

Selection of Short-term Investment Strategy-Judgment Based on Average Adhesion State

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Abstract

With the development and evolution of the futures market, the prosperity of a country's futures market is more and more important to the country's economic development. In China, the futures market development is not perfect, futures product structure still need to improve. Futures market, the existence of many speculators, futures laws and regulations imperfect, and the development of economic globalization, are the futures investment is facing many uncertain risks. In the choice of investment strategy, more and more investors to take prudent investment strategy, which, a large part of the investors tend to technical analysis. Through technical analysis, traders judge market trends and follow the cyclical changes in the trend to make stock and all financial derivatives trading decisions. In the technical analysis, the average system analysis is the most commonly used in practice is the highest accuracy of the analytical technology, this paper through the copper, rubber, sugar, cotton, zinc, several representative commodity futures to study, to verify the average bonding State of investment strategy choice. First, this paper determines the condition of the bonding state by calculating the distance of different mean points. Then, it is judged whether the reversal of the form is long or short by the comparison of the MA value of the different mean points. Finally, the factory strategy and the factory strategy are determined. And to take more and short after the operation of the proposed stop-loss strategy. The effect of these strategies is very significant, the sum of several commodity futures net profit of 113744.79 yuan, profit and loss ratio of 2.82.

Keywords: technical analysis, moving average theory, moving average bonding, MA index

1. Introduction

In the technical analysis, the market cost principle is very important. It is the basis of the trend. The trend of the market has been able to maintain, because the market cost of the driving force. In the upward trend, the cost of the market is gradually rising, and in the downward trend, the market cost is gradually moving down. The change in costs leads to a continuation of the trend. The moving average represents a change in the average cost of the market for a certain period of time. It is feasible and effective to judge the stock price trend. Therefore, the moving average is very important in the investment activity.

Average theory, also known as the moving average, refers to a certain trading time (day, week, month, year) of the arithmetic average. July 1962, the US investment expert Joseph E. Granville in the "Grammy investment law - to deal with the most effective strategy to change the stock price" put forward the moving average, by Dow's stock analysis theory of the "three trends that" evolved, The Dow theory to be digitized, from the digital changes in the stock to predict the future short-term, medium and long-term changes in the direction of investment decisions to provide the basis. Moving average (MA) is based on the concept of "average cost". Based on the principle of "moving average" in statistics, the average price of stock price in a period of time is used as a curve to show the historical fluctuation of stock price, And then reflect the future development trend of the stock price of technical analysis methods. It is a visualized expression of Dow's theory, playing a huge role in the stock market.

For a long time, many scholars use the study of moving average theory, the use of mobile average trading rules to verify the role of average analysis technology. Brock et al. (1992) studied the moving average transaction rules and found that in the US market, technical analysis was able to obtain excess profits for investors and that the tide and profit could not be explained by the mainstream yield forecast model SGMFifield, DMPower and DGSKnipe (2008) studied 15 emerging markets and three developed markets from 1989 to 2003, and the results

show that the use of mobile trading rules can generate excess returns; NMKwok, G.Fang and QP Ha (2009) uses particle swarm optimization to improve moving average transaction rules and validates its effectiveness; Shih-Kuei Lina, Shin-Yun Wang and Pei-Ling Tsai (2009) extend the moving average model into implicit Marco (MS-MA) model, it is concluded that the moving average of stock returns is related.

As China's futures market is not mature enough, the domestic research on the moving average theory is also in the immature stage, but the research results are basically consistent with foreign research. Sun Bibo (2005) on the Shanghai index study shows that holding its variable mobile average strategy for investors to obtain excess returns, while holding a fixed mobile average strategy can not get excess returns; Wang Zhigang, Zeng Yong, Li (2009) used the forward artificial neural network method to test the non-forecasting ability of China's stock market technology and found that the use of moving average rules can bring higher benefits; Zhou Mingshan, Feng Xinli, Lin Liang, Fang Xuyun, Zhou Kaiguo (2013) used the SSE index data to analyze the effectiveness of the moving average strategy. It was found that the yield of the moving average strategy could not be explained by the commonly used random walk model, ARMA model and GARCH-M model.

