Strategy Creation Thought Process (Part 2) – Think of Relationships

In trading, think in relative terms, not in absolute terms. Most things are referenced from something else.

For instance, it is hard to imagine how the markets will behave when Brexit happens. However, if there were many previous instances of countries leaving economic blocs, it would be much easier to predict Brexit's effect.

- How do we know if it will rain tomorrow? Because there are dark clouds and dark clouds historically precedes rain.
- How do we know if a stock that is trading at 10 times its revenue is overvalued? Because every other similar stock is trading at 5X revenue.
- How do we know if a stock that is trading at 10 times its revenue is undervalued? Because every other similar stock is trading at 30X revenue.
- How do we know if a stock that trading at 10 times its revenue is fairly-valued? Because every other similar stock is trading at 30X revenue, but… the last 5 times this happened the market crashed.
- How do we know that a stock future tends to lead a bond future? Because historically it has done so and most people perpetuate this behaviour by trading and referencing stock indices.
- How do we know that a group of interest rate futures tend to move together? Because historically they have done so when certain market conditions are met.
- How do we know that a growing tech stock that is constantly losing money is a good investment? Because Amazon lost money for many years and turned out to be an epic investment.

This concept makes sense because most things in the markets are social constructs. A social construct is something that does not have an objective truth, but exists as a result of human interactions and opinions.

Since the markets are giant stews of human interaction and opinions, it is hard to predict what it will do while thinking in a vacuum. We can understand the markets better if we reference it against something else that has some predictive value.
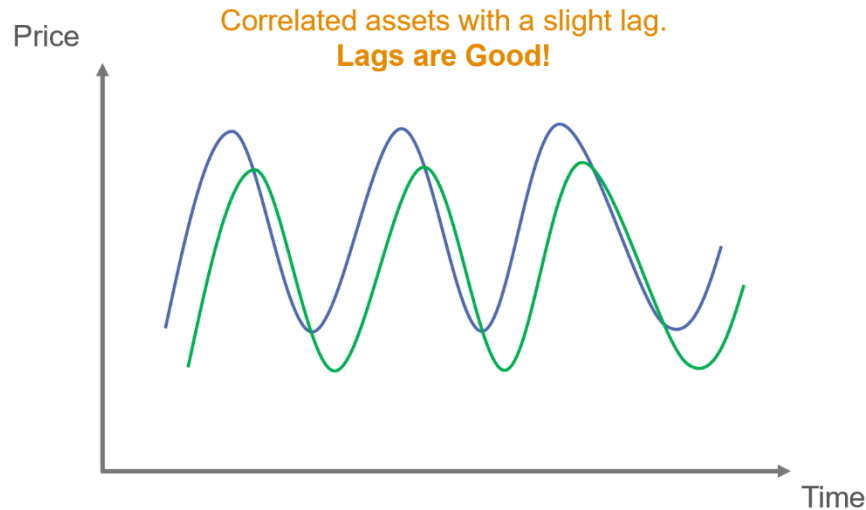
This lecture serves as an overview of this core trading concept.

Framework 1: Using Correlation and Cointegration

At the most basic level, using relative thinking in trading is either correlation, cointegration or both.

Correlation

When 2 assets move in a similar manner, we say they are correlated.

Price

Correlated assets with a slight lag.
Lags are Good!

Time

The blue line moves before the green line. Trade the green line using the blue line as reference.

This blue line can be another asset, a non-tradeable information (social media data) or historical event.

