

# Trend Expert System Empirical Analysis on Gold Plate

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**Abstract.** Based on the data of the gold plate published by China's securities market from January 26, 2018 to August 7, 2019, took the winning rate, annual return rate and net profit rate as the management targets, and use MA expert to test the above data. The results have shown that for the gold sector, the MA expert system only recorded positive returns during the second period, in which the net profit margin is 1.02%, and the winning rate is 40.00%. It has shown that the MA expert system has high risks and low returns. It is obviously not a good choice to guide the gold plate investment by using the MA expert system.

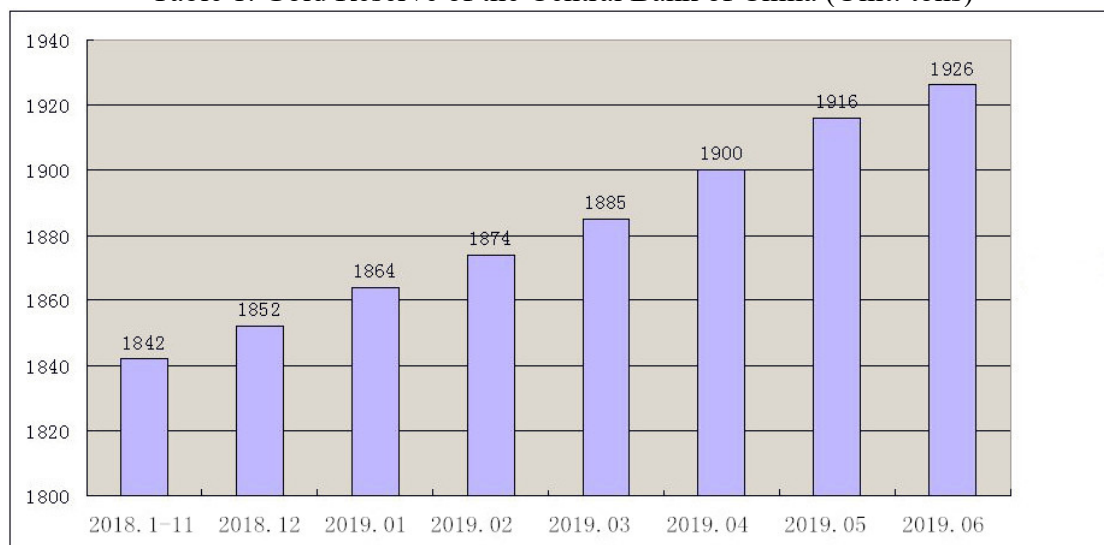
**Keywords:** Sino-US Trade Tension; Trend Expert System; Empirical Analysis; Gold plate.

## 1. Introduction

To some extent, Sino-US trade frictions may be a relatively long-term process. The recent performance of gold ETF is mainly due to the geopolitical instability, which exacerbates the uncertainty of investors and promotes an increase in gold holdings to a certain extent. The World Gold Association believes that in the long run, investors can benefit from gold investments if the global financial market is revised, because gold has historically helped to reduce losses and improve risk-adjusted portfolio returns in times of financial distress.

CCTV News: The latest data from the World Gold Association showed that by the end of July, China's gold reserves had increased by 9.95 tons to 1936.5 tons, realizing an increase in gold reserves for eight consecutive months since December 2018. Wang Lixin of the World Gold Association pointed out that central banks continue to accumulate gold reserves at a healthy rate. In the first half of 2019, global central banks' net purchases amounted to 374.1 tons, up 57% year-on-year, which was the highest level since central banks became net buyers in 2010 (in annual terms). (CCTV reporter Shi Sining)

Table 1. Gold Reserve of the Central Bank of China (Unit: tons)



(Data from the Central Bank of China)

Fang Yu and other people (2017) [1] have tested the MA and the MACD expert system, took the annual net profit rate, profit rate and success rate as the management targets, and has calculated and

analyzed the MA and the MACD expert system. And according to the calculation results, it has shown that the capital management method is meaningless for the above two expert systems.

Xiao-ming Huang and other people (2017) [2] have used the MA expert system to empirically analyze the cloud computing sector of the securities market. The analysis results have shown that the guidance of the MA expert system on cloud computing sector investment cannot exceed the market index. The 43.16% of the success rate of MA expert system also has shown that the system risk of investors is huge. Considered to the low annual return of the MA expert system, this system is absolutely not an attractive investment option for any investor.

