

ALGORITHMIC TRADING

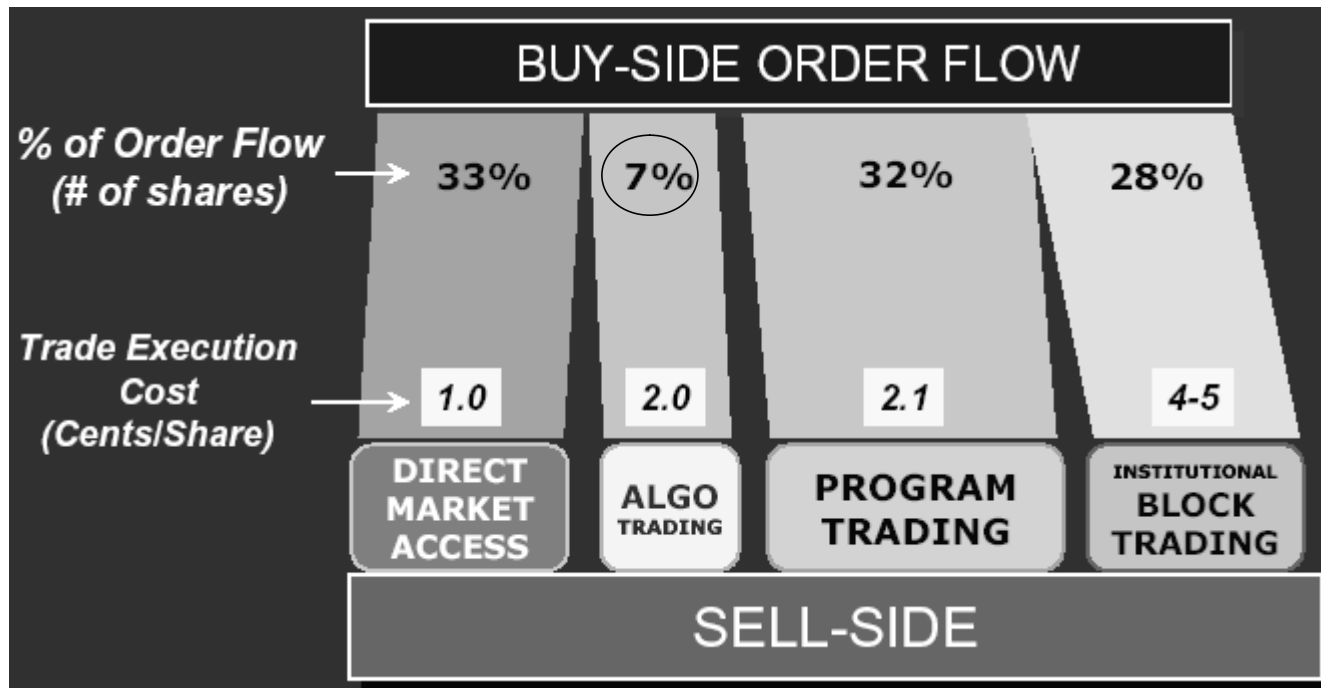
AN OVERVIEW

Algorithmic Trading – What is it?

- Electronic trade execution “piloted” by a model
- Model tries to match a specific execution cost benchmark
- Usually breaks up a larger trade into a series of smaller trades to be executed over time

Algorithmic Trading – How much is there today?

