN MOTION

developments that matter in financial markets

## High-Frequency Trading

“Highly automated trading systems have helped enable a business model for a new type of professional liquidity provider that is distinct from the more traditional exchange specialist and over-the-counter market maker.”  
**Mary L Schapiro, Chairperson, US Securities and Exchange Commission**

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### Introduction

High-frequency trading (HFT) has progressively gained a foothold in financial markets in the US, enabled and driven by significant advances in information technology. The terms ‘algorithmic trading’ and ‘high-frequency trading’ are used synonymously. However, HFT is a subset of algorithmic trading where a large number of orders that are usually small in size are sent to the market at high speed, with round-trip execution times measured in microseconds. Programs running on high-speed computers analyse massive amounts of market data, using sophisticated algorithms, to exploit trading opportunities that may open up for milliseconds or seconds. Participants are constantly taking advantage of very small price imbalances and, by doing that at a high rate of recurrence, they are able to generate sizeable profits. Generally, a high frequency trader would not hold a position open for more than a few seconds. Empirical evidence shows that on an average a US stock is held for 22 seconds in HFT. An extremely low latency, which is defined as the time that passes between the entry of an order until it is executed and the transaction is processed, is vital for HFTs. HFT firms use real-time data analysis in order to produce automatic trading decisions and very short time-frames for establishing and liquidating positions, resulting in the submission of numerous orders that are often cancelled shortly after submission and cancellation rates of greater than 80 percent are not uncommon. Moreover, HFT firms end the trading day delta-neutral, i.e., in as close to a square position as possible without carrying significant, unhedged positions overnight.

### Strategies

Extraordinarily high-speed and sophisticated quantitative and algorithmic computer programs are used for generating, routing, and executing orders. The objective of HFT strategies is to seek to benefit from market liquidity imbalances or other short-term pricing inefficiencies. The following are examples of the strategies used in HFT.

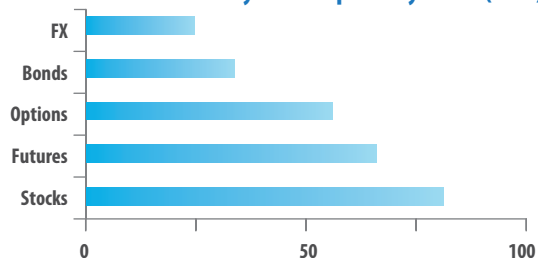
**Providing Liquidity:** The strategies involve making a two-sided market aimed at profiting by earning the bid-ask spread. As much of the liquidity provided by HFTs represents opportunistic liquidity provision, the entering and exiting of large positions are made very difficult.

**Statistical Arbitrage:** HFT firms seek to correlate prices between securities and to profit from imbalances in those correlations. Arbitrage strategies range from arbitrage between cross-border or domestic marketplaces to arbitrage between various forms of a tradable index (futures or the basket of underlying stocks) and cross-asset pairs trading, i.e., arbitrage between a derivative and its underlying.

### Players

High-frequency traders are mainly proprietary traders and they utilize their own capital for trading activities and do not usually conduct HFT on an agency basis.

### Asset Classes Traded by HFT Proprietary Firms (in %)



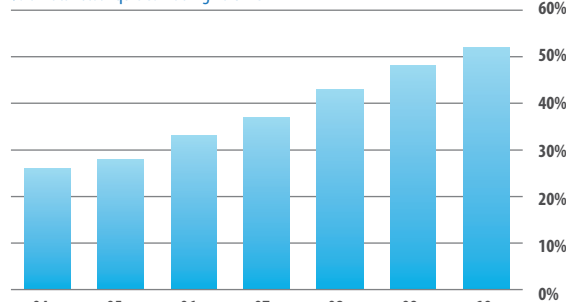
Source: TABB Group

### HFT in US

The US has a highly competitive market with a large number of participants, including exchanges, electronic communications networks (ECNs), alternative trading systems (ATs), over-the-counter (OTC) market makers, and proprietary trading firms. In the US, the Regulation National Market System (RegNMS) of 2005, which is designed to strengthen the regulatory structure of US equity markets, fosters both competition among individual markets and competition among individual orders in order to promote efficient and fair price formation across securities markets. The following graph shows the increasing use of HFT in the US.

### Adoption of Algorithmic Execution

% of Total U.S. Equities Trading Volume



Source: Aite Group, 2010

The Flash Crash in the US on May 6, 2010 has shown the vulnerability of the US equity markets to strategies facilitated by the evolutions in HFT technology. The so-called Flash Crash was a brief period of extreme market volatility on May 6, 2010 when the Dow Jones Industrial Average (DJIA) fell by 998.5 points within seconds, which marks the biggest one-day decline on an intraday basis in the history of DJIA stock index. In view of the growing importance of HFT and its alleged harmful effects in the event of adverse market conditions, regulators in the US are currently putting strong emphasis on subjecting HFT to prudential requirements and supervision.

Contributed by M Ravindran

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