How to use correlation in trading

- We trade one asset using another asset or information source as a guide.
- The latter is known as a proxy asset or leading indicator because it moves before our asset moves (thus we use it as a proxy).
- We need our asset to move after the proxy asset moves. If they move simultaneously, we have no time to fire the trade.
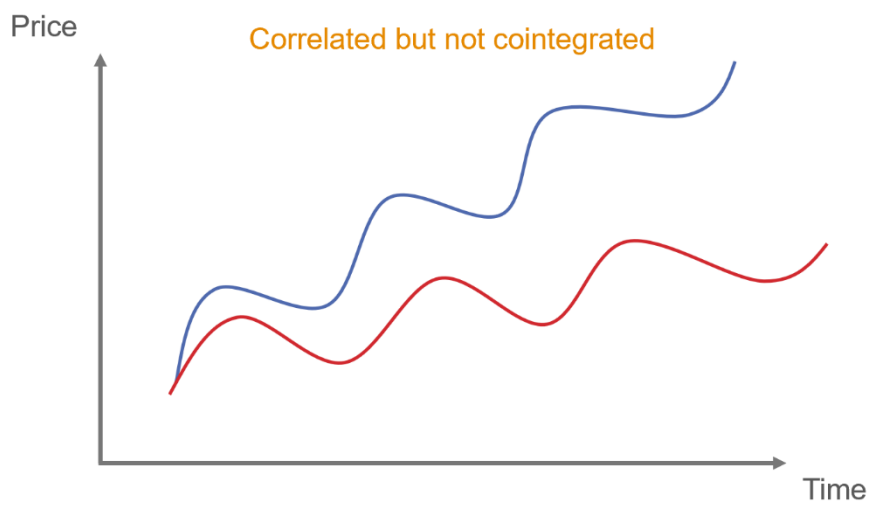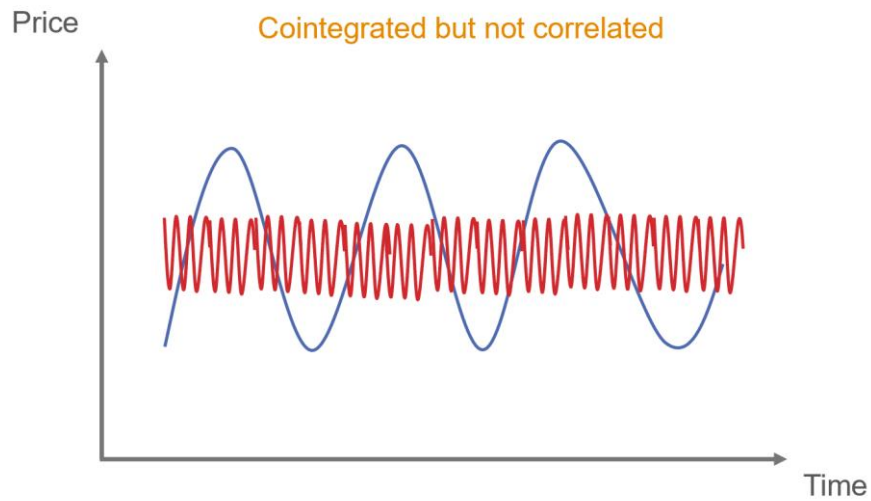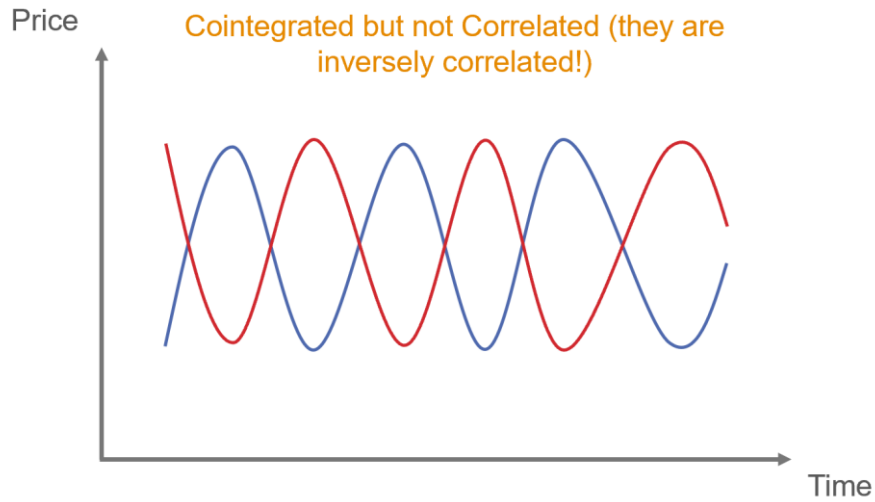
Examples

