

ELECTRONIC TRADING

A PRIMER

Managed Funds Association

April 2013



Introduction

New market structure regulations almost always require technological advancements, either for compliance or new investment opportunities.

Questions have now been raised concerning stability, fairness, and benefits of electronic trading, and the increasing sophistication of the technology necessary to support it. While electronic trading capabilities have created benefits for investors, traders, and markets, a lack of understanding remains about many market-related technological advances and their impact. Improper definitions of electronic, algorithmic, and high frequency trading have also caused significant misperceptions.

MFA's members are investors who, like other market participants, expect efficient, fair, and dependable markets, and who strongly support a robust regulatory environment. This presentation seeks to provide an overview of the evolution of electronic trading, provide clear definitions of often misused terms, demystify electronic trading strategies like high frequency trading, and highlight the numerous benefits associated with advances in market technology and electronic trading functionality.



Contents

Modernization of Markets	4
Electronic Trading	5
SEC and High Frequency Trading	6
CFTC and High Frequency Trading	7
Media Focus	8
Algorithmic Trading	9
Electronic Trading Benefits	10
Subject to Extensive Regulatory Framework	19
MFA Promotes Best Practices for Electronic Trading	21
References	22



Modernization of the Markets

- Before buy and sell orders could be submitted electronically and matched by computers as they are today, investors had to contact a broker to place an order manually – often for a substantial fee or commission.
- In the past, investors had little choice but to send their orders through a broker to Nasdaq and NYSE market makers. The substantially weaker competition among exchanges in the past made trading manually through brokers and utilizing specialists and market makers both inefficient and expensive, with wider Bid/Offer spreads and higher execution fees resulting in significant costs.
- Today, investors and traders can place orders electronically from devices such as laptops or smart phones for a fraction of the previous cost, can choose among several markets to send their orders, and can trade with many more market participants.
- These innovations, along with regulations designed to provide all investors equal opportunities, have created a more efficient, inexpensive, and reliable trading environment. The current market technology will serve as a foundation for even more efficient markets in the future.



Electronic Trading

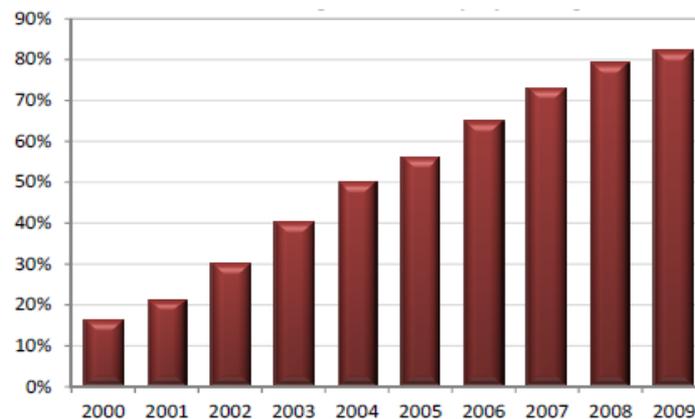
Electronic trading defined: Electronic trading occurs when a market participant executes an order with no human interaction.

Electronic trading emerged in the 1990's and quickly gained popularity as investors benefited from faster execution times, lower costs, and general greater efficiency.

Nearly all transactions in today's markets are executed electronically. In fact, electronic trading has become mainstream for many investors. From large trading rooms to small hand-held devices such as smart phones, a variety of methods to access the markets are now possible.

The advent of electronic execution revolutionized the financial marketplace – eventually allowing an investor or trader with a computer to make a trade without having to speak to a broker and pay the corresponding expensive commissions. Today, electronic trading accounts for a majority of transactions worldwide and nearly 90% of transactions in U.S. equity markets.

Exhibit 1: Electronic trading % of all US equity trading*



Source: Tower Group

*Graphic: Credit Suisse, "Who Let the Bots Out? Market Quality in a High Frequency World ", [Trading Strategy](#), March 19, 2012.



SEC: High Frequency Trading

As noted by regulators, “High Frequency Trading” (HFT) is relatively new and difficult to define. The Securities and Exchange Commission (SEC)* has stated that term typically is defined as “professional traders acting in a proprietary capacity that engage in strategies that generate a large number of trades on a daily basis.”

