Georgia Institute of Technology

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Computational Investing, Part I

211: More complete back testing

Find out how modern electronic markets work, why stock prices change in the ways they do, and how computation can help our understanding of them. Learn to build algorithms and visualizations to inform investing practice.

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What is Back Testing?

"The process of testing a trading strategy on prior time periods.

Instead of applying a strategy for the time period forward, which could take years, a trader can run a simulation of his or her trading strategy on relevant past data in order to gauge the its effectiveness."

--Investopedia

Back testing is *simulation*

1. Roll back to an earlier point in time.
2. Present current information to the strategy. No "*peeking*" into the future.
3. Ask strategy: What would you do?
4. Accept orders, simulate their execution.
5. Track portfolio value.
6. Step forward, repeat.

Some Risks in Back Testing

- The market is different now than during your test period so the performance will not persist.

  Example: Now versus dotcom boom.

Some Risks in Back Testing

- Your test strategy was just “lucky” in the past, and is not likely to be lucky now.

  This is the “data mining fallacy.”

Some Risks in Back Testing

- Over fitting:

  The strategy is tuned to the historical data. It is optimized to noise or randomness, not an underlying principle.

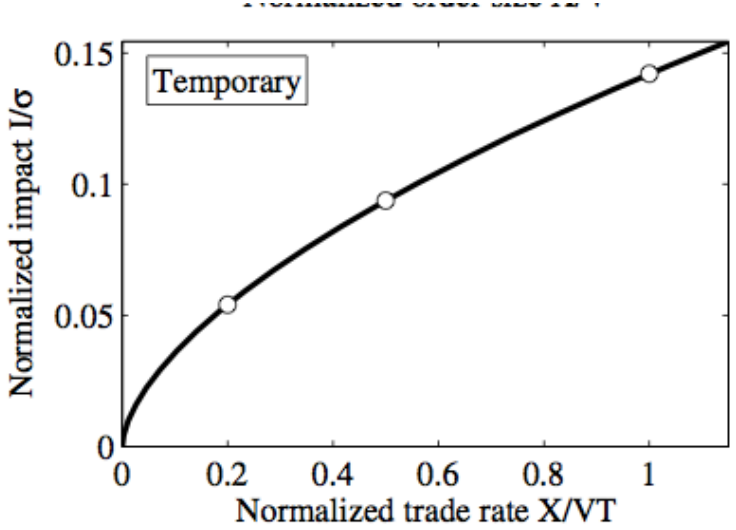
Main components of a back tester

- **Historical data:** Fed to the strategy.
- **Strategy definition:** Generates orders based on current information.
- **Market simulator:** Executes orders.
- **Analysis engine:** Assesses quantitative performance of the result.

Important features

- **Historical data:** Complete, broad, and survivor-bias free.
- **Strategy definition:** Ease of use in defining strategies to test.
- **Market simulator:** Accurate simulation of transaction costs, including commissions and market impact.
- **Analysis engine:** Complete coverage of important metrics including comparison with benchmark.

Important features: Example: Market Impact



Almgren et al 2005

Important features: Example: Analysis

Thanks Lucena