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The Formulation of Stock Trading Strategy Summary

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Abstract: *Stock traders can maximize their total income by making scientific and reasonable transactions. According to the daily price flow, this paper determines whether traders should trade the assets in their portfolios. By establishing prediction models of future output value of different investment financial projects and quantitative analysis and sensitivity analysis of losses, we can combine the investments of financial products and evaluate their future value .Finally, the sensitivity analysis, advantages and disadvantages evaluation, error analysis and improvement of the model are carried out in this paper, so that the whole model can better provide guidance and practice when dealing with stock market transactions.*

Keywords: *stock market trade strategy, ARIMA model, sensitivity analysis, least square method*

1. Introduction

1.1 The background of the problem

Stock market investment requires market traders to make careful decisions. For stock trading, market traders often buy and sell stocks, and each sale usually has a commission, and two of the assets are gold and Bitcoin. Making decisions with more scientific and rigorous mathematical models can reduce the risk of investment and maximize the investment returns [1].

Stock investment income depends on the price, in general, according to the time of the stock running trend, so as to choose when to buy and sell, need investors according to real-time according to the relevant data and forecast analysis to choose stocks and buy and sell timing, and according to the corresponding mathematical model to analyze, figure 1 for stock trading and investment diagram. If we can make better use of mathematical models to quantitatively analyze the phenomenon of financial and trade, in order to find the potential laws in financial activities, and to guide the practice, then it will play a great role in the steady development of the stock market and the healthy development of the world economy.

Figure 1: Stock Trading and Investment

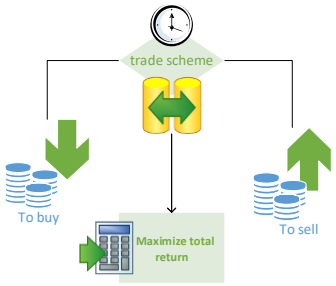

Figure 2: Trade strategy maximizes return

1.2 Restatement of the problem

According to the meaning of the question, establish the mathematical model to enable the trade strategy to maximize the income, and give the best strategy for daily trade based on the price data up to that day [2]. According to the model and strategy established, if there is an initial $1,000 investment, how much is it worth on October 9,2021?

Give evidence and relevant results that your mathematical model can provide the best trade

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strategy.

Determine the sensitivity that your strategy is subject to the transaction price. How does the transaction price affect your strategy and results?

Write a two-page memo in which you can communicate your strategies, models, and results with your traders.

1.3 Our work

For the first analysis of the annual value change characteristics of gold and Bitcoin in the stock trade, it needs to be clear that the model constructed in this question must be established with "based on the daily price of the past time" data in the past five years. The data were preprocessed, the outliers were removed and the time-based interpolation method was used to improve the accuracy of the basic data [3].

The time series ARIMA model was used to process the data for stability and significance test, and finally predict the multi-cycle comprehensive average to further improve the accuracy of the resulting model, and finally get the changes of the daily return value and yield of gold coins and Bitcoin. For the formulated strategy, use historical data to simulate the return curve, and calculate the value of the trade strategy on October 9, 2021.

To prove that the best trade strategy is not a simple planning problem, we need to use data statistics data mining to reasonably plan effective information, to prove that our established model can provide the best trade strategy, need from the yield, risk avoidance ability and produce stable yield for numerical and visual analysis, to prove that the mathematical model achieves the optimal investment results.

The sensitivity analysis of the model, that is, adjusted the trading cost of stocks and gold coins and Bitcoins and analyzed the yield situation, so as to get the price cost a% change, the investment strategy according to the change trend of the price cost;

According to the law of the financial market, extract the characteristic information of the stock financial products trade and formulate the position management strategy, and then introduce our model with continuous and stable yield rate and low risk. This model introduces the data provided by the simulation attachment, and finally summarizes the overall model has high sensitivity and sensitivity to the market reflection [4].

2. Global assumption

Suppose that the daily stock price does not fluctuate more with other secondary factors such as season and price index, and only has a regular relationship with its past price, that is, season and price need not be taken into account factors when establishing the model;

Suppose that there is no singularity in the missing price in the given table;

Suppose that there are no financial products change or disappear in the future when stock trade;

Acknowledge the continuity of the development of things, that is, by applying the past daily data, you can infer the development trend and basic laws of things;

Assuming that the financial assets can be distributed at will, they will be traded independently within their tradable time.

3. Symbol description

The price change decomposition model can systematically study the price changes of high-frequency financial data. For the various components of the price change decomposition model, the explanatory variables of the model were selected according to the sample auto-correlation function graph and the information criterion, and the model was built using logistic regression. It is found that there is some dynamic dependence of the price change, so a trading strategy based on the price change decomposition model is developed.The details are shown in Table 1:

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Table 1: Data description

symbol	*instructions*
P_{t+1}	*Forecast prices for the next business day*
P_t	*The actual price*
a_t	*Represents relative error*
P_{tn}	*The price of the NTH period*
m_i	*Subset of price increase*
n_i	*Price drop subset*
$M_{u.}$	*Maximum cumulative increase*
M_f	*Maximum cumulative decline*
u_i	*Falling number*
P_n	*Amount of the NTH addition*
w	*Cumulative rise and fall*
y_-	*Add warehouse strategy*
y_+	*And reduction strategy*
P_{gold}	*Initial investment amount of gold coin*
$P_{bitcoin}$	*Initial investment amount in Bitcoin*

4. Establish and solving the model

4.1 The data analysis

4.1.1 Data pre-analysis

This question can only be analyzed from the data given in the two tables given, from which we can get five years for stock trading. When choosing when the data is used, the model must be built to be "based on the daily price" in the past five years [5]. However, there are large fluctuations and abnormal data values in the five years of the given data, and the outliers offset the data and reduce the accuracy, so they need to be selectively eliminated. At the same time, there are also vacancy values in the data given, which we need to fill in scientifically [6].