In this paper, we study the short-term K-line to study the three K-line of 5min, 10min and 15min, and use the moving average to analyze the condition of bonding condition and short-term investment strategy of morphological reversal after bonding. Make a choice, and use the stop-loss conditions to Jiancang after the stock to follow-up investment strategy research.

2. Model

2.1 MA Indicators

Moving Average (MA), which is based on the "average cost concept" in Dao's theory. Through the "moving average" method in statistics, the use of a certain period of time. The algorithm is based on the average price of the shares connected to the formation of the curve. The moving average can show the historical fluctuation of stock price more intuitively and reflect the future development trend of stock price through the historical data of stock price, which is an important index of trend analysis in Dow's theory.

According to the average length of time, moving average is divided into the daily moving average (also known as short-term moving average, mainly including 5, 10 day moving average), quarter moving average (also known as the medium moving average, including 30, 60 day moving average) and The annual moving average (also known as the long-term moving average, mainly including 120 and 240 day moving average), in addition to points, hours and other units of the moving average. This article uses 5min, 10min, 15min average.

According to the algorithm, the moving average can be divided into arithmetic moving average, linear weighted moving average, ladder moving average, smooth moving average and so on, and this article is used in the most commonly used arithmetic moving average, $MA(n)_t = \sum_{i=1}^n C_{t-i+1}$

$$MA(n)_t = \sum_{i=1}^n C_{t-i+1}$$

Here, $MA(n)_t$ represents the n-minute moving average at time t, C_t represents the closing price at time t

The average is the external performance of the average cost of a stock, the essence of which is the stock price will change in the average cost of the stock, when the stock price deviation from the average cost of the stock too far (the price is too high or too low), the stock price will be under the market. Move closer to the moving average. When the stock price is higher than the average cost, most investors will choose to throw the stock, while a small number of investors optimistic about the stock and increase the purchase, when the stock oversupply, the price drop to the moving average closer; when the stock price is lower than the average cost, Most investors will choose to increase the purchase of the stock, and a small number of investors are not optimistic about the stock will choose to throw, when the stock in short supply, prices rose closer to the moving average.

2.2 Average line bonding

The reason for the formation of the average bond form is actually the stock price after a long period of shock consolidation, making the long and short moving average close to the formation of the average point of view from the point of view is the average line of bonding, from the point of view of the shape, Angle is a high concentration of chips. When the multi-level, multiple moving average appears bonding state, indicating that the cost of the market to a target set, this time is the market or individual stocks of the important variable disk critical point. Therefore, it is of great significance to judge whether the moving average is in the bonding state. The following chart is the performance of the average bond:

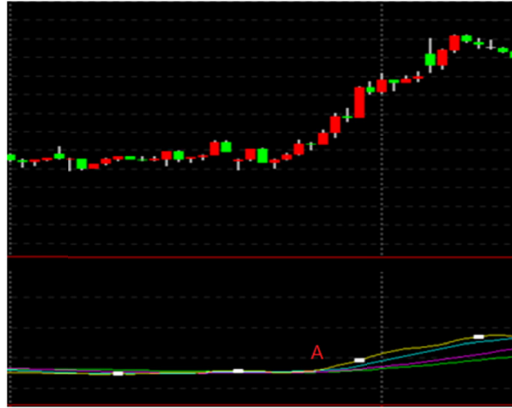


Figure 1. Average line bonding state

(A point before the average line in the bonding state, A point after the average start divergence)

2.2.1 Determination of Average Adhesion

In this paper, through the three short-term moving average (5min, 10min, 15min) the size of the moving average difference to determine whether a stock in a bonding state, that is, when

$$\begin{aligned}
 |MA(n_1)_t - MA(n_2)_t| < a \\
 |MA(n_1)_t - MA(n_3)_t| < a \\
 |MA(n_2)_t - MA(n_3)_t| < a
 \end{aligned}$$

