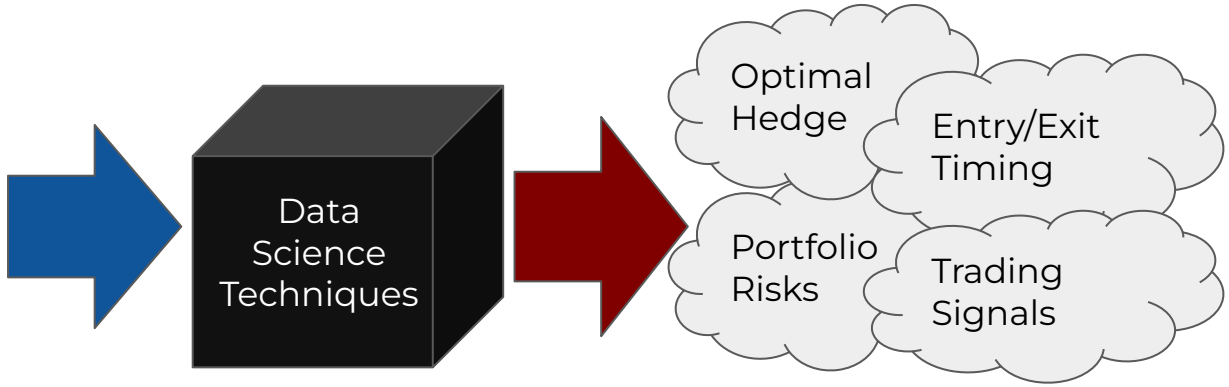
What & How of Quantitative Trading

By John Lee

What is Quantitative Finance?

- Known as “Quant” Finance.
- Leverages financial theory and statistics to make decisions
- Data science is a tooling to to extract statistical insights from the market.

Symbol	Open	High	Low	Close	Volume
BBW	18.73	18.92	18.493	18.76	137,679
CONN	9.25	9.54	9.04	9.44	88,062
CTRN	22.47	23.19	21.75	23.13	224,246
LOVE	25.29	25.825	24.94	25.72	148,265
MSTR	168.45	176.72	166.21	176.39	480,205
PETS	20.19	20.50	20.09	20.48	249,293
PLCE	41.45	41.83	39.45	39.60	394,883



A Brief History of Quantitative Trading

1960's

Trading At The Pit

- Before the 1970's, traders and market makers yelled across the trading floor to settle trades.

2000's

Trading Online From Anywhere

Later on, electronic markets opened a digital front door to new data and asset types.

2010's

Bots Trade for You

Technological advances led the path to data mining, quantitative research, automated trading, and more.

[A brief history of quantitative finance]

Why Learn Quantitative Finance?

- Build your own programs to help inform your investment capabilities
- Become your own analyst and account manager of your portfolio
- Highly transferable skill sets in other areas like trip planning and art bidding
- Learn skill sets for financial data research in your own style
- Real-world & real-time data exposure
- Engineer tools to detect market patterns that are not observable by eye

Quantitative Finance Examples

Example #1:

- Trader believes the S&P 500 Index is more likely to move in a certain direction at a particular point in the trading week. He/she then builds a statistical model to identify the probability of the index making an upward move that week, and use this information to open positions for profit.

Example #2:

- Trader believes the Technology sector is likely to become more volatile next month. He/she uses past returns and economic releases to project how a sector stock deviates from its average value over the next month.

What is Risk Management

- The two major risks to tackle are interest rate and credit spread risks
- Micro and macro-economic risks (e.g., inflation, supply chain)
- Quantification of extreme returns in a portfolio - demonstrates volatility
- Used in hedge funds to offset the portfolio's directional losses
- Reflects reality through volatility-adjusted models

Why Learn Risk Management

- We have to reserve enough capital to prepare for major losses
- Used to protect your gains under changing market conditions
- Probes beyond a company’s fundamentals (e.g., debt)
- Use data to factor in risks, especially unobservable ones
- Helps institutional or personal finance analyses

Risk Management Examples

Example #1:

- Traders to identify highly correlated pairs of assets based on their instrumental or economic relationship, then construct a strategy where one asset's directional move is opposite from that of the other asset by the same degree; this way, you will have a market neutral strategy that sums to 0 PnL.

Example #2:

- A fund manager wants to determine the probability that the stock will lose at least a certain amount in the next trading day, so that the department can set aside enough cash in the case when the loss occurs.

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