- Bond futures move slightly slower (less than a second) than stock index futures (short term).
- Analysing a restaurant's foot traffic data collated by an app to predict the restaurant's quarterly revenue and hence, stock price movement (medium term).
- Betting on Brexit by collating and analysing private poll results (medium term).
- Making a macro bet on how a country's bonds will behave in a 0% interest rate environment by analysing what happened to Japan 30 years ago (long term).

<u>**Cointegration**</u>

In some cases, when the prices of 2 or more assets move away from one another, they tend to converge eventually. Another term for this is mean reversion.

Cointegrating assets may be correlated, or they may not be. So, it is not useful to talk about correlation when talking about cointegration.

Price

Cointegrated but not Correlated (they are inversely correlated!)

Time

Price

Cointegrated but not correlated

Time

Price

Correlated but not cointegrated

Time

How to use cointegration in trading

We find 2 or more assets, trade them in a way where we exploit their mean reversion behaviour.

At the most basic level, we have a pair trade. A pair trade consists of 2 assets that cointegrate.
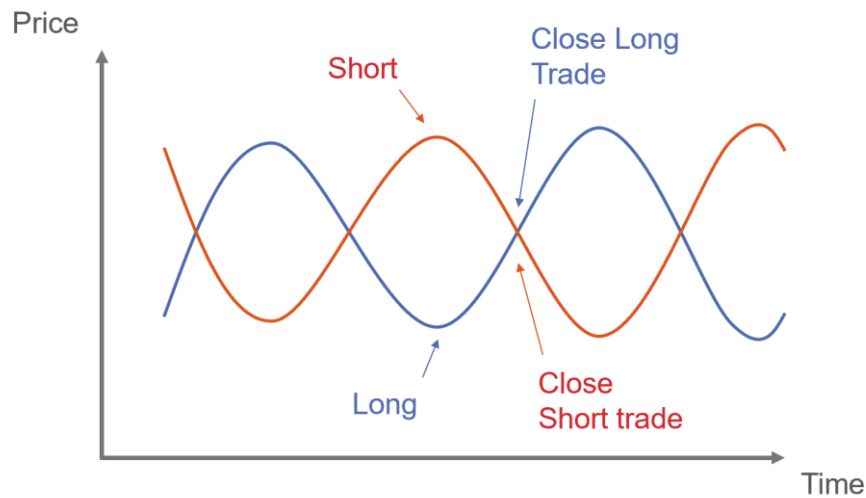
In the chart above, we fire 2 trades and close them both after the assets' prices converge.

Pair trading is a rather common strategy. As such, it is not that profitable, especially if done on popular assets (US stocks, US bonds, Forex, Oil etc).

We need to either use 3 or more assets or/and trade less popular assets (stocks in less developed countries, interest rate futures, exotic futures or derivatives, newly launched products etc).

Difference between correlation trading and cointegration trading

Correlation trading refers to trading *1 asset* when using a proxy asset as a guide.

Cointegration trading refers to trading *multiple assets* in a manner that exploits their mean reversion behaviour.

Note that the term correlation is sometimes used (inaccurately) by traders to describe cointegration.

Examples

- Trading interest rate future calendar spreads
- Trading arbitrage opportunities where the same asset is priced differently in 2 exchanges
- Trading stocks from less developed countries using statistical arbitrage
- Trading newly launched products against their underlying assets
- Trading newly launched products against similar but more developed products

Correlation + Cointegration

Double up your trading prowess by using both correlation and cointegration.

When do you know to start your cointegration trades? Use your proxy assets to guide you.

The main idea here is to use proxy assets to guide when to enter and exit your cointegration trades.