When the three formulas are set up at the same time, it means that the three averages are in a state of bonding

2.2.2 Moving Average Long and Average Short Arrangement

When the moving average from the average line bonding state, began to change disk, this time there will be average long and short arrangement of two cases. Smaller short-term moving average parameters in the larger long-term moving average above, and the average divergence, this arrangement is long arranged. Smaller short-term moving average parameters in the larger long-term moving average below, and the average divergence, this arrangement is short order. The so-called long arrangement and short arrangement do not have a specific quantitative concept. In this paper, the size of MA indicators in different periods are compared with the slope of moving average to determine whether the moving average is in long or short order. Judgment is as follows:

At time t, when $n_1 < n_2 < n_3$

1) if the following two conditions can be met:

$$\begin{aligned}
 MA(n_1)_t > MA(n_2)_t > MA(n_3)_t \\
 k_{n_1} > k_{n_2} > k_{n_3} > \theta_1 (\theta_1 \geq 1)
 \end{aligned}$$

Then the average line is in a long row of state. A long time market price is lower than the market price of short time, and the stock price will continue to keep the trend of rising which is the signal of buying;

2) if the following two conditions can be satisfied:

$$\begin{aligned}
 MA(n_1)_t < MA(n_2)_t < MA(n_3)_t \\
 k_{n_1} < k_{n_2} < k_{n_3} < \theta_2 (\theta_2 \leq -1)
 \end{aligned}$$

Then the average line is in a short position. A short time market price is lower than the market price of long time, and the stock price will continue to keep the trend of declining which is the signal of selling.

Among them, k_{n_1} 、 k_{n_2} 、 k_{n_3} respectively represents the slope of moving average n_1 , moving average n_2 , moving average n_3 .

2.2.3 To Determine the Timing of the Plant

When it is judged that a certain point at a certain time is in the average line bonding state, immediately send the averaged state signal to roots of K line, and mark the K points as 1; And then judge at the next K-line position whether the next moving average line meets the divergence conditions, if it does, then immediately enter the plant strategy, which is issued open air or drive signal; if not, if judged to be averaged bonding state at this time, then continue to repeat the above operation; if both not, no action is taken. The model is shown below:

$$\text{Order } b_t = b_{t+1} = \dots = b_{t+m} + b_{t+m+1} + \dots = 0$$

And the t-point moving average is in the bonding state, that is, the MA indicator coincides with the same time

$$|MA(n_1)_t - MA(n_2)_t| < a$$

$$|MA(n_1)_t - MA(n_3)_t| < a$$

$$|MA(n_2)_t - MA(n_3)_t| < a$$

Then records $b_t = b_{t+1} = \dots = b_{t+m} = 1$

1) If the t+k time point, the average slope is satisfied $k(n_1)_{t+k} > k(n_2)_{t+k} > k(n_3)_{t+k} > \theta_1$

That is, t + k moment moving average in the upward divergence of the state, this time is a long arrangement of the situation, issued a multi-signal;

Or meet

$$k(n_1)_{t+k} < k(n_2)_{t+k} < k(n_3)_{t+k} < \theta_2$$

That is, t + k moment moving average in the downward divergence state, this time is a short arrangement of the situation, issued an empty signal.

When the averages meet one of the situations in the up or down divergence state, it is time to take the incoming strategy, and the signal at the same time should be closed at the same time

$$b_{t+k+1} = b_{t+k+2} = \dots = 0$$

2) If the moving average does not satisfy the divergence condition for the t + k time point, and the moving line is still in the bonded state, it continues to send the signal to the back of the K-line and mark it, and then repeat the first step.

$$b_{t+k} = b_{t+k+1} = \dots = b_{t+k+m} = 1$$

3) If the condition is not satisfied for the condition of the divergence state and the condition of the average line bonding, then no operation is performed and the plant strategy is not implemented.

