Trading Systems

Here, we will have an overview of different kinds of quantitative trading strategies possible. Then we will explore the details of a trading strategy called Pair-Trading with code snippets that gives an idea of how it can be made possible.

Alternative Data

Alternative data is non-traditional (not price or volume) data that has predictive value in the financial markets.

Examples of Alternative Data Strategies

- Satellite images of Walmart parking lots allow hedge fund to analyse the change in the number of people going to Walmart. This enables them to predict Walmart's sales figures.
- Surveyors record the number of trucks leaving Company A's factories. This data allows traders to predict Company A's revenue.
- Having social media foot traffic data (such as Foursquare's check-in data) around Restaurant X's outlets allows traders to predict Restaurant X's sales figures.

The 5 popular types of alternative data are:

- Location Data
- Consumer Expenditure Data
- Satellite/Drone Imagery
- Weather Data
- Web-scrapped Data

As tradition trading opportunities decreases, traders need information that can put them one step ahead of the competition.

They need to be creative with their information sources. Not only do they need quality alternative data, they need quality alternative data they other traders don't have access to.

Traders and hedge funds either buy these data from data providers or collect them themselves.

Arbitrage – There are different forms of arbitrage, but at its core, it involves simultaneous buying and selling of assets and or its derivatives. The goal is to take advantage of mispricing and to minimize downside risk.

Pairs Trading – Similar to arbitrage, this involves buying one asset and selling another. The difference in pairs trading there can be two different assets that make up the strategy whereas in arbitrage there is typically only one asset.

We will be discussing Pairs Trading in more detail.

Technical Analysis – This method heavily relies on price movements in the past to predict what an asset will do next.

High-Frequency Trading (HFT)

High-frequency trading describes trading that require high computing and communication speeds.

HFT is characterized by high communication and computing speed, large number of trades, low profit per trade and expensive software infrastructure.

High-frequency traders use communication speed to profit and outwit other traders.

High Frequency Strategy Types

Arbitrage

Arbitrage trades happen when an asset is priced differently on 2 exchanges and a trader buys the cheaper one while shorting the pricier one.

Reaction to news

When a major news is released, the trader who reacts the fastest wins. In this case, the high-frequency trader needs to analyse the news and fire the trade before everyone else

Latency Arbitrage

When a traditional (slower) hedge fund buys a large amount of Stock A, a HFT hedge fund will detect that.

The HFT hedge fund will then buy all the Stock A on the other exchanges and sell it back to the slower hedge fund for a small profit.

The HFT hedge fund might do this millions of times over a day.

Statistical Arbitrage

A large number of similar stocks might move in a similar manner. When any of the stocks diverge, the high-frequency trader will buy the cheaper one and/or short the pricier one.

Index Arbitrage

An index or exchange-traded fund is designed to track the returns of an index such as the S&P500.

Other strategies

HFT is a secretive field. Once a strategy is revealed and the other funds join in, the profit opportunity disappears fast.

Thus, many new innovative strategies are created every day and are not known to the general public.

Investment in infrastructure

HFT is usually a winner-take-all industry. If you are faster than your competition (even by a slight amount), you get all the profits.

Since relative speed is more important than absolute speed, HFT funds constantly try to be faster than their rivals.

HFT funds spend hundreds of millions on hardware and software infrastructure to reduce their computing and communication speed by the milliseconds.

Investments in infrastructure include building a straight tunnel to lay communication lines and putting their servers right beside the financial exchange’s servers.

Here's a basic structure of the upcoming parts.

1. What is Pair-Trading and how it works.
2. How to choose pairs
    1. Quantitative analysis of stocks to find right pairs to hedge.
    2. This consists of statistical methods employed, the idea behind them, and program snippets for a way to employ these methods.

What is Pair-Trading and how it works

↗ Finding good pairs