JOINT CFTC-SEC
ADVISORY COMMITTEE
ON
EMERGING REGULATORY ISSUES

MAY 24, 2010
STATION PLACE AUDITORIUM
Agenda

1. May 6th General Market Context

2. Preliminary Findings
   a) Securities
   b) Futures

3. Initial Q&A

4. Next Steps and Analysis
   a) Securities
   b) Futures
   c) Joint

5. Closing Q&A
General Market Context

• Economic News
  – Uncertainties in Europe
  – Higher CDS spreads
  – Broad decline in U.S. equity market prior to 2 p.m.
  – Higher volatility index

• Market News
  – 10-year Treasury yield fell
  – Price of gold rose from the open to the 1:30 p.m. close
  – After 1:00 p.m., the Euro declined further against U.S. Dollar and the Japanese Yen
Figures 2 & 3: CBOE SPX Volatility Index Daily and Intraday Levels
Figure 4: Ten-Year U.S. Treasury Note Yield
Figure 6: U.S. Dollar/Euro and Japanese Yen/Euro Exchange Rates on May 6, 2010
Afternoon of May 6

- 2:00 p.m. to 2:30 p.m. increase in liquidity replenishment points
- Existing market decline accelerated and implied volatility sharply increased
- Declarations of self help
- Dislocation of liquidity in E-mini S&P 500 futures contract
- Rebound begins with CME Stop Logic functionality
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Preliminary Findings* - Securities

A. Market Impact

B. Examples of Select Securities

C. Broken Trades

D. Exchange-Traded Funds

E. Liquidity Issues

* Based on initial data and subject to change
The Securities Markets on May 6th 2010
# Summary of Major Index Moves

Lows from Previous May 5\textsuperscript{th} Close (4:00pm)

<table>
<thead>
<tr>
<th></th>
<th>S&amp;P 500 Index</th>
<th>S&amp;P 500 ETF</th>
<th>DJIA Index</th>
<th>E-Mini Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00</td>
<td>-1.78%</td>
<td>-1.81%</td>
<td>-1.51%</td>
<td>-1.78%</td>
</tr>
<tr>
<td>2:40</td>
<td>-4.35%</td>
<td>-4.45%</td>
<td>-3.91%</td>
<td>-4.43%</td>
</tr>
<tr>
<td>2:45-2:47</td>
<td>-8.58%</td>
<td>-10.12%</td>
<td>-9.16%</td>
<td>-9.18%</td>
</tr>
<tr>
<td>3:00</td>
<td>-4.90%</td>
<td>-5.05%</td>
<td>-5.00%</td>
<td>-5.12%</td>
</tr>
<tr>
<td>4:00</td>
<td>-3.30%</td>
<td>-3.37%</td>
<td>-3.26%</td>
<td>-3.48%</td>
</tr>
</tbody>
</table>
May 6th Lows for Individual Securities

Low Return from May 5th Close (%)

-100% -90% -80% -70% -60% -50% -40% -30% -20% -10% 0% 14:00 14:10 14:20 14:30 14:40 14:50 15:00

S&P 500
Stock A
Stock B
14:44:56
14:56:27
14:44:56
14:56:27
## Distribution of Lows from 2:40 – 3:00 pm

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Total # trades</th>
<th>Total volume</th>
<th>Total volume ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All trades</td>
<td>7,135,104</td>
<td>1,995,000,637</td>
<td>56,651,582,692</td>
</tr>
<tr>
<td>Losses</td>
<td>5,013,724</td>
<td>1,358,709,226</td>
<td>38,047,617,508</td>
</tr>
<tr>
<td>0% to -10%</td>
<td>4,912,125</td>
<td>1,324,448,213</td>
<td>37,383,122,363</td>
</tr>
<tr>
<td>-10% to -20%</td>
<td>63,890</td>
<td>22,171,745</td>
<td>522,444,343</td>
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<tr>
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<tr>
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<tr>
<td>-50% to -60%</td>
<td>1,682</td>
<td>472,624</td>
<td>8,334,944</td>
</tr>
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<td>370,920</td>
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<tr>
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<td>237,259</td>
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</tr>
<tr>
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<td>11,510</td>
<td>3,553,885</td>
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</tr>
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May 6th Highs for Individual Securities

High Return from May 5th Close (%)

