INTRODUCTION TO DERIVATIVES

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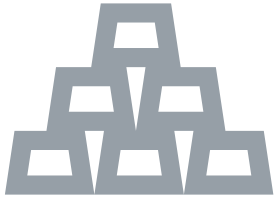
AGENDA

Derivatives 101



Systematic trading strategy

Case Study

DERIVATIVES 101

KEY FUNDAMENTAL CHANGE TO FINANCIAL MARKET IN 21ST CENTURY

WHAT IS DERIVATIVES

- Definition: A contract between two or more parties whose value is based upon an agreed underlying assets I.e. equity return, commodities, currencies, interest

- Features of derivatives:
  1. Pre-agreed payoff: Linear or non-linear
  2. Well defined underlying asset
  3. Cash flow structure: Which party (buyer or seller) is designated to pay/receive cashflow
  4. Term of maturity: Term or opened
  5. Leverage: Cash invested vs exposure gained

- Example of well common used derivatives

- Listed vs OTC derivatives

PURPOSES OF FINANCIAL DERIVATIVES

- Why do we need derivatives?

    1. Hedging from uncertainty of any particular underlying asset price i.e. airline company for oil price, export company exposure to foreign currency, mortgage loan borrowers

    2. Speculating for significant change in asset prices

    3. Circumventing regulatory I.e. equity investment in ID markets, pension/insurance funds investment constraint

    4. Minimizing cost I.e. fixed vs floating rate loan

- Why do you need financial derivatives?

DRAWBACKS OF FINANCIAL DERIVATIVES

- Due to widely common usage of financial derivatives in early 2000's, we end up having "financial derivatives" of almost every underlying asset and the concept was even applied in prior non-tradable risks (I.e. weather)
- However, financial derivatives was accused of being the primary driver of Subprime crisis in year 2008

  https://www.youtube.com/watch?v=k2VSSNECLTQ

- Will history repeat itself?

TYPE OF FINANCIAL DERIVATIVES

Type	Payoff Structure	Term to maturity	Leverage
1. Forward contracts			
2. Futures contracts			
3. Option contracts			
4. Swaps			

RISKS INVOLVED IN FINANCIAL DERIVATIVES

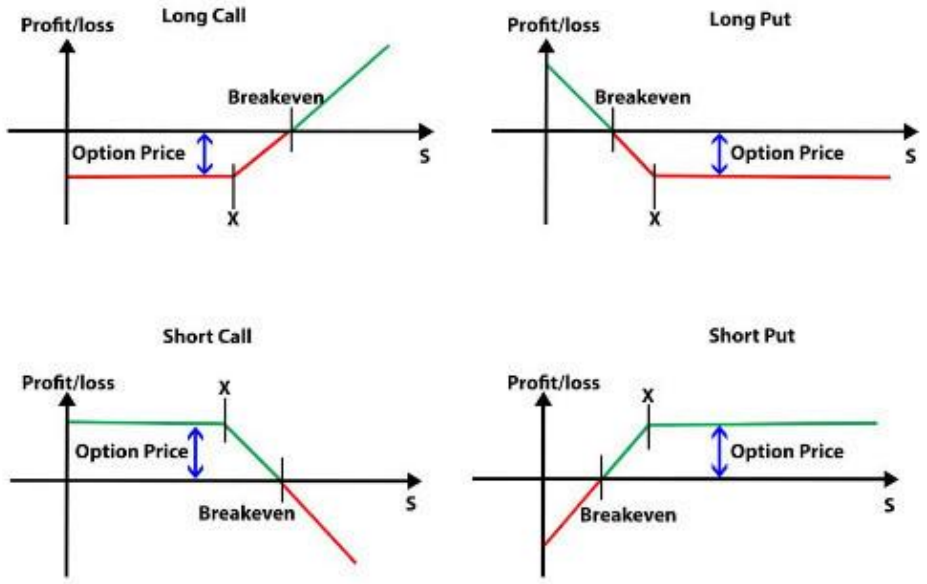
- Financial derivatives create a variety of risks which certainly need to be discussed
- Counterparty risk
- Price risk
- Agency risk
- Systemic risk

SYSTEMATIC TRADING

REAL-LIFE PRACTICES OF FINANCIAL DERIVATIVES TRADING

TYPES OF DERIVATIVES TRADING STRATEGY

- Directional strategy: Have delta exposure
  1. Bullish: Long forward/futures, Long Call
  2. Bearish: Short forward/futures, Long Put



- Arbitrage strategy: no delta exposure (delta-neutral) I.e. basket of stock vs equity index futures

