Oversight of Automated Trading at CME Group

Dean Payton, Managing Director, Market Regulation

CFTC TECHNOLOGY ADVISORY COMMITTEE
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Changes in Market Structure & Infrastructure

Increased Automation

- Technological Innovation & Market Structure Evolution
- Expand Access, Transparency, & Competition
- Participants Seek to Optimize Quality & Efficiency of Execution

Evolution of Market Oversight & Risk Management

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Competitively Executed Volume By Venue

Open Outcry Trading
12% of Volume

Electronic Trading
88% of Volume
Improvements in CME Globex Infrastructure Have Increased the Efficiency of Trading

2012 futures RTT running approximately 3.6 ms
Evolution of Market Driving Evolution of Oversight

LEVEL PLAYING FIELD

Topics
- Fair Access
- Risk of Disruption
- Oversight Capabilities
- Trading Practices

RISK CONTROLS

SURVEILLANCE

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Equal Access to Host Proximity & Data

- All participants have non-discriminatory access to the same connectivity options at the same prices
- Market data is disseminated to all participants simultaneously
- All participants have access to identical data
- Anonymity of traders and firms is protected in all bids, offers and execution reports
- All orders are processed in the order received
- Bids and offers are available to all participants and matched according to transparent algorithms (primarily Price/Time or Pro-Rata)
CME Group’s Market Regulation Department has developed a highly granular and precise audit trail for electronic order, trade and market data information which we further enrich with substantial reference data.

Market Regulation tracks every order, modification, cancellation, rejection, transaction and book state change on the Globex platform at the millisecond level in its regulatory systems.
## Data Set Comparison & Audit Trail Tools

<table>
<thead>
<tr>
<th>Order Entry Data (RAPID System)</th>
<th>Cleared Trade Data (SMART System)</th>
<th>Market Data (ARMADA System)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order entry and trade data</td>
<td>Processed trade data from Clearing House</td>
<td>Order book, trade price and volume</td>
</tr>
<tr>
<td>≈ 35 data fields</td>
<td>≈ 120 data fields</td>
<td>Price, time and quantity</td>
</tr>
<tr>
<td>≈ 250-300 million messages per day</td>
<td>≈ 7.5 million transactions per day</td>
<td>≈ 80-100 million book state changes per day</td>
</tr>
<tr>
<td>Live and History</td>
<td>T+1 and History</td>
<td>Live and History</td>
</tr>
</tbody>
</table>

In addition, we have a Large Trader Reporting System which gives us access to end-of-day positions of all reportable accounts - representing ≈ 80% of open interest.
Electronic Audit Trail – Identification Fields

How we know WHO is acting in CME Group markets.

- Clearing Firm
- Trading Firm
- Session ID
- Market Participant ID
- Operator ID (Tag 50) & ATS Team
- Account
- ATS Order Identifier (Tag 1028)
- Country of Origin

Identified Market Participants represent ≈ 90% of Volume
Identified Operator IDs (Tag 50s) represent ≈ 75% of Volume
Each order is designated as automated or manual entry (Tag 1028)
Multifaceted Oversight

- Risk Management Reviews
- Globex Credit Controls
- Account Level Live Alerts

- Global Command Center
- Clearing Risk
- Market Regulation

- Real-Time Monitoring
- Risk Parameters
- Messaging Efficiency
- Trade Cancellations
- Trading Halts

- Trade Practice Surveillance – Programs & Research
- Robust Data Query and Analytical Tools
- Live Account Level and Market Alerts
- Investigations and Enforcement

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Key Regulatory Transactional Data Systems

Rapid System

- Electronic Order Entry and Trade Data – Live & History
- System connected into the Globex infrastructure
- In-memory database can read/aggregate 1 billion messages per second

- Specific functions:
  - Detail
  - Aggregation
  - Profiles
  - Reconstructed Order Books
  - Account Position and Volume Alerts
Key Regulatory Transactional Data Systems