Sample ETF

Others at $100,000
Preliminary Findings* - Securities

A. Market Impact
B. Examples of Select Securities
C. Broken Trades
D. Exchange-Traded Funds
E. Liquidity Issues

* Based on initial data and subject to change
Stock A: 90 Seconds of Trading

Bids

Offers

Volume (Thousands)
Stock B: A 10-Second Bounce
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</tbody>
</table>

**Broken Trades**
Low-Priced Broken Trades over Time

43% of Broken Loss Trades were < $0.05
Broken Trades and Short Sales

43% of Broken Loss Trades were < $0.05

70-90 % of Broken Trades < $0.05 are Shorts
## Securities with Broken Trades

<table>
<thead>
<tr>
<th></th>
<th>Market</th>
<th></th>
<th>Broken</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>%</td>
<td>Total</td>
<td>%</td>
</tr>
<tr>
<td>All Exchange-Traded Securities</td>
<td>7,878</td>
<td>100.0%</td>
<td>326</td>
<td>100.0%</td>
</tr>
<tr>
<td>• Primary Listing on NYSE</td>
<td>3,277</td>
<td>41.6%</td>
<td>56</td>
<td>17.2%</td>
</tr>
<tr>
<td>• Primary Listing on NASDAQ</td>
<td>2,946</td>
<td>37.4%</td>
<td>42</td>
<td>12.9%</td>
</tr>
<tr>
<td>• Primary Listing on ARCA</td>
<td>1,088</td>
<td>13.8%</td>
<td>225</td>
<td>69.0%</td>
</tr>
<tr>
<td>• Primary Listing on Amex</td>
<td>567</td>
<td>7.2%</td>
<td>3</td>
<td>0.9%</td>
</tr>
<tr>
<td>• Component of DJIA</td>
<td>30</td>
<td>0.4%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>• Component of S&amp;P 500</td>
<td>500</td>
<td>6.3%</td>
<td>12</td>
<td>3.7%</td>
</tr>
<tr>
<td>• Component of Russell 2000</td>
<td>2,000</td>
<td>25.4%</td>
<td>30</td>
<td>9.2%</td>
</tr>
<tr>
<td>• Exchange-Traded Fund</td>
<td>838</td>
<td>10.6%</td>
<td>227</td>
<td>69.6%</td>
</tr>
</tbody>
</table>

Almost 70% of Affected Securities are ETFs

326 Securities Affected
Preliminary Findings* - Securities

A. Market Impact
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May 6th Lows for Exchange-Traded Funds

27% of ETFs had Broken Trades, most at stub quotes
Asset Classes of ETFs with Broken Trades

Low proportion of bond ETFs were affected
Sample Exchange Traded Fund

S&P 500
Low

Low Price = $0.15
Preliminary Findings* - Securities

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Liquidity and Order Routing

1. NYSE Liquidity Replenishment Points (LRPs)

2. Self-Help Declarations against Arca
   - Nasdaq: 2:37
   - Nasdaq OMXBX: 2:39
   - BATS: 2:49
   - NSX: 2:51
NYSE Liquidity Replenishment Points (LRP)

May 6th vs. 2010 Average

Peak on May 6th
May 6th Volume from 2:00 – 3:00

Volume Spikes During Market Decline

S&P 500 Low
Top 10 Liquidity Providers

% Volume Provided/Taken

% Volume Provided/Taken Stays ~Constant
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Analysis of E-mini S&P 500 Futures on May 6

- Liquidity Dislocation
- Market Volume and Price Movement
- Role of Liquidity
- Balance of Trading
Liquidity Dislocation

- An imbalance of orders on the sell side resulted in prices falling.
- The depth of the order book declined, as prices fell.
- The price decline induced buyers to enter the market, coinciding with the CME Globex Stop Logic event.
E-mini S&P 500 Futures Volume and Price Movement

• Higher than Normal Volume
  – 2.6 times average volume
  – 5th highest daily volume in 5 years
  – Spike in volume between 2:40 and 2:49 p.m.

