InferTrade
PREDICTIVE RESEARCH TOOLS

Predictive Relationship: Level Relationship

Contents

1 Relationship Description

In a level relationship, the current value of the signal directly affects future changes in the price:

$$\Delta P_{t+1} \propto kS_t + c \tag{1}$$

where ΔP_{t+1} represents the future price change, S_t represents the current value of the research signal at current time t, k is a scalar, and c is a constant. Intuitively this means that when the signal is high it is good to buy the market, as the price will tend to drift higher. When the signal is low, it is good to sell the market as the price will tend to drift lower.

After finding the relationship which maximises risk adjusted returns, InferTrade runs tests for statistical significance to verify that the relationship gives a predictive edge. A predictive level relationship can be used to invest when the signal value moves above its historical average, and *sell* if the signal moves below its historical average. If the scalar k is negative, inverting the signal will make this true.

An example of a time series that might show a predictive level relationship is a sentiment index:

positive sentiment -> index is high -> price goes up because investors are bullish

We would typically not expect a signal that is a price forecast to show a predictive level relationship, as a price forecast is typically relative to the current price (a difference relationship). Similarly, a technical positioning indicator as a signal may be more likely to show a change relationship, whereby changes in the value of a signal drive the price, because a stable level of interest may not move the market.

2 Trading Strategy Description

A level relationship can be reflected in many kinds of rules. InferTrade uses a 120 period (6 months for daily data) rolling regression of the signal against next day's price change as a benchmark. This trading rule recommends portfolio allocation based on the value of the rolling error obtained when comparing the historical ground truth prices with their predictions from research. The smaller the error, the greater the size of the recommended allocation.

The allocation is scaled by the Kelly Fraction, a mathematically proven formula for determining optimal bet sizing. This rule will show higher returns than usual after optimisation if a significant Level Relationship is present between the price and signal series. The following equation shows how a Level Regression trading rule calculates a position sizing:

$$z_t = k_1 R_t + k_2 \tag{2}$$

where z_t is the portfolio allocation at time t, R_t is the Research value at time t, k_1 is the level coefficient and k_2 is the static coefficient.

3 Rule Parameters

Below is a table summarizing the parameters specific to this trading rule.

Parameter Name	Default Value	Description	Symbol
Level Coefficient	0.1	Multiplier for regression.	k_1
Constant Coefficient	0.1	Initial constant for regression.	k_2

4 Glossary

- **Bullish:** Positive outlook on the market. Expectation of positive returns.
- **Bearish:** Negative outlook on the market, Expectation of negative returns.
- **Allocation:** The allocation is the fractional amount of the portfolios value used to determine the size of the trading position.
- **Parameter:** Value used by the trading rule in the calculation for trading position
- **Trading Rule:** Strategy to determine when to buy, hold or sell a position.

Further Links

1. InferTrade: `https://www.infertrade.com`
2. Privacy Policy/Legal notice: `https://www.infertrade.com/privacy-policy`
3. InferStat Ltd: `https://www.inferstat.com`