Smart System

- Highly enriched dataset of cleared trades (T+1 and history) across all venues with a full suite of analytical applications including:
  - Participant and Market Profiles
  - Pattern Detection
  - Volumetric Analysis
  - Trader Anomalies
  - Graphic Capabilities

Armada System

- Publicly Disseminated Market Data - Live & History
- Multispeed Market Replay Functionality
Types of Surveillance & Investigations

- Disruptive Risk Management Deficiencies
  (e.g. Risk Controls, Testing, Supervision)

- Disruptive Trading or Messaging Practices
  (e.g. Spoofing, Pre-Open Abuses, Manipulation)

- Trade Practice Abuses
  (e.g. Wash Trades, Prearrangement, Money Pass, Frontrunning)

- Anomalies & Complaints
  (e.g. Participant Referrals, Stop Logic Events, Error Trades)
Robust risk management and volatility mitigation frameworks are critical to market integrity and market participant confidence. CME Group has designed strong risk and volatility mitigation controls at the exchange level which complement firm-level controls.
## Risk & Volatility Mitigation Controls

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
<th>Non-Reviewable Range</th>
<th>%</th>
<th>Price Banding</th>
<th>%</th>
<th>Stop-Logic Trigger</th>
<th>%</th>
<th>Protection Points</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Mini S&amp;P</td>
<td>1390.00</td>
<td>6.00</td>
<td>0.4%</td>
<td>12.00</td>
<td>0.9%</td>
<td>6.00</td>
<td>0.4%</td>
<td>3.00</td>
<td>0.2%</td>
</tr>
<tr>
<td>Corn</td>
<td>6.7300</td>
<td>0.1000</td>
<td>1.5%</td>
<td>0.0975</td>
<td>1.4%</td>
<td>0.1000</td>
<td>1.5%</td>
<td>0.0500</td>
<td>0.7%</td>
</tr>
<tr>
<td>10-Year Notes</td>
<td>128-19</td>
<td>0-30</td>
<td>0.7%</td>
<td>0-20</td>
<td>0.5%</td>
<td>0-30</td>
<td>0.7%</td>
<td>0-15</td>
<td>0.4%</td>
</tr>
<tr>
<td>Euro FX</td>
<td>1.3200</td>
<td>0.0040</td>
<td>0.3%</td>
<td>0.0060</td>
<td>0.5%</td>
<td>0.0040</td>
<td>0.3%</td>
<td>0.0020</td>
<td>0.2%</td>
</tr>
<tr>
<td>Gold</td>
<td>1655.0</td>
<td>10.0</td>
<td>0.6%</td>
<td>12.0</td>
<td>0.7%</td>
<td>10.0</td>
<td>0.6%</td>
<td>5.0</td>
<td>0.3%</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>108.00</td>
<td>1.00</td>
<td>0.9%</td>
<td>0.75</td>
<td>0.7%</td>
<td>1.00</td>
<td>0.9%</td>
<td>0.50</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

E-mini S&P, Corn and Crude Oil also have price limits and/or circuit breakers.
Required automated pre-trade risk controls at the trading firm level without introducing additional order processing latency

Clearing Firm Risk Administrator has ability to select real-time actions if the risk limits are hit, including: e-mail notification, blocking of non-risk reducing orders, cancellation of working orders, kill button, early warning options

Provides protection against high level risks arising from adverse execution activity and is intended to complement risk management tools used by trading firms and clearing firms
New Risk Management Interface (RMI)

- To be introduced April 1, 2012
- New risk management tool consisting of a web services API and a GUI that allows clearing firms to automatically block/unblock order entry at the following levels:
  - execution firm
  - account
  - futures/options
  - side of market
  - product
  - exchange

- Allows firms to build into cross exchange risk systems
Futures trading is not suitable for all investors, and involves the risk of loss. Futures are a leveraged investment, and because only a percentage of a contract’s value is required to trade, it is possible to lose more than the amount of money deposited for a futures position. Therefore, traders should only use funds that they can afford to lose without affecting their lifestyles. And only a portion of those funds should be devoted to any one trade because they cannot expect to profit on every trade.

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