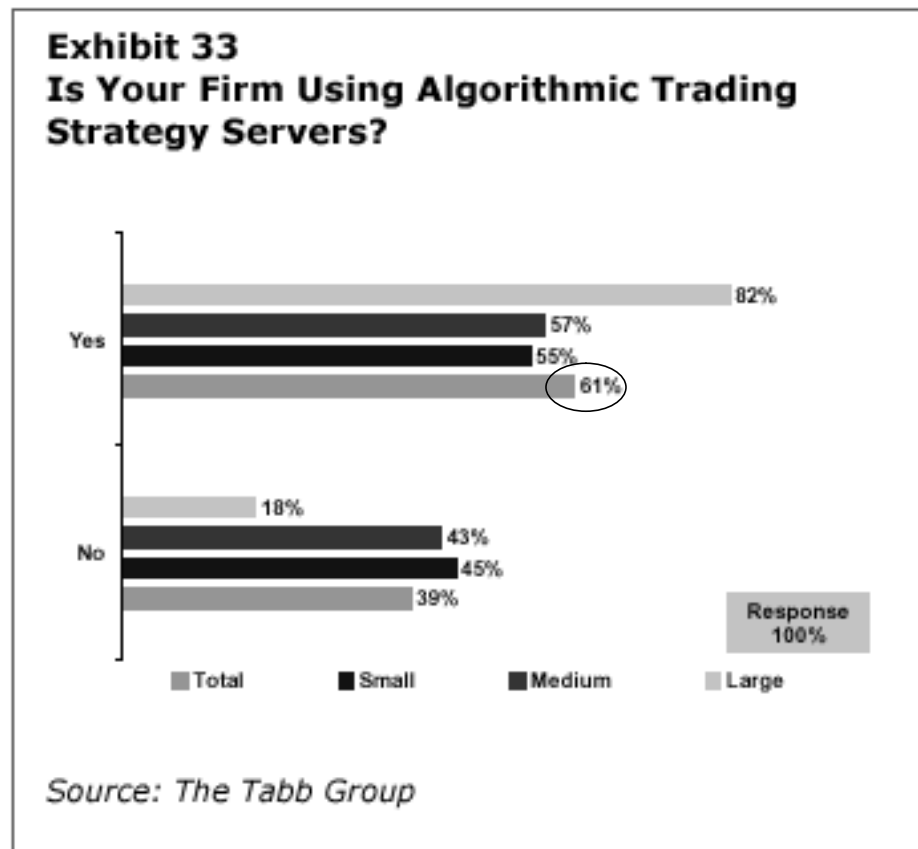
Tower Group says 7% of all Buy Side flow...



Source: "Market Structure and the Role of Exchanges, ECNs and ATs" Tower Group (2004)

Algorithmic Trading – How much is there today?

..while the Tabb Group reports that over half of all firms have access to algorithms.



Source: "Institutional Equity Trading in America: A Buy-Side Perspective" The Tabb Group (2004)

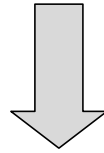
Most Popular Algorithms

The list of most popular algorithms is dominated by the key execution benchmarks: VWAP and Arrival Price

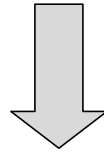
- **VWAP (27%)**
 - **Arrival Price (19%)**
 - **Imp. Shortfall (13%)**
 - **EOD / Beat Close (10%)**
 - **Guerilla (8%)**
 - **Liquidity (8%)**
 - **% ADV (6%)**
 - **Other (9%)**
- } Essentially the same algorithm (32%)

Trading Cost – How Big?

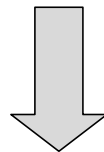
~ 20bps Implementation Shortfall for Average Trade per Side*