Price

Trade the blue lines using
the red ones as proxies

Time
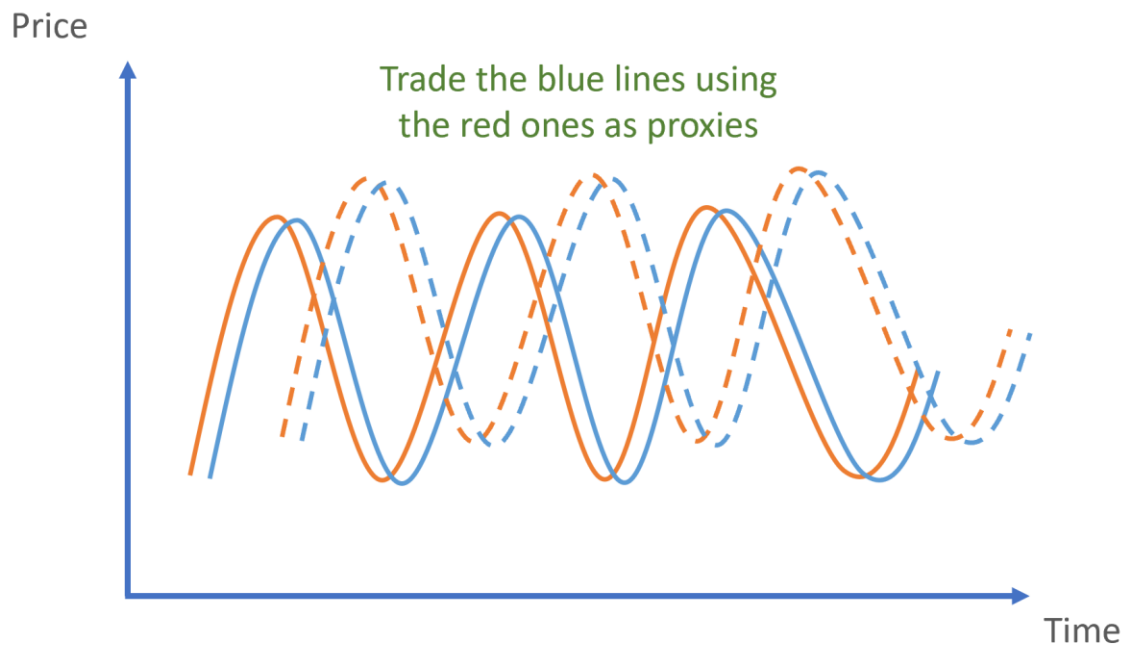
The chart above combines correlation and cointegration.

The red dashed line leads the blue dashed line. The red solid line leads the blue solid line.

Trade the 2 blue lines using the 2 red lines.

Framework 2: Obscure & Small Markets, Alternative Data and Machine Learning

This second framework complements the first framework. This framework looks at the current market opportunities and tools.

Here is a quick overview.

Obscure and small markets

Obscure markets refer to markets which are less popular and regulated.

Small markets refer to markets that can only absorb a small amount of trading volume without a large price movement.

Big funds can only put their capital in certain regulated and large markets. We can trade any products.

Examples

- Cryptocurrencies? Go for it.
- Stock market in developing countries? Go for it.
- Unregulated derivatives? Go for it.
- Price discrepancy due to geopolitical reasons but you can trade them because you know a trusted local guy? Go for it.
- Penny stock that can only absorb $50K a day without its price spiking? Go for it.
- Weird commodity markets in Asia? Yup… go for it!

We look at obscure and small markets because the popular markets are swamped with the big hedge funds, especially in intraday trading.

Here is a list of markets available to retail traders. Even if you ignore the popular markets like the US, the UK, Hong Kong and Japan, there are still many markets available.

Link: https://www.interactivebrokers.com/en/index.php?f=1323

The Exception

The exception here is if you are investing and holding equities for the long term. For this strategy, investing in the popular markets will work in your favour as you are riding a wave along with the rest.

