



Predictive Relationship: Average Directional Movement Index

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1 Trading Strategy Description

The Average Directional Index (ADX) introduced by Wells Wilder, is a technical indicator that is used to help measure the overall strength of the trend. This indicator attempts to measure the strength of price movement in positive and negative direction using the +DMI and −DMI indicators along with the ADX. A trend is considered strong when the value of the ADX is above 25 and considered weak when the value is below 25. A trend is also considered bullish when the +DMI is above the −DMI and considered bearish when the +DMI is below the −DMI.

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 portfolio's 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

The strategy is to identify the trend and the strength of the trend using the values of ADX, +DMI and −DMI.

Bullish Trend - When the +DMI is above the −DMI and the ADX value is above 25.

Bearish Trend - When the +DMI is below the −DMI and ADX is below 25.

3 Rule Parameters

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

Parameter Name	Default Value	Description	Symbol
Look Back Length	14	Number of timestamps used to calculate ADX.	L

4 Equation

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

$$TR_t = \max \{P_t^h - P_t^l, |P_t^h - P_{t-1}^c|, |P_{t-1}^c - P_t^h|\} \quad (1)$$

$$ATR_t = \frac{1}{L} \sum_{i=1}^L TR_i \quad (2)$$

$$+DM_t = \begin{cases} 0 & P_t^h - P_{t-1}^h < 0 \\ P_t^h - P_{t-1}^h & \text{else} \end{cases} \quad (3)$$

$$-DM_t = \begin{cases} 0 & P_{t-1}^l - P_t^l < 0 \\ P_{t-1}^l - P_t^l & \text{else} \end{cases} \quad (4)$$

$$+/-DM_t^s = \sum_{i=1}^L DM_i + \sum_{i=1}^L \frac{DM_i}{L} + DM_c \quad (5)$$

$$+DI_t = \frac{+DM_t^s}{ATR_t} \times 100 \quad (6)$$

$$-DI_t = \frac{-DM_t^s}{ATR_t} \times 100 \quad (7)$$

$$DX_t = \left(\frac{|+DI_t - -DI_t|}{|+DI_t + -DI_t|} \right) \times 100 \quad (8)$$

$$ADX_t = \begin{cases} \frac{1}{L} \sum_{i=1}^L DX_i & t = 0 \\ \frac{(ADX_{t-1} \times (L-1)) + DX_t}{L} & t > 0 \end{cases} \quad (9)$$

where:

- P_t^h : is the asset's high price at time t.
- P_t^c : is the asset's close price at time t.
- P_t^l : is the asset's low price at time t.
- TR_t : is the True Range at time t.
- ATR_t : is the Average True Range at time t.
- DM_c : is the Directional Movement at current time.
- $+/-DM_t$: is the Directional Movement at time t.
- $+/-DM_t^s$: is the Smoothed Directional Movement at time t.
- $+/-DI_t$: is the Directional Index at time t.
- DX_t : is the Directional Movement Index at time t.
- ADX_t : is the Average Directional Movement Index at time t.

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>