At 1 x Portfolio Turnover, 40bps Drag on Annual Portfolio Performance

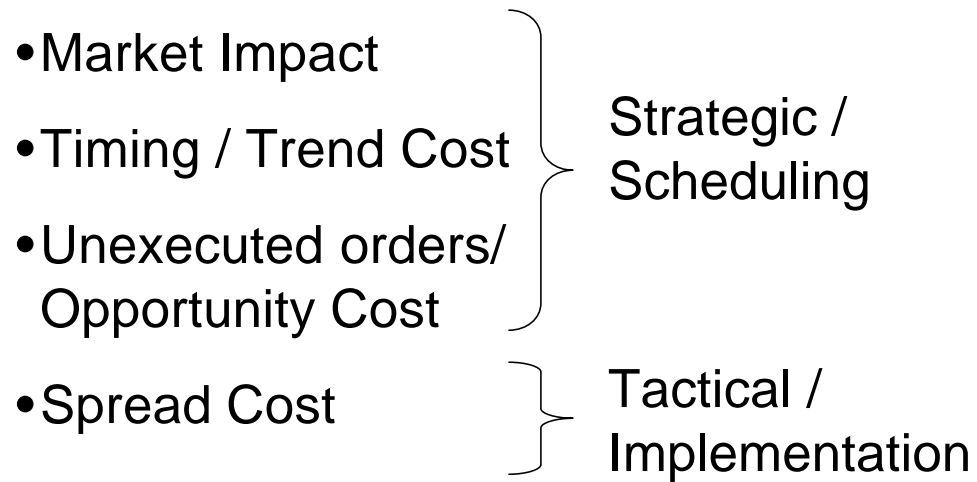


Assume 6% Annual Return



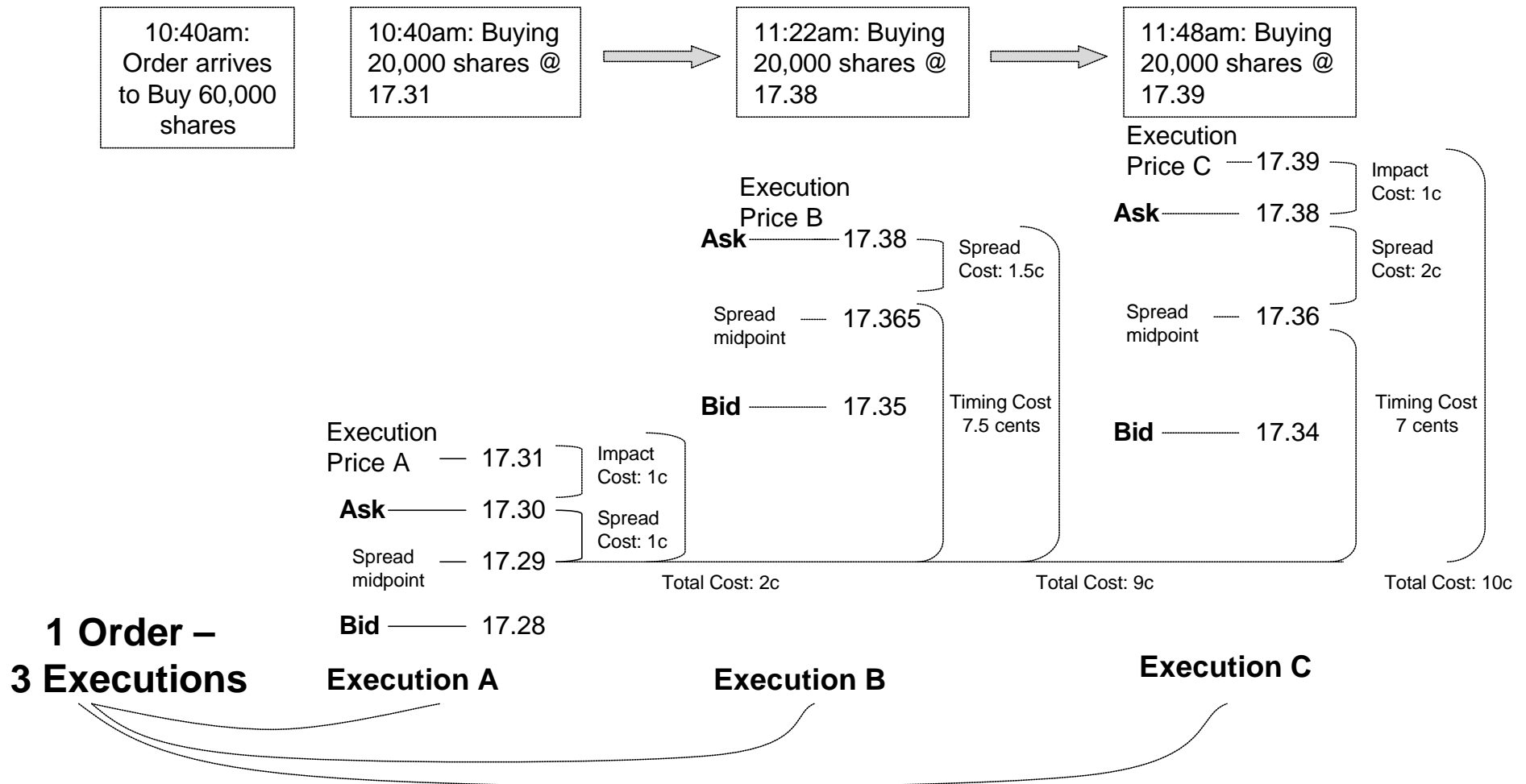
$40\text{bps} / 6\% = 6.7\%$ negative return contribution

Implicit Trading Cost Attribution



Timing Cost is Critical, but Spread Costs Matter Too!

Cost Attribution Example: Order to Buy 60,000 shares, filled via 3 Executions*



➔ Order Trading Cost is Sum Total of Executions A/B/C

Two Common Benchmarks

Volume Weighted Average Price (VWAP)

- A weighted average price
- Trading volumes are the weights
- Intuitive & easy to use for traders > commonly used in the market
- VWAP does not measure Trend/Timing Cost!