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 funds to analyse the changes 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.
- Using soccer betting odds to trade the stocks of soccer clubs.

The 5 popular types of alternative data are:

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

As traditional trading opportunities decrease, 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 that other traders don't have access to.

Future of alternative data and trading

That said, the effectiveness of alternative data is eroding away. Market players are catching on. The effectiveness of common alternative data is decreasing, and moreover, data with predictive value are expensive.

Let's face it, hedge funds can spend hundreds of millions to purchase alternative data. We can spend hundreds of dollars to buy common alternative data that have been analysed hundreds of times by others. We can't win this way.

Thus, we need to innovate further.

Here are 4 levels of alternative data with increasing levels of sophistication:

1. Buying alternative data from vendors
2. Combining those data to form a new dataset with (supposedly) more predictive power
3. Collecting your own alternative data (web scraping, private polls etc)
4. Combining bought and self-collected data to form a new dataset with (supposedly) more predictive power

Number 4 will give you the highest chance of success.

Machine Learning

Machine learning techniques enable computers to do things without being told explicitly how to do them.

The essence of machine learning is the ability for computers to learn by analysing data or through its own experience.

Traditional Computing Rules

If an image has 4 legs, fur, pointy ears and whiskers, label it as a cat. (What if the cat has a missing leg?)

Machine Learning Rules

We give the computer 1000 cat pictures and 1000 pictures that are not cats. After analysing these 2000 pictures, the computer will be able to tell if a picture contains a cat.

Advantages of Machine Learning

- Being able to analyse large quantities of data without being explicitly told what to look for
- Being able to understand texts (in large quantities and different languages)
- Being able to interpret images
- Being able to come up with creative solutions
- Being able to analyse and output a prediction fast

Examples of Machine Learning Trading Strategies

- Reading texts fast. So that we can quickly know how a newly published news article affects the market.
- Reading huge chunks of texts. So that we can get summaries effectively.
- Looking at many drone and satellite images. So that we can know what the images are telling us. Are the soybean crops dying or booming? Then we'll buy or short soybeans!
- Scanning the many orders coming into the market. We are looking for patterns to see if someone is trying to buy or sell a large quantity of Apple stock.

Dangers of Machine Learning in Trading

Machine learning is just a tool to analyse information.

The danger happens when we misuse machine learning to find patterns that don't exist:

- Throwing in a million data points from many different sources without a proper hypothesis or constraints
- Throwing in one large dataset from only one source and force the machine to find a pattern (e.g. just throwing in price data, especially of a popular asset like Forex or the S&P500 index)

In those cases, the machine will spit out results that are overfitted or p-hacked.

This means that the results either follow the past so closely that it won't work in the future (overfitting) or the results happen by manipulating the data and check all data combination to force out a favourable result (p-hacking).

To use machine learning effectively, we need to understand the markets, our data and the methods we are implementing.

Ending Notes

Think different and play in your field of competency

If you want to outperform the market returns (i.e. the average market participants' returns), you need to think different from the average market participant, and be correct.

Obvious trades tend not to work. You need non-obvious trades. One way to do this is to trade in your own domain of expertise. Combine your domain specific knowledge with trading knowledge.

The dude who spent 10 years analysing plant-based meat is probably going to trade the alternative meat stock better than the average person.

Personally, I like tech and have been following it for many years. Thus, I have an inclination towards it.

Find your unfair advantage!

AT101 and PT101 Content Coverage

Correlation will be covered in AT101.

PT101 will cover both frameworks (including correlation).

Machine learning will be covered in a new course (you will get access when it's done) called ML101.

MT4 limitations

Running backtests based on proxy assets require our backtests to read 2 or more data sources. MT4 can live trade and read multiple assets but unfortunately, it can't run backtests using multiple assets.

However, we have a workaround where we insert the data of our proxy asset manually by importing a CSV. More on that in an upcoming chapter.