- The SEC points to the following elements, among others, as potentially signifying high frequency trading:
 1. *the use of extraordinarily high-speed and sophisticated computer programs for generating, routing, and executing orders;*
 2. *use of co-location services and dedicated market data feeds offered by exchanges and others to minimize information transfer latencies.***
 3. *very short time-frames for establishing and liquidating positions;*
 4. *the submission of numerous orders that are cancelled shortly after submission; and*
 5. *ending the trading day in as close to a flat position as possible (that is, not carrying significant, unhedged positions over-night).*
- High frequency trading is usually conducted by a proprietary trading firm, a proprietary trading desk at a broker-dealer, or by an investment adviser.*

*The U.S. Securities and Exchange Commission (SEC) – www.sec.gov

**SEC, [Concept Release on Equity Market Structure](#), January, 14, 2010.



CFTC: High Frequency Trading

The Commodity Futures Trading Commission (CFTC)* is formulating a definition of HFT as a form of automated trading that employs the following:

- *algorithms for decision making, order initiation, generation, routing, or execution, for each individual transaction without human direction;*
- *low-latency technology that is designed to minimize response times, including proximity and co-location services;*
- *high speed connections to markets for order entry; and*
- *recurring high message rates (orders, quotes, or cancellations) determined using one or more objective forms of measurement, including:*
 - *cancel-to-fill ratios*
 - *participant-to-market message ratios*
 - *participant-to-market trade volume ratios.*

The CFTC also notes that high frequency trading ‘is a mechanism utilized by a variety of trading strategies [including – but not limited to – liquidity provision and statistical arbitrage].’ **

*The U.S. Commodity Futures Trading Commission (CFTC) – www.cftc.gov.

**CFTC Technology Advisory Committee Sub-Committee on Automated and High Frequency Trading – Working Group 1, Draft Definition of HFT October 2012.



Electronic Trading and High Frequency Trading in the Media

- Electronic trading -- and more specifically high frequency trading -- has been the subject of public focus and debate since the May 2010 “Flash Crash” which began when a mutual fund initiated a rapid selling program in response to increasing volatility and concerns about European debt. Market participants including HFT strategies initially absorbed this selling; however, a liquidity crisis developed following the activation of trading algorithms which reinforced the selling pressure and encouraged some participants to halt trading.*
- Market structure legislation based on headlines instead of empirical research may engender rather than reduce uncertainty, possibly leading to increased volatility and diminished investor confidence. MFA and its members work proactively with regulators to help educate market participants and regulators as well as to improve regulation worldwide to strengthen the integrity of market structure for all investors.
- MFA strongly believes that regulators globally must acknowledge the benefits of electronic trading technology while continuing to monitor all types of trading and investment activities closely. The next several slides provide an overview of the benefits of electronic trading and high frequency trading.



Algorithmic Trading

Algorithmic Trading – Electronic Evolution Continues

- The rapid adoption of electronic trading, reduced costs, and an expanding global network of exchanges from which to choose created the foundation for “Smart” execution systems, or Algorithmic trading. Algorithmic Trading is not necessarily “high frequency,” as an investor could use algorithms to trade gradually over the long term.
- **Algorithmic trading defined: Algorithmic trading uses mathematical models to determine the optimal time and venue(s) to execute a buy or sell order. The algorithms are designed to analyze market data and trends continuously in order to execute an investor’s orders as efficiently as possible.**

Algorithmic Trading Benefits Many Types of Investors – Investors of all sizes use algorithmic trading to manage a large order (buy and sell) as series of smaller orders with the goal of reducing transaction costs (bigger orders cost more to execute) while lessening market impact. Investor types that use algorithmic trading include the following, among others:

- Pension funds
- Foundations
- Investment banks
- Sovereign wealth funds
- Hedge funds
- Endowments
- Mutual funds



Electronic Trading Benefits Investors

Technological advances accompanying automated, electronic markets have brought numerous benefits to investors of all types. These benefits – described on the following slides – include the following:

- Lower Volatility
- Increased Liquidity
- Reduced Transaction Costs
- Smaller Bid / Ask Spreads
- Improved Price Discovery
- Enhanced Risk Management



Electronic Trading Benefits Investors

“The Future of Computer Trading in Financial Markets - An International Perspective” was an independent study commissioned as part of the UK Government’s Foresight Project. Over 150 academics from over 20 countries have been involved in this study. Over 50 independent academic studies were commissioned.

This is the most in-depth report on computer and high frequency trading to date.