Arrival Price

- The portfolio decision price
- Difference between Arrival Price and execution price, plus forgone returns on unexecuted shares is called “Implementation Shortfall”
- There is little agreement in the market on what an “appropriate” implementation shortfall ought to be

Pros and Cons: VWAP vs Arrival Price

VWAP Advantages

- Easy-to-use
- Direction-neutral

VWAP Disadvantages

- “Becoming” VWAP
- “Waiting out” VWAP
- “Stretching out” the order
- “Saying No” to a block

Arrival Price Advantages

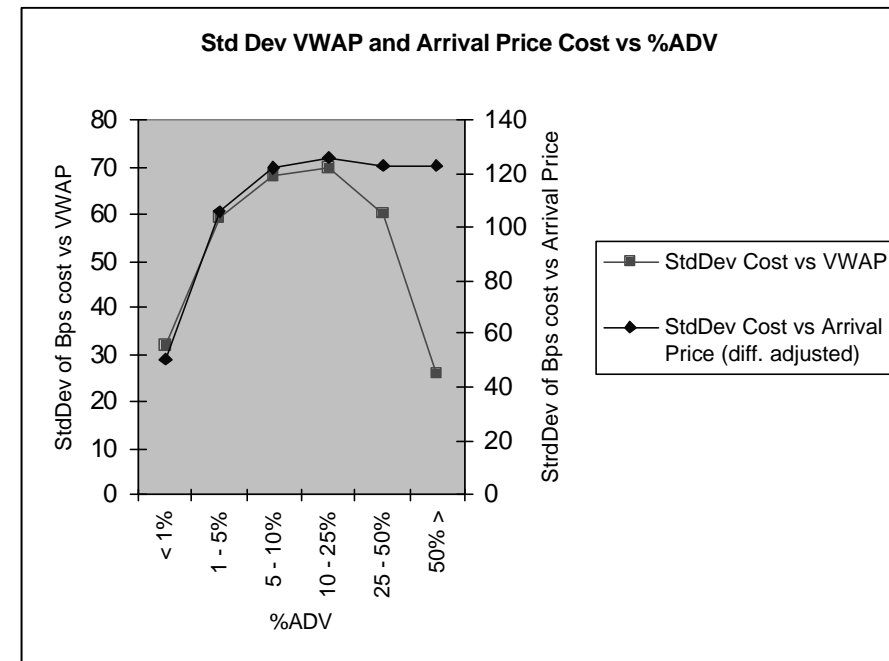
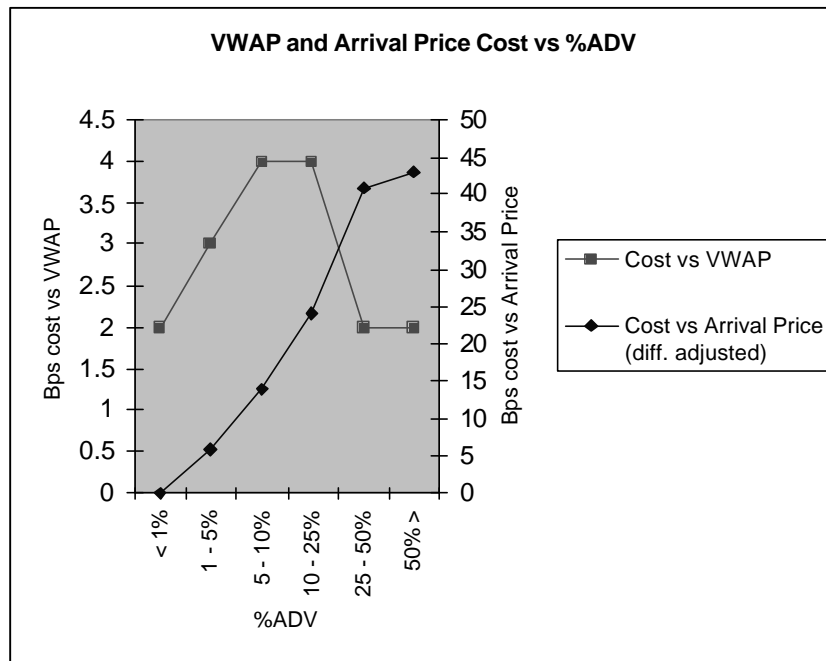
- Directly related to portfolio returns (“capturing alpha”)
- Can’t be fooled