Data-driven

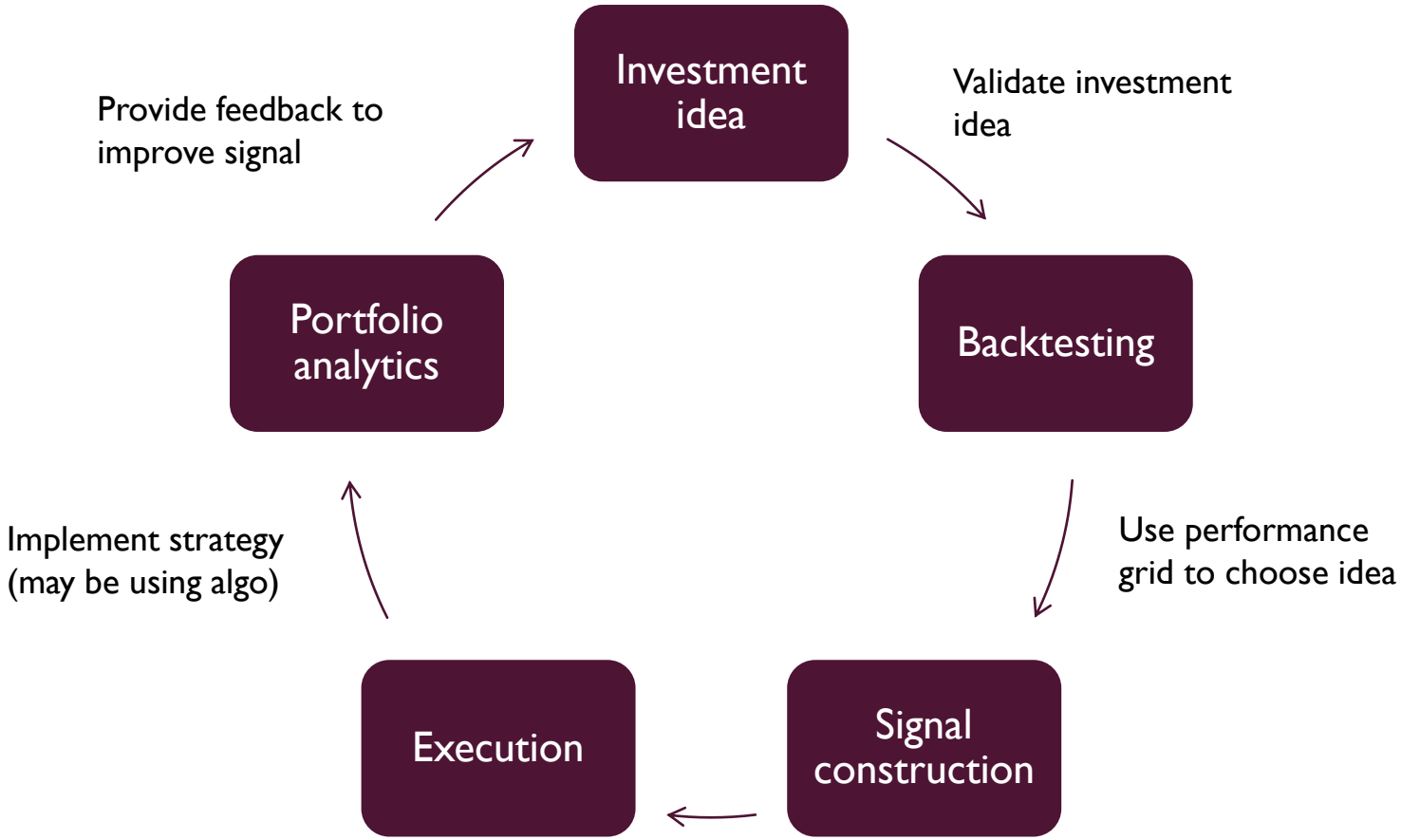
- Mainly focus on data calibration by using forecasting model and/or advanced machine learning techniques
- Assumption: The data pattern that will repeat in the future

Fundamental-driven

- Construct signal based on fundamental factors i.e. dividend yield, price valuation, analyst's estimates
- Assumption: There is no change in company structure

TYPE OF SYSTEMATIC TRADING STRATEGIES

SYSTEMATIC INVESTMENT PROCESS



WHAT ARE SOURCES OF INVESTMENT IDEA?

Market data	Fundamental data	Non-process data
• Stock price • Volume • Bid/offer price	• EPS, DPS, Book value • Analyst's estimates i.e. target price, forecasted EPS	• Investment blog • News

BACKTESTING 101

- **Data description**: Define scope of data, period used, and indicate data limitation
- **Hypothesis testing**: Test relationship and its significance between signal and forward return
- **Signal construction**: Construct signal based on your hypothesis and calibrate to find optimal result
- **Backtest result**: Run backtest to obtain performance evaluation result i.e. return, risk, drawdown, turnover
- **Additivity test**:
  - Combine signal with your current portfolio return and evaluate its additivity
  - Good additive signal will have low correlation with current one
- **Signal limitation**: Be aware of its limitation and signals will not be working in what kind of situation

PORTFOLIO ANALYTICS

- This is very important step. Most investors only keep track of their PnL.
- It is a must to compare your live portfolio vs backtest result of live period (i.e. daily return, return correlation). Identify gap and assess what causes the difference between backtest and live result
- Decompose your portfolio return into various periods (i.e. daily, weekly, monthly), across countries (for multiple market portfolio) and various risk factors
- Evaluate your market impact