- The report concludes that, available evidence indicates that, computer-based trading “has several beneficial effects on markets,” such as improved liquidity, lower transaction costs for both retail and institutional investors, and more efficient market prices.
- The study found no direct evidence to suggest that computer-based HFT has increased volatility in financial markets or led to an increase in market abuse.
- The report indicates that it is unlikely that currently discussed legislation for HFT would achieve the desired effect and could have unintended consequences. The authors of the academic studies were “unanimously doubtful that minimum resting times would be a step in the right direction.” The evidence also offers little support for policies imposing market-maker obligations.*
- **Effective regulation must be founded on robust evidence and sound analysis. Regulators must be aware that market structure evolves and that new regulations should be considered to address these changes as they develop.**

*Foresight, “The Future of Computer Trading in Financial Markets,” [Final Project Report](#), Government Office of Science, London, 2012.



Electronic Trading Benefits Investors

In a March 2013 market commentary review, Credit Suisse asked the question “Is Increased Market Complexity Hurting?” and reached the following conclusions:

The market encompasses a wide variety of participants, including corporations, retail investors, broker-dealers, market makers, hedge funds, liquidity providers, quants, fundamental investors, and index funds. Structural changes may affect these entities in different, often indirect, ways:

- Computerization provides direct and less expensive market access for investors, while at the same time leaving an electronic footprint.
- Market making became more sophisticated with improved technology, with spreads tightening and latency increasing.
- Trade data grew in light of the smaller trade sizes, increasing both exchange revenue and routing costs.

The report concluded that computerization, technological advances, and small, more numerous trades have benefited investors:

*If the primary role of the market is the efficient transfer of capital in the economy – the ‘cost’ of trading, for real investors, is a potentially important measure of progress (or lack there-of)...The US market trades around \$200bn/day, which equates to \$50tr a year. One estimate indicates that around one-third of this is real investor trading. As all trades are 2-sided, this would equate to \$33tr in buying + selling per year. A conservative estimate shows that the 30% improvement in [Credit Suisse’s] Transaction Cost Index, at current levels of trading, would translate to savings for real investors of over \$10bn per year. On balance, the changes to the market over the past decade seem to have made trading less expensive for all investors.**



Electronic Trading Benefits Investors

Eurex, a leading derivatives exchange, presented an analysis of the impact and effect of high frequency trading based on its proprietary data at a February 2013 workshop.

Eurex's findings were as follows:

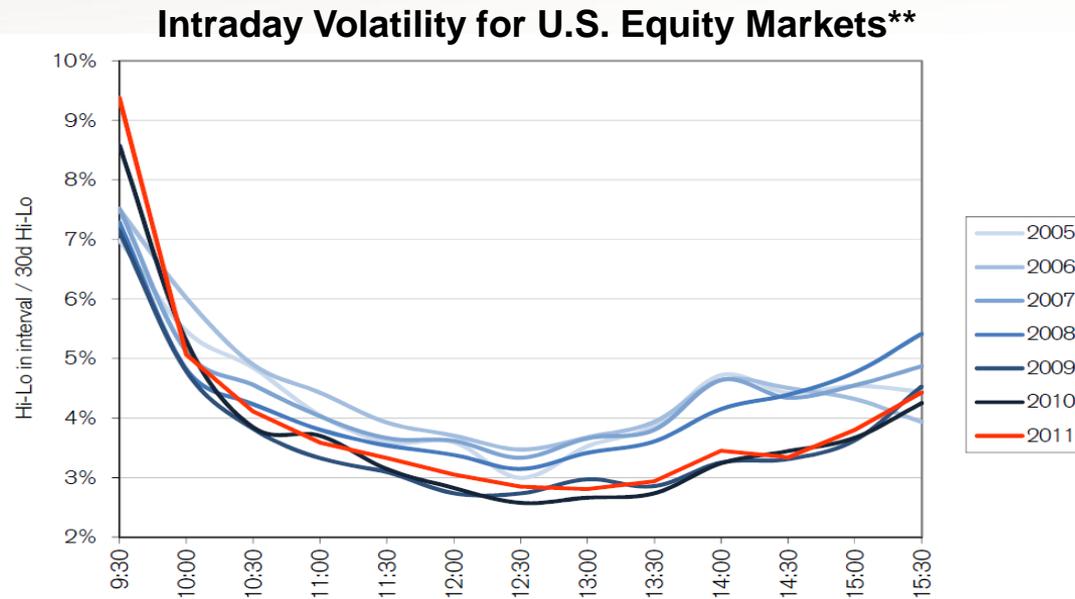
- Technical advancements enabled European institutional investors to incur substantially lower transaction costs.
- HFT increased the liquidity resilience in benchmark futures.
- Little evidence supports the accusation that High Frequency Trading firms pursue front running of customer orders.
- While tighter spreads reduce Bid/Ask quantities and thus lead to a perception of reduced liquidity increased HFT participation has actually increased liquidity.
- Most impressively, an interactive Eurex program recreated the total Bid/Ask, broken-down by HFT and non-HFT orders at and away from the BBO, leading up to, during, and after its August 25, 2011, mini-flash crash. The data showed that the initial shock was absorbed by a large number of buyers and that HFTs provided liquidity through their purchases in falling markets.*