• High Price Volatility
  – Daily price range of 112.75 points
  – 2nd highest range in 5 years
  – 59.75 point range between 2:40 and 2:49 p.m.
Figure 29: CME E-mini S&P 500 Futures Trade Price and Volume
Role of Liquidity

• Liquidity reflects ease of buying/selling without exerting a significant price impact
• Liquidity cannot be directly observed
• Three indicators of liquidity
  – High volume may indicate more liquidity
  – Narrow bid-offer spreads may indicate more liquidity
  – Greater order book depth may indicate more liquidity
Role of Liquidity

• High and Erratic Volume
  – 10 times average volume between 2:30 and 3:00 p.m.
  – Possible execution deep into the order book

• Widening of Bid-Offer Spreads
  – Minimum bid-offer spreads prior to Stop Logic event
  – Widening and variable spreads just prior to and following Stop Logic event

• Imbalance and Decrease in Market Depth
  – Less market depth on buy side
  – Overall decrease in market depth after 2:45 p.m.
  – Return to relative balance in orders after 2:45 p.m.
Figure 30: Price and Trading Volume in the June 2010 E-mini S&P 500 Futures Contract
Figure 31: Bid/Offer Spread (in Ticks) and Price in the June 2010 E-mini S&P 500 Futures Contract
Figure 32: Bid/Offer Quantities: 5th Best in the June 2010 E-mini S&P 500 Futures Contract
CME Globex Stop Logic Functionality

- Designed to stop a cascade of stop loss orders.
  - A cascade is one stop loss order triggering another.
  - Market pauses to prevent a cascade greater than 6 points
  - Triggered at 2:45:28 p.m.
- Reserve State Pauses Execution
  - Five second hold
- Reserve State Exit
  - Release if execution within 6 points, otherwise hold for additional 5 seconds
  - Trading resumed at 2:45:33 p.m.
Large Trader Analysis
Buyer and Seller Transaction Volume

• Volume of 10 largest net sellers exceeds volume of 10 largest net buyers:
  – 51,526 net buys vs. 72,186 net sells during 2:30-2:45 p.m.
  – 49,180 net buys vs. 67,544 net sells during 2:46-3:00 p.m.

• Largest Net Seller
  – Only entered orders to sell
  – 9% of volume
  – Position executed between 2:32 p.m. and 2:51 p.m.
Large Trader Analysis
Liquidity Provision

• Liquidity Providers (Active but Flat Positions)
  – 2:30 to 3:00 p.m. review period
  – Methodology to select providers of liquidity
  – Six trading accounts
  – 50% of early trading activity
  – Decline of activity during volatile period

• Liquidity Takers (All Others: 4,573 accounts)
Figure 33: Cumulative Volume of Transaction Sides of Liquidity Providers and Liquidity Takers in the June 2010 E-mini S&P 500 Futures Contract
Summary of Findings—CFTC

- Broad-based desire for investors to reduce exposure to risky assets
- Liquidity Dislocation
  - Rise in volume during price decline
  - Imbalance of sell and buy orders
  - Reduction in depth of order book
- Triggering of Stop Logic functionality
- Return to balanced order book and tight bid-offer spread
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A Framework for Next Steps and Analyses

External **shock, signal, or change in perception**

- Market Makers
- Institutional Investors
- Retail Investors
- Algorithmic Traders

Cross-Market Linkages

Market 1 → Market 2 → Market 3

Inter-Market Feedback

Creates New Signals
Topics for Further Research

1. Where did the downward price pressure originate?
   a) Price discovery, arbitrage and linkages between markets
   b) Short sales and directional algorithms
   c) Hedging existing holdings
   d) Liquidating positions

2. What happened to liquidity?
   a) Withdrawal of market makers, internalizers, high-frequency algorithms
   b) “Trapped” liquidity: Declaration of Self-Help, LRP
Topics for Further Research

3. What role did order types play?
   a) Market Orders, Stop Loss Orders, ISOs
   b) Stub Quotes

4. What explains the experience of ETFs?

5. Were there other contributing factors?
Data Context

Orders To Sell

Exchange

Exchange

Internalizer

Broker

Broker

Offer Books

National Best Offer

National Best Bid

Bid Books

Trades

Asset Mgr

Hedge Fund

Retail Client
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Further Analysis—CFTC

• Review of special call on large traders and OTC swap dealers
• Review of trade-register data
• Review of electronic trading
  – High Frequency trading
  – Algorithmic trading
  – Pre-trade automated safety features
Further Analysis—Joint

• Study the linkages between correlated assets in equities (single stocks, mutual funds and ETFs), options and futures markets

• Focus on cross-market linkages in stock index products
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