Predictive Relationship: Static Log Difference Regression

Contents

1 Trading Strategy Description

Regresses the one-day price changes against the lagged difference of research to price for the specified number of days, using coefficients estimated from the start of the data.

2 How to Trade

In order to trade with the rules InferTrade provides, we calculate allocations for each day. We then allocate that fraction of our total portfolio value (cash and securities) to the market we are trading - to do this we buy or sell securities to reach the target allocation.

How Allocation Determines Trade Size

The allocation is the fractional amount of the portfolios value used to determine the size of the trading position. For example, if the allocation for Microsoft (MSFT) shares is 50%, and we have $100, we invest $50 so that the value of held stock is the same as the value of held cash.

Rule Specific Trading Details

Given default parameter values, if the asset drift is 0.001 and the error is 0.02 (2% daily volatility), this rule will take a $0.001/(0.02)^2 = 2.5$ or 250% position (leveraged).

3 Rule Parameters

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

Parameter Name	Default Value	Description	Symbol
Kelly Fraction	0.1	Amplitude weighting (Kelly Fraction). 1.0 is maximum growth if regression is exact. <1.0 scales down positions taken.	F
Regression Length	100	This is the number of days used to estimate the regression coefficients.	L

4 Equation

Below are the equations which govern how this trading rule determines a trading position.

$$y_t = \kappa(ln(p_t) - ln(r_t)) + c, \tag{1}$$

The equation (1) predict the value of the price y_t at time t using the difference from the logarithm of the price and research values. Using the logarithm function properties, we can rewrite it easily as:

$$y_t = \kappa ln\left(\frac{p_t}{r_t}\right) + c, \tag{2}$$

Since we are using a static approach the amplitude coefficient κ remains constant. In order to calculate the resultant fractional portfolio allocation z_t we use the Kelly fraction to obtain the maximum results for the long run.

$$z_t = F \frac{y_t}{\varepsilon_{rms_t}{}^2_y} \tag{3}$$

Additionally, the standard error $\varepsilon_{rms_t y}$ is calculated and included in equation (3) to normalize the predicted price.

5 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`