3. Model Parameters

It is important to measure the parameters of the condition of the moving average. Parameter correlation and matching, reasonable range, parameter optimization is an important direction to explore, so we use a separate part to explain the relevant parameters. The following are the parameters mentioned in this article:

$MA(n)_t$ Represents the n-minute moving average at time t

C_t Represents the closing price at time t

a: indicates the critical condition value of the moving average of the moving average. When the difference between the two indexes of MA is less than a, the moving average is in the bonding state

$b_{...}$: Represents the value of the k-th root of the k-th value after the t-time indicated by the t-time state, $1 \leq k \leq m$

k_{n_1} : the slope of the moving average n_1

k_{n_2} : the slope of the moving average n_2

k_{n_3} : the slope of the moving average n_3

$k(n_1)_{t+k}$: The slope of the moving average n_1 at $t + k$

$k(n_2)_{t+k}$: The slope of the moving average n_2 at $t + k$

$k(n_3)_{t+k}$: The slope of the moving average n_3 at $t + k$

θ_1 : The lower bound of the average slope of the average upward divergence, $\theta_1 \geq 1$

θ_2 : The upper bound of the average slope of the average downward divergence, $\theta_2 \leq -1$

4. Trading Strategy

4.1 Strategy Idea

The trading strategy of this paper is based on the tracking of the short-term moving average, and the tracking operation is carried out by changing the moving average. We will be divided into the strategy into the plant strategy and factory strategy, and the use of copper, rubber, sugar, cotton, zinc, five representative commodity futures in 2012 to 2016 stock price data, the use of this model on its average Bonding state after the occurrence of strategic choice, and set the profit only stop loss strategy.

4.2 Entry Strategy

1) Going Long

When a futures 5min moving average, 10min moving average, 15min moving average bonding state, that is, the distance between the two averages is less than a small enough value, to the back of the root K line signal, if the moving average A moment of upward divergence, and the average line in accordance with the 5min moving average, 10min moving average, 15min moving average order from top to bottom order, is issued to do more signal, then at this moment do more strategies to buy a certain amount Of the futures

2)Going Short

Similarly, when a futures 5min moving average, 10min moving average, 15min moving average bonding state, comes to the back of the root K line after the signal, if the average line at a moment there is a downward divergence state, and the average line in accordance with the 5min moving average , 10min moving average, 15min moving average from bottom to top orderly arrangement, is issued a short signal, then at this moment to take a short strategy to sell a certain amount of futures.

4.3 Exit Strategy

When making a short and short strategy based on the model, we should determine a reasonable stop price, prevent the market from running, and the rhythm is expected to cause a large difference. The so-called profit, refers to the profitability of profits in a timely manner after the profit-taking, to prevent the market reverse run erosion profit; the so-called stop loss, refers to the investment error caused a small loss, the timely cut off losses to prevent greater losses.

1) Going long

When we make a long strategy, suppose we buy a certain futures at a certain price. When the future futures trend of a loss, we set the futures fell more than 20 points, they began to open positions, sell the futures; if the future futures trend of profit, we set up 20 points and then down 10 Point, began to open positions, if the futures trend continues to rise, then rose 70 points when the decline of more than 20 points, then immediately open positions.

2) Going short

Similarly, when we make a short strategy, we assume that we sell a certain futures at a certain price at a certain price. When the future futures trend of profit, that is, prices continue to decline, we set the futures prices fell more than 20 points and then rose 10 points in reverse, then choose to open, that is, buy the same amount of the kind of futures, If the futures prices continue to decline more than 70 points and then reverse growth of 20 points, at this moment choose to open positions; when the future futures trend losses, that is, futures prices have a strong upward trend, we set the futures prices 20 points when the choice of open, stop loss.

5. Analysis

5.1 Properties of Parameters in the Model and Interrelatedness

In the model established in this paper, there are several indicators to determine is very important, directly affect the use of the model effect. Therefore, we need to analyze these parameters.

