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The Case for Algo Trading Derivatives

Oct 29, 2009

CADC

Agenda

- Challenges
- Opportunities
- Volatility: Friend or Foe
- Bottlenecks
- Paper on Option Algos

Challenges

Lack of a Benchmark

Options

- GWAP (Convexity Benchmark Calculated Price)
  - *Journal of Trading* 2008 Vol. 3, No 1
  - “TCA & Liquidity Discovery w/ Equity Options,” Scott Larison, 3-D Markets

Futures

- Previous Settlement Price
- VWAP suggested / no basis

Challenges

- Liquidity
- Information Leakage
  - Name
  - Size
  - Price
- Gaming
- Transparency

Challenges

- One size fits all approaches (vary parameters; vary algos)
- Predictability: T-Slice or TWAP (Be Unpredictable)
- Replacing “static” with dynamic parameters in some broker algos, e.g., static delta for ATM near-expiration options.
- Routing multi-legs to multiple exchanges (in the States)
- Regulations (restrictions on trading/hedging)
- Internalization (Opportunity for some; challenge for others)

Challenges

- Technology (Build vs. Buy)
  - Data
  - Latency
  - APIs
- Market Structure
  - Pennies (Opportunity for Prop Desks)
- Extreme Volatility (Opportunity for some)

Opportunities

- Choose among asset classes: Trade cheapest or richest
- Auto Hedging
- “Risk Arbitrage” using options
- Multi-Leg trade on one or multiple exchanges
- One platform for equities, warrants, options, convertible bonds, futures, and FX
- Brokers rehash equity algos as options algos (TWAP)

Opportunities

Option algos

- Volatility pegged trades w/ Options pricing models built-in, i-rates, borrow rates, and div projections
  - 20 vol. bid at 40 vol. offer
- Delta-adjusted limits (poor man's vol.) with static (constant delta - 0 gamma over a small range) or dynamic delta
- Multi-legged trades done algorithmically
  - Spreads, Butterflies, Condors
  - Dispersion Execution

Opportunities

Option algos (cont'd.)

- Short Vol: Auto Delta Hedging w/ User Defined Hedge Instrument
- Long Vol: Gamma Hedge (Buy Low, Sell High)
- Staged Sweeper – Liquidity Cleaner sweeps exchanges multiple times – allows exclusions
  - Mkt is .15 - .25, bid .20 -- but don't show anything!

Opportunities

Futures Algos

- Synthetic Order Types
    - Iceberg
    - Enhanced Stops
    - Cross market spreads
- Contingent Orders
- Multi-legged trades done algorithmically
- Auto-hedging of portfolios

Volatility: Friend or Foe

FLEXTRADE
Trade your best.

Long Vol. & Vol. Expands

- Trade underlying -- Buy Low - Sell High
- Challenge if market is halted
- Love everyone & close some positions by shorting vol. and recording PROFIT

Short Vol. & Vol. Expands

- F****d. Close positions and book loss
- Short into expanding vol. & pray (Double up! BTDT)
- Look for long vol. trades and execute

Bottlenecks to Peak Algo Trading

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- Lack of Broker-Neutral Multi-Asset Execution Management System
- Lack of good algos
- Lack of execution venues
- Lack of expertise

Paper on Options Algos

A Guide to Multi-Asset Trading Strategies
Fall 2008

Options Algorithms and Algorithmic Trading of Options

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The incredible growth in volume of exchange-listed options trading and the rush by brokers to help the buy side execute even more options trades has resulted in a flourishing cottage industry of options algorithmic trading. Initiated by nimble, state-of-the-art independent software vendors (such as FlexTrade Systems, Inc.) and followed by brokers seeking an advantage, there is plenty of hype and smoke on the algorithmic horizon. To blow away the smoke let us examine this field in some depth, first by taking a brief, clinical look at trading algorithms, and then by differentiating between options algorithms and the algorithmic trading of options.

A QUICK OVERVIEW OF TERMS

A trading algorithm has several attributes, including but not limited to time, price, and quantity. Sometimes time and quantity are combined, creating a scheduler. An equity Volume Weighted Average Price (VWAP) algorithm makes use of the stock's Volume Profile and the desired Target Shares to derive a schedule. Aggressiveness levels influence the pricer (and may also influence the scheduler).

Algorithmic trading of options refers to slicing and dicing, tick setting, scheduling, and liquidity seeking of orders (which are orders in instruments that *happen to be options*). Time Slicing or TWAP-ing an option order is one example. Market microstructure differences between different instruments (such as stocks and options) can have a profound effect on the effectiveness of the algorithm.

Options algorithms, on the other hand, are algorithms that are unique to options and hinge on their derivative nature. Examples of options algorithms include volatility pegged orders, delta-adjusted limit orders, and volatility dispersion trades.

ALGORITHMIC TRADING OF OPTIONS

Some brokers relabeled equity algorithms as options algorithms, sometimes accounting for microstructure differences, but often not. Does it make sense to VWAP an option order? What VWAP profile do you use for an option trading 10 contracts a day (not even a 1 lot in a 15-minute period)? How do you adjust for the decrease in volume after a shift in an At-The-Money (ATM) contract becoming deep In-The-Money (ITM) or Out-The-Money (OTM) after a large move in the underlying? So with the possible exception of some heavily traded options, such as ATM QQQQs, it does not make sense to VWAP an option order.

Examples of broker algos being used in the options space are: TWAP, pathfinder, sniper, and trigger.

Other uses of algorithmic trading of options are found in Smart Routing of option

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