* "High Frequency Trading – a discussion of relevant issues," Eurex: February 25-27, 2013.



Electronic Trading Reduces Volatility

The Chicago Mercantile Exchange (CME), which operates a futures exchange, has stated: "...we believe that automated trading contributes to market efficiencies, generally bolsters liquidity and thereby contributes to the price discovery function served by futures markets."* In recent years, the average level of intraday volatility has been consistently lower than it had previously been.



Source: Credit Suisse Trading Strategy

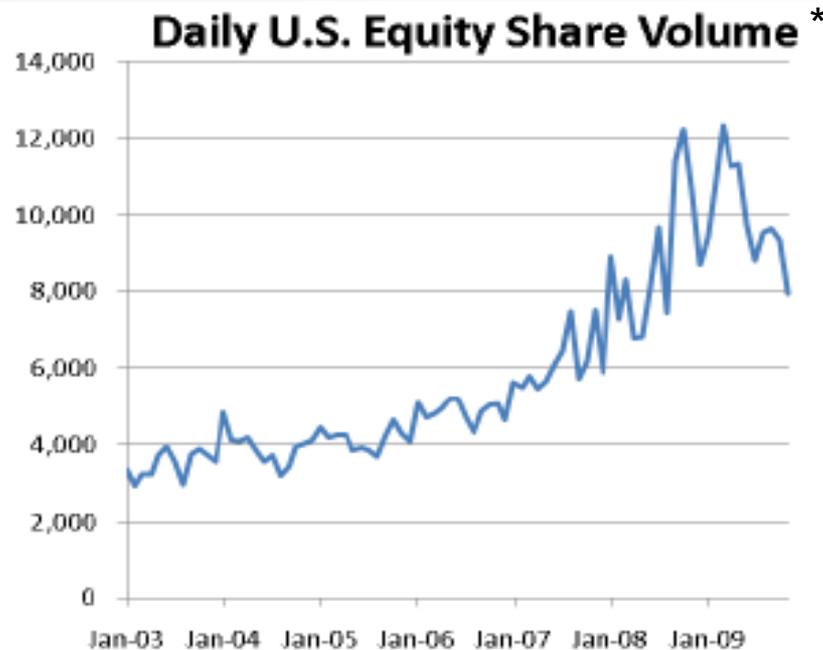
*CME Group, "What Happened on May 6?", CME Group: May 10, 2010.

**Graphic: Credit Suisse, "Who Let the Bots Out? Market Quality in a High Frequency World," [Trading Strategy](#), March 19, 2012.



Electronic Trading Increases Liquidity

Technology has made investors and traders more agnostic to the source of orders. As trading execution technology has become dramatically more efficient, the number of market participants has increased significantly. These new market participants have obviated the need for traditional market making.

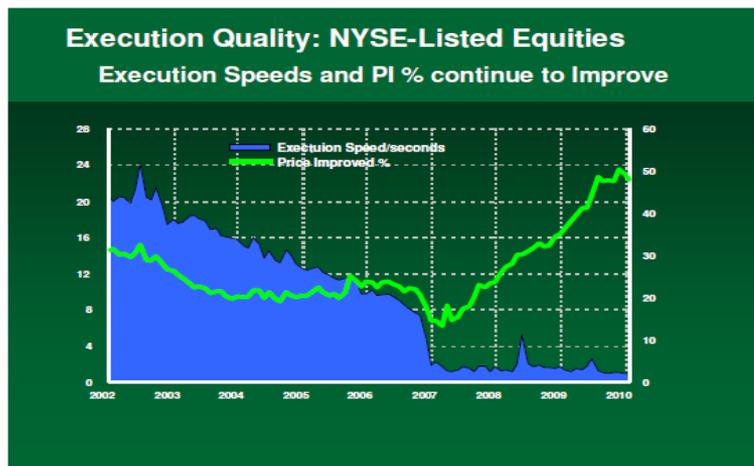


*Graphic: Commentary, *Traders Magazine Online News* "[Commentary: How High Frequency Trading Benefits All Investors](#)," March 17, 2010.