1) Parameter a: When we judge whether the moving average is in the bonding state, we use a parameter a, which is the decision we used 5min, 10min, 15min these three moving average in the bonding state of the two MA

index value The distance between the three averages is less than the parameter a, we determine that the three averages are in the bonding state, so the determination of the value of a is very important. If the value of the set is too high, the MA index value of the three averages satisfies the model condition, but it is very likely that the moving average is not in the bonding state or the bonding state is not sufficient. At the same time, for a different commodity futures, the optimal value of a is inconsistent.

2) Parameter θ_1 : We use this parameter when we judge whether the moving average is in the long permutation state. He indicates the lower bound of the slope of each moving average. When the slope of the averages is large enough to exceed this value, we say that the moving average satisfies divergence condition. The greater the slope of the averages that satisfies the divergence condition, the more steep the moving average is. Similarly, for different commodity futures, there are different optimal values.

3) Parameter θ_2 : Similarly, so that we judge whether the moving average is used in a short order, he said is the average slope of the average slope of the average, when the slope of the average is small enough, less than this value, we say the average line to meet the downward divergence conditions, the smaller, that meet the divergence conditions under the average slope of the average, the greater the degree of divergence. For different commodity futures, there are different optimal values.

5.2 Determining of Model Parameters

After the testing of more than 3000 data, we have obtained the copper, rubber, sugar, cotton, zinc, five commodity futures the best value of the parameters:

Table 1. The best value of the parameters of five commodity

Commodity futures	copper	rubber	sugar	cotton	zinc
a	1.6	8	5	44	21
θ_1	47	42.5	29	20	23
θ_2	-11	-38	-41	-24.5	-39.5

5.3 Model Implementation and Testing

In this paper, the use of copper, rubber, sugar, cotton, zinc, five representative commodity futures in 2012 to 2016 futures price data, the use of this model to simulate the test results shown in the following chart:

Table 2. Model test results

Commodity futures	Net profit	Number of trades	Maximum asset withdrawal number	Profit and loss ratio
copper	27724.99	58	-5876.66	1.62
rubber	7415.80	5	-1245.90	2.25
sugar	2108.00	1	-60.00	6.67
cotton,	47255.00	205	-5519.00	1.11
zinc	29241.00	107	-2685.00	1.58
total	113744.79	376	-7860.07	2.82

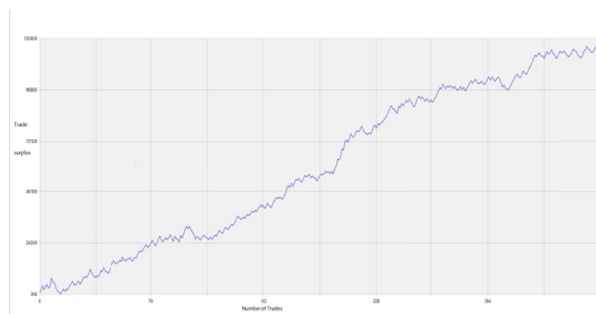


Figure 2. Summary of model tests - Transaction Surplus curve

(The vertical axis represents the transaction surplus, the horizontal axis represents the number of transactions)

6. Conclusions

Based on the most common averages theory, this paper makes a simple quantification of the moving average index to track the short-term trend, and determines the judgment condition of the average bond state. The long-term arrangement and the short arrangement may occur after the average bonding state. Made a judgment and given the specific investment decision-making and stop-loss conditions. Although this paper is based on simple technical analysis, and is focused on short-term investment decision-making research, there are some shortcomings, but still has a certain significance for short-term investment.

We study the futures price data of the five representative commodity futures of copper, rubber, sugar, cotton and zinc from 2012 to 2016 and apply the model of this paper to the data of these five futures. The investment effect is very good, indicating that this short-term investment strategy has a certain degree of operability and practicality.

For many investors, the use of moving average theory to study the short-term trend is the most basic but also the most effective way, through the average line of this common special form of research, the trend of the trend is to grasp the investment operation Basis, although only the use of different length of the MA indicators to simply quantify the choice of investment strategy conditions, but we through the easy way to maximize the play to play the role of moving average, making the actual operation has achieved good results.

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