Arrival Price Disadvantages

- Harder to implement
- Law of large numbers
- Direction-bias

“Becoming VWAP” Threat – Recent Data

ITG Study Shows Empirical Evidence of ‘Becoming VWAP’



Data Source: ITG “The Cost of Algorithmic Trading: A First Look at Comparative Performance” (March 2005)

Charts: Instinet

Instinet & Northfield

Instinet already had a robust VWAP rule

We wanted to develop an Arrival Price rule that would

- Factor in an effective measure of timing risk
- Work for portfolios & pairs, not just single stocks
- Factor in short-term stock correlations for portfolios & pairs

So we turned to someone who

- Had expertise in risk management models
- Had a proven short-term risk model



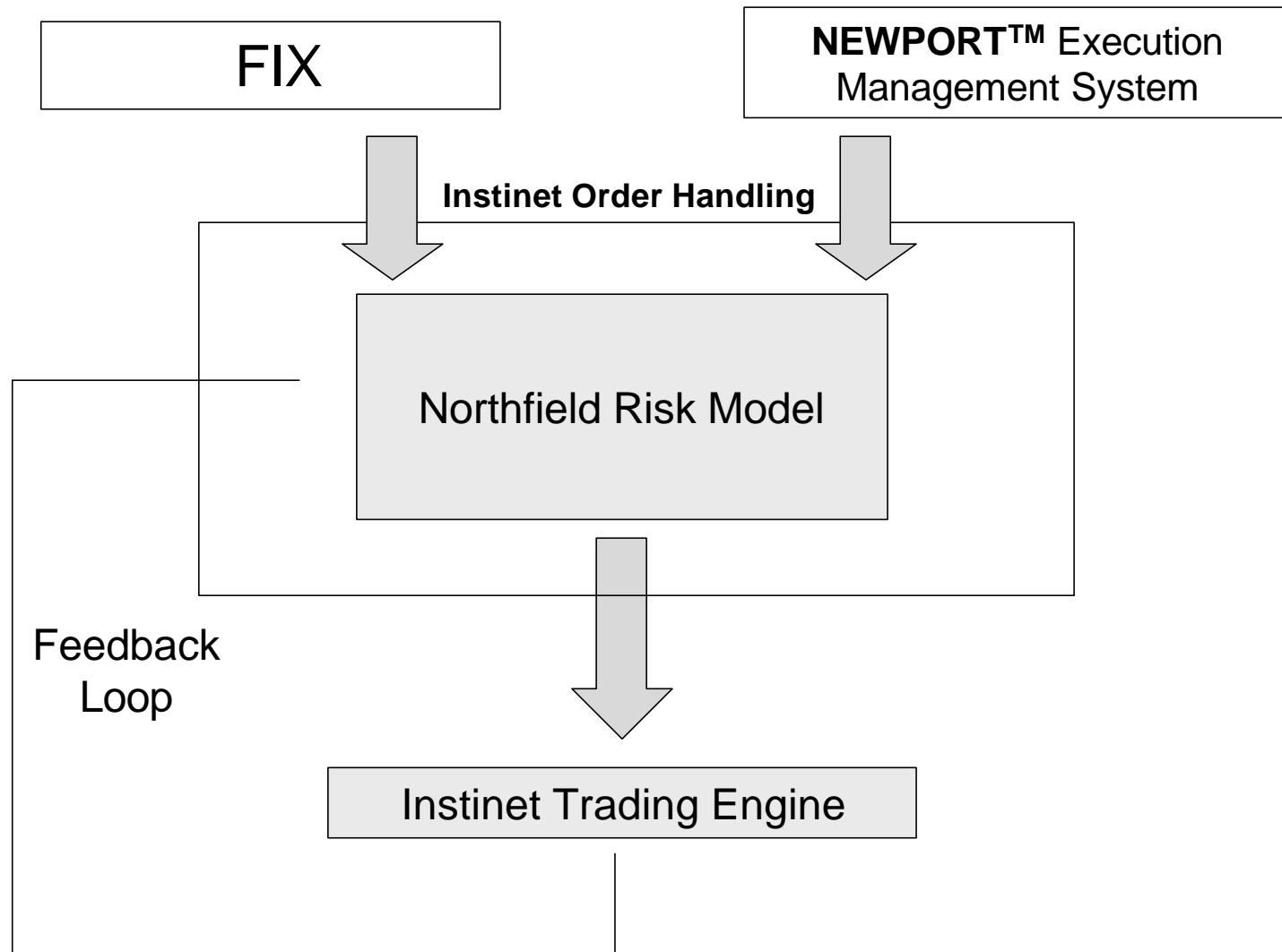
The Instinet & Northfield Partnership

Benefits & Synergies

- Be able to execute portfolios against Arrival Price
- React to real-time market data
- Optimize and re-balance real-time, during the execution process

TRADING TACTICS FOR ALGORITHMIC TRADING

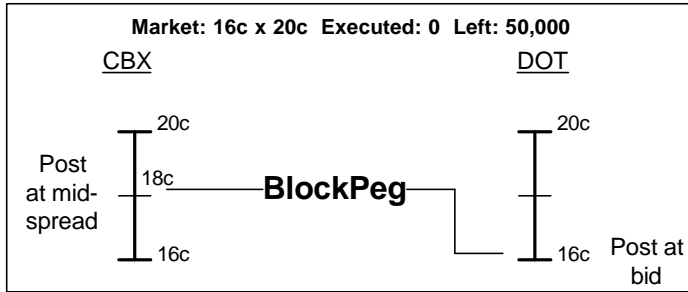
Implementation



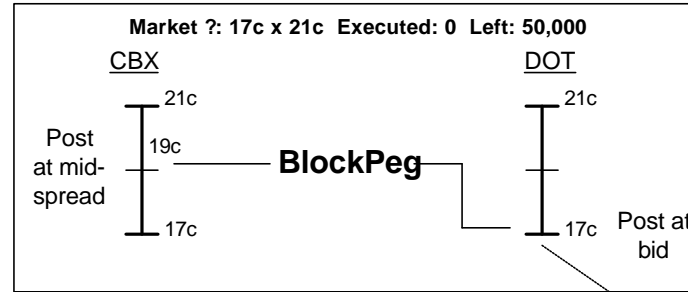
NYSE Spread-cost Minimization Tactic: BlockPegSM

Scenario: Buying 50,000 of NYSE-listed mid-cap, Limit 19c, Current Market 16c x 20c. BlockPeg Execution Style "Aggressive"

1

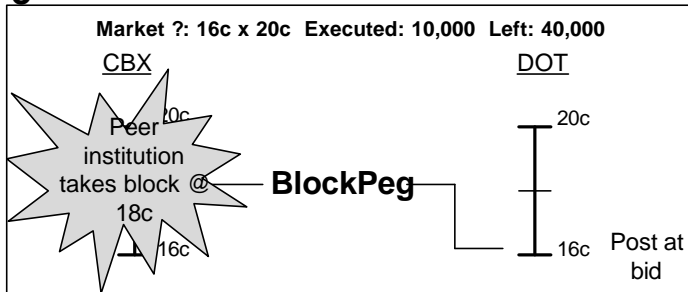


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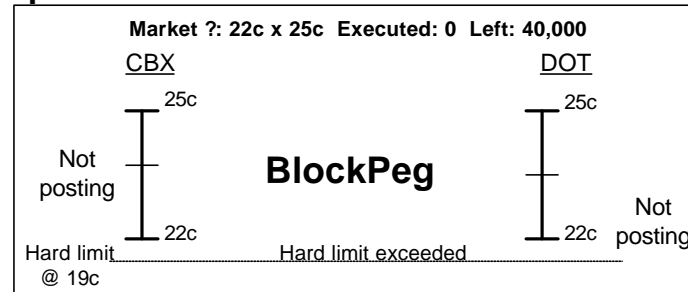