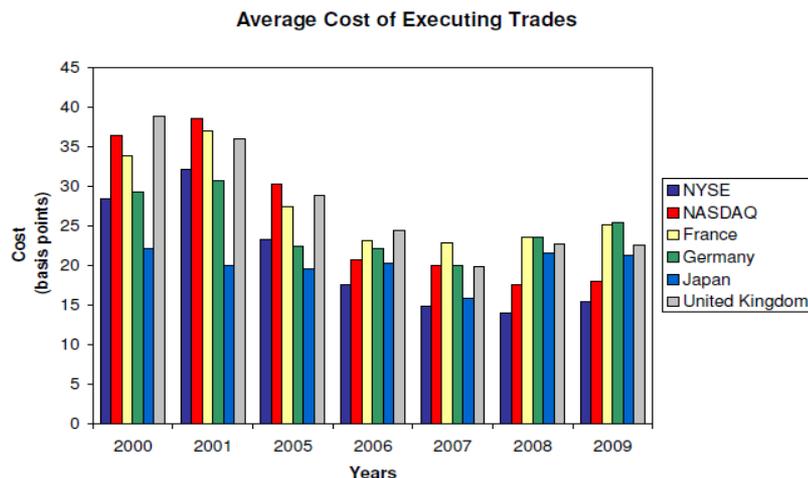


Electronic Trading Reduces Trading Costs

Regulatory changes in markets and advancing technology have lessened fees and improved execution speed and pricing reliability, to the benefit of the investing public. Financial intermediaries now offer better service and more low-cost options for all investors who want to enter markets and execute orders.



Source: Thomson Transaction Analytics¹⁹
Note: All NYSE stocks, All market centers, All executed market order shares (605-reported, 100-9999 shares)



Source: Elkins/McSherry, Institutional Investor

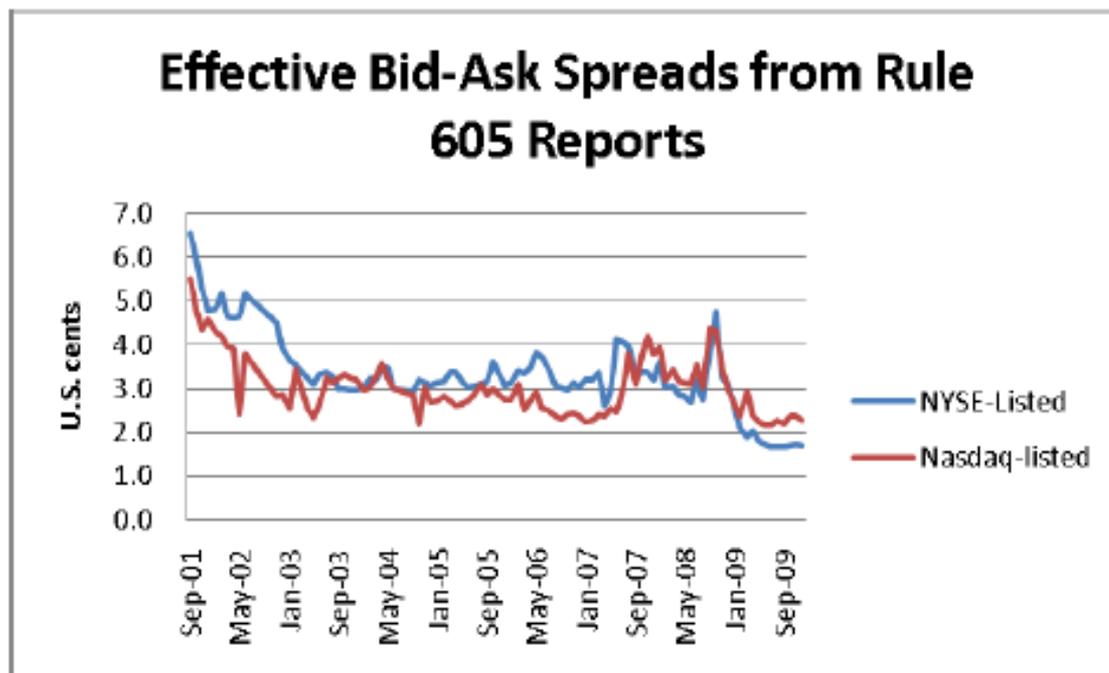
Graph, Left: [Thomson Transaction Analytics](#), 2010.

