Trafing strategies theory

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1 Financial Forecasting And Trading Strategies

1.1 MA

Moving Average rules (MAs) are also common mechanical indicators and their applications are known for many decades in trading decisions and systems. In simple words, a MA is the mean of a time series, which is recalculated every trading day. Their main characteristic is the length window, namely the number of trading days that are going to be used to calculate the rolling mean of the high frequency data. MAs are identifiers of short- or long-term trends, so the window length can be short (short MAs 1 to 5 lags) or long (long MAs- 10 to 100 lags). The intuition behind them isthat buy (sell) signals are triggered when closing prices cross above (below) the x day MA. Another variation is to buy (sell) when x day MA crosses above (below) the y day MA.

Assuming that the length window is n days, the current periods t closing price P_t, MAs can be further divided into three main categories

- Simple MA (SMA): $SMA_{t+1} = \frac{P_t+P_{t-1}+...+P_{t-n+1}}{n}$
- Exponential MA(EMA): $EMA_{t+1} = EMA_t + \alpha(P_t - EMA_t)$
- Weighted MA (WMA): $WMA_{t+1} = \frac{nP_t+(n-1)P_{t-1}+...+2P_{t-n+2}+P_{t-n+1}}{n(n+1)/2}$

The SMA is an average of values recalculated every day. The EMA is adapting to the market price changes by smoothing constant parameter .

The smoothing parameter expresses how quickly the EMA reacts to price changes. If is low, then there is little reaction to price differences and vice versa. The WMA give weights to the prices used a lags. These weights are higher in recent periods, giving higher importance in recent closing prices. All these MAs are using the closing price as the calculation parameter, but open, high and low prices could also be used.

1.2 Oscillators(OTs) and Momentum Rules(MTs)

The third class of mechanical trading rules consists of the Oscillators (OTs) and Momentum Rules (MTs). OTs are techniques that do not follow the trend. Actually, they try to identify when the trend is apparent for too long or dying. Therefore they are also called non-trending market indicators. The main drawback of MAs is the inability to identify the quick and violent swifts in price direction, which lead to capital loss by generating wrong trading signals. This performance gap is filled from OT indices. Their basic intuition is that a reversal trend is eminent, when the prices move away from the average. Simple OT rules are based on the difference between two MAs and generate buy (sell) signals when prices are too low (have risen extremely). Nonetheless, being a difference of MA rules, OTs can also present buy and sell position, when the index crosses zero. The boundaries between OTs and MTs can be a bit vague depending on the case, because MTs can be applied to MAs and OTs. The main difference is that OTs are non-trend indicators, whereas MTs are capitalizing on the endurance of a trend in the market. A simple MT rule would be the difference between todays closing price and the closing price of x days ago. The trading signal is generated based on this momentum. To put it simply, the buy (sell) signal is given when todays closing price is higher than the closing price x days ago. Setting properly the x days price that is going to be used is also a matter of trader intuition, market knowledge and historical experience (5 and 20 days are common).There are many types of OTs and MTs used in trading applications. Some typical examples are summarized, interpreted in short and followed by relevant research applications below:

- Moving Average Convergence/Divergence (MACD): MACD is calculated as the difference between short- and long-term EMAs and identifies where crossovers and diverging trends to generate buy and sell signals.

- Accumulation/Distribution (A/D): A/D is a momentum indicator which measures if investors are generally buying (accumulation) or selling (distribution) base on the volume of price movement.
- Chaikin Oscillator (CHO): CHO is calculated as the MACD of A/D.
- Relative Strength Index (SI): The SI is calculated based on the average up moves and average down moves and is used to identify overbought (when its value is over 70 sell signal) or oversold (when its value is under 30-buy)
- Price Oscillator (PO): PO is identifying the momentum between two EMAs.
- Detrended Price Oscillator (DPO): DPO eliminates long-term trends in order to easier identify cycles and measures the difference between closing price and SMA.
- Bollinger bands (BB): BB are based on the difference of closing prices and SMAs and determine if securities are overbought or oversold.
- Stochastic Oscillator (SO): SO is based on the assumptions that as prices rise, the closing price tends to reach the high prices in the previous period.
- Triple EMA (TRIX): TRIX is a momentum indicator between three EMAs and triggers buying and selling signals base on zero crossovers.

The exact specifications and formulas of the abovementioned indicators can be found in Gifford (1995), Chang et al. (1996) and Edwards and Magee (1997) or in any common textbook of technical analysis. Their utility though has been eminent years before that. The pioneering paper of Brock et al. (1992) presents evidence of profitability of MACD, as for MAs and FRs mentioned above. Kim and Han (2000) propose a hybrid genetic algorithm neural network model that uses OTs, such as PO, SO, A/D and RSI, along with simple momentum rules to predict the stock market. Leung and Chong (2003) compare the profitability of MA envelopes and BBs. Their results suggest BBs do not outperform the MA envelopes, despite being able to capture sudden price fluctuations. Shen and Loh (2004) propose a trading system with rough sets to forecast SP 500 index, which outperforms BH

rules. In order to set up this hybrid trading system, they search for the most efficient rules based on the historical data from a pool of technical indicator, such as MACD, RSI and SO. Lento et al. (2007) also present empirical evidence that prove BBs inability to achieve higher profits compared to a BH strategy, when tested on tested on the SP/TSX 300 Index, the Dow Jones Industrial Average Index, NASDAQ Composite Index and the Canada/USD exchange rate. Chong and Ng (2008) examine the profitability of MACD and RSI using 60-year data of the London Stock Exchange and found that the RSI as well as the MACD rules can generate returns higher than the BH strategy in most cases.

2 Introduction

This document serves as a sample for a LaTeX file in TeXstudio. LaTeX is a powerful typesetting system widely used for creating scientific documents, articles, reports, and more.

3 Basic Elements

Below are some common elements used in a LaTeX document.

3.1 Text and Paragraphs

LaTeX automatically handles spacing between paragraphs. For example:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

3.2 Mathematical Equations

LaTeX excels at typesetting mathematics. Here is an example of an inline equation: $E = mc^2$. And here is a displayed equation:

$$\int_a^b f(x)\,dx = F(b) - F(a)$$

3.3 Including Graphics

You can include images using the `graphicx` package. For example:

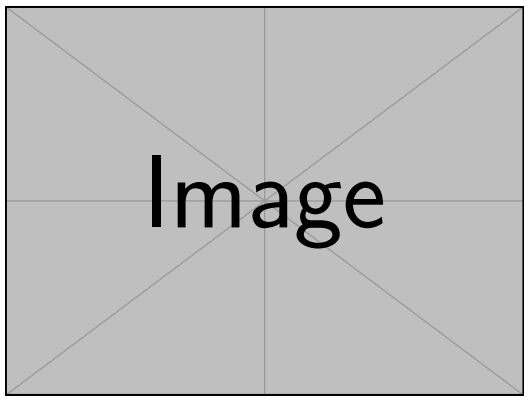

Figure 1: Sample Image

3.4 Hyperlinks

The `hyperref` package makes it easy to add hyperlinks. For example, visit the LaTeX Project website.

4 Conclusion

This sample document provides a basic framework for creating documents in LaTeX with TeXstudio. From here, you can expand your document with more sections, figures, tables, and custom formatting as needed.