DOT slice moves with the market

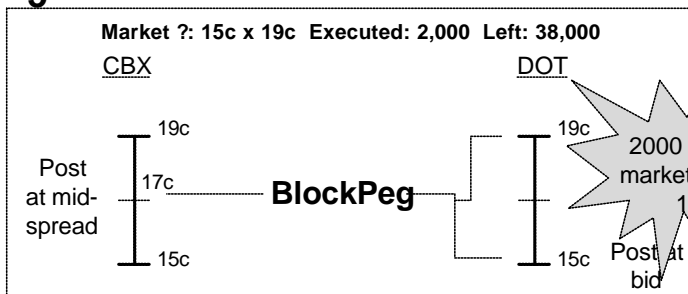
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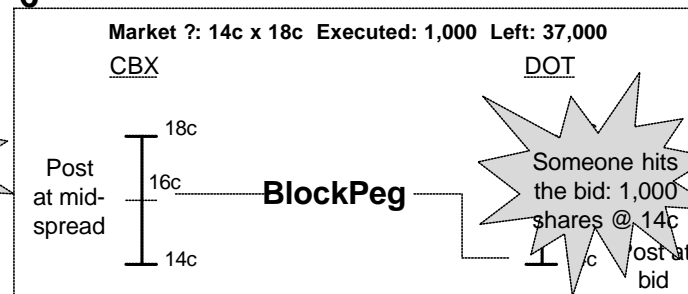
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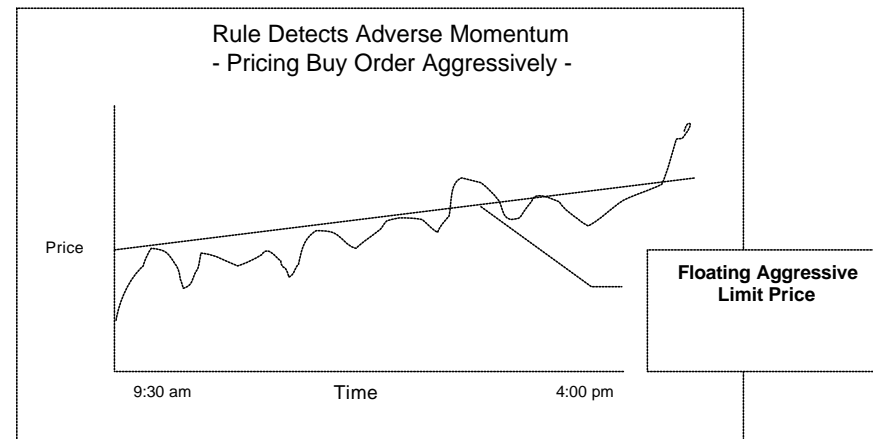
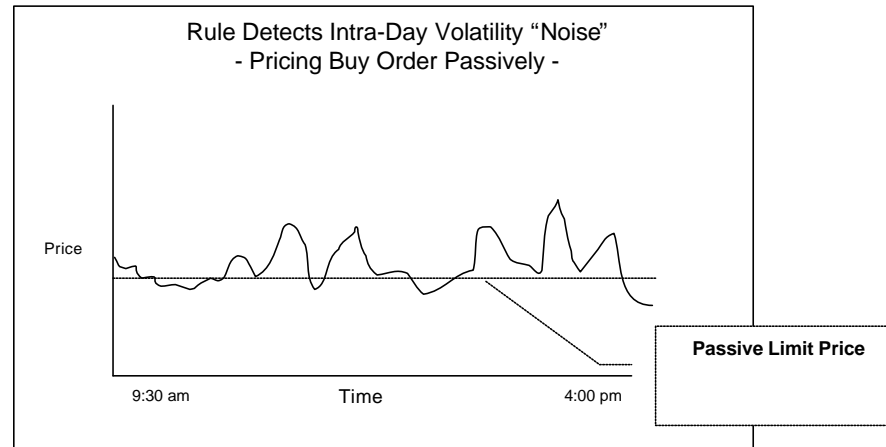
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Another Spread-Cost Minimization Tactic: Momentum detection & Mean reversion



Tracking Transaction Cost in Newport

Cost vs Arrival Price I
have realized (executed
portion of the order)

What the entire order's
realized Cost vs Arrival
would be if I executed
all residuals now

Newport Demo Desk Orders										
Analysis [Blank Template]										
Row	Side	INET	Order Qty	Benchmark	Impact bp	1. Impact cps	Opp bp	Opp cps	Cost bp	Cost cps
1	Sell	AAPL	10,000	36.426300	0	0.000	-32	-11.630	-32	-11.630

Arrival
Price

Cost vs Arrival Price
of *unexecuted*
residuals

Best Execution – What else can you do?

- Use a great model
- Use great technology
- Trade through a broker who doesn't have a dog in the fight

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