Graph, Right: Byrne, [“Elkins/McSherry -- Global Transaction Costs Decline Despite High Frequency Trading.”](#) Institutional Investor: November 2010.



Electronic Trading Decreases Bid / Ask Spreads

Traders operating within the new automated markets, including high frequency traders, have replaced manual market making by trading much more efficiently and at lower profit margins. This efficiency has led to lower spreads, which is a cost-saving benefit to all investors.



Source: Public Rule 605 Reports from Thomson, Market orders 100-9999 shares



Electronic Trading Improvements and Risk Management

What do we know about high-frequency trading?

Charles M. Jones*

Summary of findings:

Based on the vast majority of the empirical work to date, automated and high frequency trading improves market liquidity, reduces trading costs, and makes stock prices more efficient, although the data indicates that HFT may not be as helpful in stabilizing prices during unusually volatile periods.

Over the past few decades, technology has transformed the trading of securities and other financial instruments.

While technology is the driver, it is clear that regulation has also contributed to the current automated market structure. For example, the SEC's Regulation NMS, adopted in 2005, provided strong incentives for trading venues to automate.

Market quality, including risk management, has improved because liquidity suppliers, based on the advancements in market structure, are better able to adjust their activities in response to new information.

As all aspects of market-structure technology continue to advance, it is imperative to test critical software thoroughly. Periodic regulatory reviews of critical aspects of market structure as needed, but those formulating policy should be especially careful not to reverse the liquidity improvements of the last twenty years.

* Jones, Charles M., "What Do We Know About High-Frequency Trading?" March 20, 2013.



The Markets are Safeguarded Through Regulation

MFA believes that regulations must keep pace with technological developments if we are to safeguard our markets properly and protect investors. The SEC has taken a number of steps to ensure that exchanges and investors are accountable for keeping markets secure, fair, and stable.

Former SEC Chairman Mary Schapiro has stated:

Reliance on computers is a fact of life not only in markets everywhere, but in virtually every facet of business. That doesn't mean we should not endeavor to reduce the likelihood of technology errors and limit their impact when they occur.

*...existing rules make it clear that when broker-dealers with access to our markets use computers to trade, trade fast, or trade frequently, they must check those systems to ensure they are operating properly.**



Electronic Trading is Subject to an Extensive Regulatory Framework

U.S. regulators' approach to oversight has historically been robust and continuous. Regulators have recently taken several steps to keep pace with the advancements in market technology and electronic execution automation. These new regulations are designed to encourage competition, make opportunities available to all, and ensure technological integrity in all market conditions. These rules apply to electronic trading, algorithmic trading, and high frequency trading.

Recent Relevant Regulatory Actions in 2010-2013:

- Self-Regulatory Organizations Adopt a Circuit Breaker Rule (2010)
- SEC Adopts Modified Uptick Rule Subject to Circuit Breaker (2010)
- SEC prohibits “naked sponsored access” and adopts rule on “Risk Management Controls for Brokers or Dealers with Market Access” (2010)
- Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues issue recommendations in response of the market events of May 6, 2010 (2011)
- Self-Regulatory Organizations Adopt Amendments to the Circuit Breaker Rule (2011)
- Self-Regulatory Organizations Adopt a Limit Up-Limit Down Mechanism (2012)
- SEC Adopts a Consolidated Audit Trail Rule (2012)
- SEC proposes Regulation SCI to bolster “Systems Compliance and Integrity” (2013)



MFA Promotes Best Practices for Electronic Trading

The MFA's advocacy on market structure and electronic trading issues is based on the following guidelines and best practices:

MFA believes strongly that efficient financial markets are vital for capital formation, the growth of economies, and increases in the standard of living for all individuals. At the core of efficient financial markets is the relationship between regulators, free markets, and technology.

This relationship has allowed markets to experience reduced transaction costs, greater volumes, faster execution rates, low latency in the transfer of critical information, and has facilitated the inclusion of more market participants.

MFA believes that regulation is a continuous process and that regulators have responded in a decisive manner to industry concerns - the resulting benefits to market participants and market structure are undeniable.



References

Regulatory Agencies:

- The U.S. Commodity Futures Trading Commission (CFTC) – www.cftc.gov
- The U.S. Securities and Exchange Commission (SEC) – www.sec.gov

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