Zhong-hua Ling and other people (2017) [3] have used the MACD expert system to calculate and analyze the annual net profit margin, return rate and winning rate. The results have shown that the value is 102.08% and 102.07% of the Shanghai Stock Composite Index, and the annual return rate is 11.85 times of the annual interest rate of bank deposits, which is an attractive solution for investors.

Ni Ruan and other people (2017) [4] have empirically analyzed MACD and MA these two expert systems based on the cloud computing section of the securities market. The analysis result has shown that the annual return rate and net profit rate of the MACD expert system are the 215.42% and 215.25% of that of the MA expert system. Therefore, it is obvious that investors shall choose the MACD expert system.

## 2. Model and Experiment

### 2.1 General Trend Indicators

Moving Average Convergence and Divergence MACD mathematical formula:

$$\text{MACD} = 12\text{-daysEMA} - 26\text{-daysEMA} \quad (1)$$

Exponential Moving Average EMA mathematical formula:

$$\text{EMA}_{\text{today}} = \frac{p_1 + (1-\alpha)p_2 + (1-\alpha)^2 p_3 + (1-\alpha)^3 p_4 + \dots}{1 + (1-\alpha) + (1-\alpha)^2 + (1-\alpha)^3 + \dots} \quad (2)$$

$$\alpha = \frac{2}{N+1} \quad N \text{ is the periodicity.}$$

In which  $p_i (i = 1, 2, \dots, n)$  is the closing price of Day  $i$ ,  $n$  is the Moving Average Periodicity  
Moving average MA mathematical formula:

$$\text{MA} = \frac{c_1 + c_2 + \dots + c_n}{n} \quad (3)$$

In which,  $c_i (i = 1, 2, \dots, n)$  is the closing price of Day  $i$ ,  $n$  is the Moving Average Periodicity MA expert system experiment:

The MA expert system is based on the Eight Big Business Law of Long. The business rule is: MA (5) online wears the MA (10) line to form a gold cross purchase, and the MA (10) offline breaks the MA (30) line to form a death cross sell.

MA expert system source code

SHORT 1 30 5

LONG 5 100 30

CROSS(MA(CLOSE,SHORT),MA(CLOSE,LONG))

CROSS(MA(CLOSE,LONG),MA(CLOSE,SHORT))

ENTERLONG:CROSS(MA(CLOSE,SHORT),MA(CLOSE,LONG));

EXITLONG:CROSS(MA(CLOSE,LONG),MA(CLOSE,SHORT))

Table 2. MA expert system test result

<b>System test setting</b>			
Test method: stock selection formula----MA buying			
Test period: 01/25/2018----01/02/2019 excluding forced liquidation			
Test-stock: total of 24 stocks		Initial investment: 10,000 yuan	
Buying conditions:			
One of the following conditions:			
The following conditions are simultaneously satisfied:			
Stock selection formula: MA buying (5, 10) [daily]			
When the conditions are satisfied: based on the middle price: the closing price, use all funds to buy			
When a continuous signal appears: no longer buy			
Selling conditions: no selling conditions			
Close position conditions: (according to the closing price)			
Index stock picking: stock selection formula: MA selling (10, 30) [daily]			
<b>System test report</b>			
Amount of the tested stock:	24		
Net profit:	-36,386.02 yuan	Net profit rate:	-15.16%
Total earnings:	15,852.21 yuan	Total loss:	-51,808.52 yuan
Number of trades:	80	Winning rate:	36.25%
Annual number of trades:	80	Number of profit/loss trades:	29/51
Total volume:	810,965.69 yuan	Trading fee:	767.39 yuan
Maximum single profit:	2,619.24 yuan	Maximum single loss:	-5,462.04 yuan
Average earnings:	198.15 yuan	Average loss:	-647.61 yuan
Average profit:	-454.83 yuan	Average earnings/Average loss:	-30.60
Maximum number of consecutive profits:	5	Maximum number of consecutive losses:	5
Average number of trading cycles:	42.11		
Average profit trading cycle:	40.72	Average loss trading cycle:	42.90
Profit index:	-0.53		
Maximum floating profit:	230,776.91 yuan	Maximum floating loss:	0.00 yuan
Maximum floating profit and loss difference:	230,776.91 yuan		
Total input:	240,000.00 yuan		
----- Buying signal statistics-----			
(Count all buying signal points, regardless of the signal deletion caused by funds and strategies in the transaction test)			
Success rate:	35.29%		
Signal amount:	104	Annual signal amount:	104.00

