Compliance and Risk Management in 21st Century

Erozan Kurtas

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Convergence of disciplines: Rise of the Algorithms

Computing Power

- Internet
- Broadband
- Smart Routers
- High speed Networks

Algorithmic/Computerized Trading

Computational Power

- ECN/ATS
- DMA
- Electronic Market Making
- Dark Pools
- Tick Sizes
- Co-Location

Storage Capacity

- Computer Science
- Statistics
- Data Mining
- Artificial Intelligence
- Econometrics
- Financial Engineering
- Behavioral Economics

GLOBALIZATION

- Connectivity of the markets
- 24/7 News
- Global social networks
Algorithms come in many fashion

- Execution Tactics
  - VWAP, TWAP
  - HFT
  - UHFT
  - Latency Arbitrage
- Statistical Arbitrage
- Market Making
  - Fees/Rebates
  - Maker/Taker

- Fundamental
- Technical
- Event Based
- News Aggregators
- Alpha Capture
- Analyst surveys
- Time series Analysis
- Neural Networks
- Adaptive/Learning Systems
- Pattern Recognition
Alpha Capture Systems

• Started with Marshall Wace in 2001 in UK
• Web based systems to capture trading ideas coming from contributors: sales desks, analysts
• More than buy or sell ideas
• Becoming more and more common place
Trade Idea Flow: Old Model

SELL SIDE
- IDEAS
  - Decentralized
  - Minimal Computational Power
  - Minimal use of Historical Data
  - No Statistical Analysis

BUY SIDE
Alpha Capture Systems: New Model

Computation Power
Real Time
Historical Data
Centralized
Sophisticated Statistics
A Few of The Risk Factors for Alpha Capture

• Material non-public information

• Compliance requirements both at the contributing and receiving firms

• Compensation Structure

• Difficulty in establishing cause-effect relationship between contributor ideas and executed trades

• Regulation arbitrage: lack of strong controls in overseas markets
## High Frequency Trading

<table>
<thead>
<tr>
<th>Type</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra High Frequency</td>
<td>1 millisecond to 1 second</td>
</tr>
<tr>
<td>High Frequency</td>
<td>1 second to minutes</td>
</tr>
<tr>
<td>“Slow”</td>
<td>Minutes to hours</td>
</tr>
</tbody>
</table>

### Research By Tabb Group

<table>
<thead>
<tr>
<th>Region</th>
<th>Year 2005</th>
<th>Year 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>21%</td>
<td>56%</td>
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<tr>
<td>Europe</td>
<td>9%</td>
<td>25-35%</td>
</tr>
<tr>
<td>Asia</td>
<td></td>
<td>10-30%</td>
</tr>
</tbody>
</table>
High Frequency Trading: Good or Bad?

**STRATEGIES**
- Liquidity Providing
- Trading the Tape
- Statistical Trading
- Market Making
- Momentum Trading
- Technical Trading
- **OTHER:**

**SUPPORTERS**
- Increases Liquidity
- Makes markets more efficient
- Decreases Volatility
- Natural evolution of markets
- Cancellations are natural
- Does not need more regulation

**OPPONENTS**
- Liquidity Fleeting: not real, not there when needed
- Distorts the markets: self similarity, correlation
- Increases Volatility
- Privileged access to markets, data
- Huge number of cancellations to manipulate markets
- Significant Number of ODD LOT trading
- Needs more regulation

**ACADEMIC RESEARCH**
- J. Brogaard, July 2010: HFT and its impact on market quality.
- J. Hasbrouck and G. Saar, Oct 2010: Low-Latency Trading
- R. Smith, June 2010: Is HFT inducing changes in market microstructure and dynamics?
- R. Cont, September 2011: Statistical Modeling of High-Frequency Financial Data
- M. O’Hara, July 2011: What’s Not There: The Odd-Lot Bias in TAQ Data

JURY IS OUT ON HFT
HFT IMPACT IS REAL
RESEARCH INCONCLUSIVE SO FAR

1/27/2012
Erozan Kurtas
Out On The Field

What We Hear: Nice and Orderly

Data Sources

Data Normalization

Forecasting Models

Risk Models

Portfolio Generator

Order Management and Execution Tactics

Exchanges

1/27/2012

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REALITY IS DIFFERENT: What We See

Land of many languages: Lost in Translation

Micro second latency

Alpha $$$

Risk Metrics, VaR, Stress Tests, Cross Business Impact

C++, Python, Java, Matlab, FPGA

Optimization, Information Ratio, Covariance Matrix

Dodd-Frank

Cross Trades, wash trades, churning, layering ...
Interaction of Algorithms
Compliance and Risk Management Challenges

• Proper documentation of models, systems and processes

• Proper testing of the models and systems:
  – Can they start or accelerate market events?
  – How do they behave individually and in aggregate under stress environments?
  – How do the changes in models tracked?

• Most compliance personnel do not have the background to understand, monitor or test the models

• Models and Systems evolve faster than Risk or Compliance processes

• In my opinion, traditional compliance need to become Quantitative Compliance: Financial Engineering requires Compliance Engineering.
A Robust Risk and Compliance Process