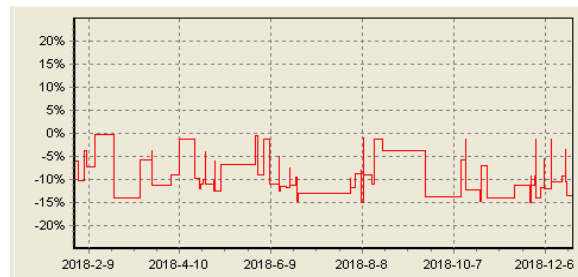


Figure 1. 01/25/2018-01/02/2019 MA income curve

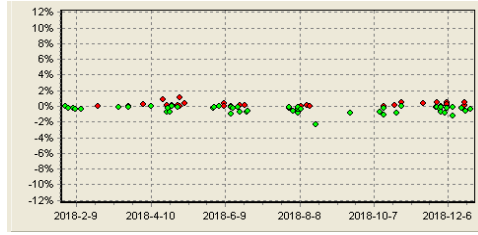


Figure 2. 01/25/2018-01/02/2019 Trading signal diagram

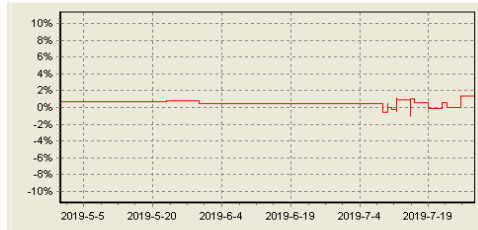


Figure 3. 04/18/2019-08/07/2019 MA income curve

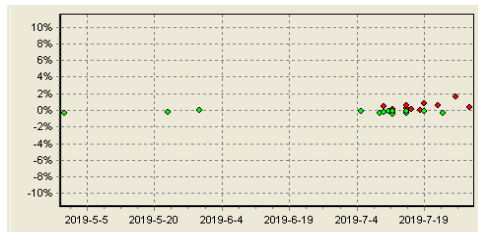


Figure 4. 04/18/2019-08/07/2019 Trading signal diagram

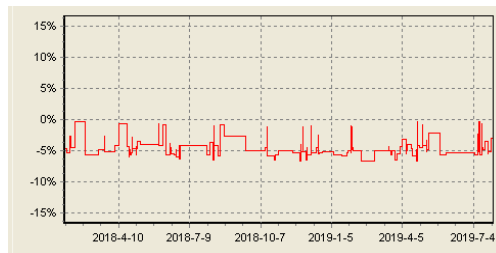


Figure 5. 01/25/2018-08/07/2019 MA income curve

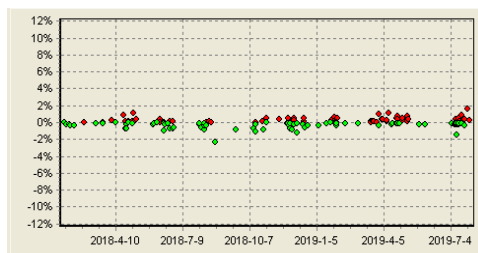


Figure 6. 01/25/2018-08/07/2019 Trading signal diagram

All experimental results (Figure 1-6 has given all of the experimental results of the income and trading signals)

**Table 3. MA expert system data table**

Time	Plan setting	Winning rate	Annual return rate	Net profit rate	Annual trading amount
01/2018---- 01/2019	Buy it when MA(5) is higher than MA(10), sell it when MA(10) is lower than MA(30)	36.25	-15.16	-15.16	80
04/2019---- 08/2019	Buy it when MA(5) is higher than MA(10), sell it when MA(10) is lower than MA(30)	40.00	3.05	1.02	75
01/2018---- 08/2019	Buy it when MA(5) is higher than MA(10), sell it when MA(10) is lower than MA(30)	45.21	-4.19	-6.63	92

### **3. Conclusion**

In the first period, on January 26, 2018, Shanghai Securities Composite Index was 3,558.13 points. On January 2, 2019, Shanghai Securities Composite Index was 2,465.29 points, which has increased up by -30.71%. In the second period, on April 18, 2019, Shanghai Securities Composite Index was 3,250.20 points. On August 7, 2019, Shanghai Securities Composite Index was 2,786.68 points, which has increased up by -14.82%. For the gold plate, the MA expert system only recorded positive returns in the second period. In which, the net profit margin was 1.02%, while the winning rate was 40.00%. Speaking of winning rate and net profit margin, Table 3 has shown that the MA expert system has high risks and low returns. Therefore, it is obvious that it is not a good choice to guide the gold plate investment by using MA expert system. And it is recommended to select other methods.

### **Acknowledgements**

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### **References**

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