In addition, we need to adopt the time-series ARIMA model, and the ARIMA model can essentially only capture linear relationships, but not nonlinear relationships. That is to words, the ARIMA model to predict timing data must be stable. If the data is not stable, it needs to be processed smoothly, that is, the existing data needs to be preprocessed.

4.1.2 Data preprocessing

If a value in the data deviates larger from the rest of the column, it may be an outlier value. In data preprocessing, this outlier needs to be detected and then removed and processed separately. Processing missing values in time-series data is an important and challenging task. Traditional interpolation techniques such as averaging method and endpoint method have large error after tests and do not apply to time series data because the order of received values is important. To solve this problem, we use the time-based interpolation method to complete the relevant data, that is, to fill in the data value with the dimension of the development law of time [7].

According to the observation of the transaction data of the selected five years, it can be concluded that the time sequence diagram has obvious local fluctuations and shows a stable trend on the whole, without seasonality and singularity. In order to ensure the correctness of the judgment, we will use the correlation coefficient for further exploration. MATLAB and SPSS were used for testing $\mathrm{p-value} = 0.7216 > \alpha = 0.05$. [8]Confirm that the sequence is non-stationary. In this case, the time series is usually processed by difference, and then the stationarity judgment is made. If the time series after difference is still not stationary series, we need to proceed with difference processing until we find stationary series. The stationarity is realized after one difference.

4.1.3 Analysis of the results obtained from the data processing

After the stationary processing, the stock market trading price changes greatly with time lag in the five years, so the difference and data processing are carried out with a cycle of 50, and FIG. 3 and FIG. 4 can be obtained. Figure 3 shows the transaction data graph before data processing, and Figure 4 shows the result after data pretreatment. It is obvious that the stability of data changes is greatly

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improved after data processing. Figure 4. First difference diagram of time series. The image is evenly distributed on both sides of 0 value, and the trend has almost no influence. For further determination, we also test the stationarity of the first-order difference sequence. The result of the test is $P-value \leq 0.01$ [9].That is less than the significant level of 0.05, so we can consider that the first-order difference sequence has passed the stationarity test.

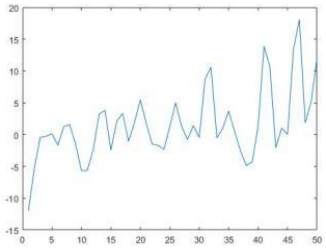

Figure 3: Data before data processing

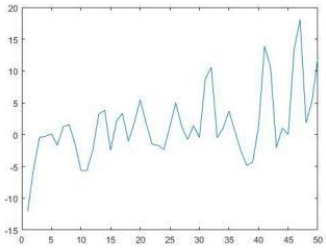

Figure 4: Data after first-order difference processing

4.2 Problem 1: Establishment and solution of the model

This topic is to make a reasonable forecast of the financial market in the future according to the situation of market trade in the past. Therefore, we select the ARIMA model of time series prediction analysis method for prediction. ARIMA model is applied to the dynamic and static prediction of stock prices, and it is worth noting that data needs to be processed smoothly. Figure 5 is the schematic diagram of ARIMA model. In ARIMA (P, D, Q) model, AR is "autoregressive" and P is the number of autoregressive items. MA is the "moving average", q is the number of terms in the moving average, and D is the number of differences made to make it a stationary sequence. After processing, the data conforms to the characteristics of stationarity. Therefore, the data that has been processed is selected for direct use.

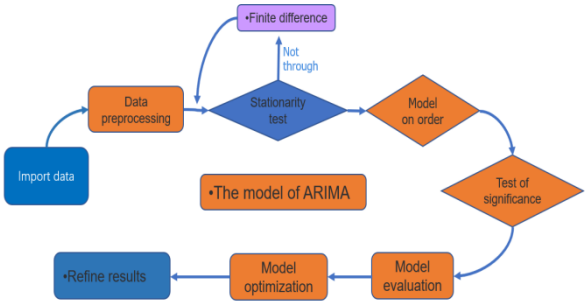

Figure 5: ARIMA model

4.2.1 The order problem of ARIMA model

The time series has been transformed into a stationary series after first-order difference, so we need to determine the values of P and Q. To this end, we check the ACF diagram and PACF diagram of the first-order difference sequence of the first-order difference sequence, as shown in Figure 6.

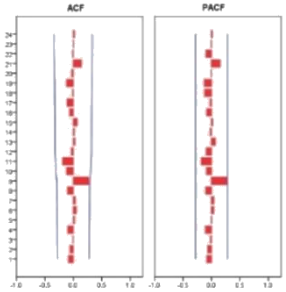

Figure 6: ACF and PACF of first-order difference sequences

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Both ACF and PACF plots have no obvious tailing and tailing characteristics, so it is difficult to judge the order. So we need other ways to help. First, we consider modeling one by one to compare BIC criteria for judgment. The details are shown in Table 2:

Table 2: BIC criterion values

ARIMA	*0,1,0.*	*0,1,1.*	*0,1,2.*
BIC	*616.6076*	*560.1466*	*561.5013*

After searching for the optimal model with MATLAB, ARIMA(0,1,1) was selected as the preliminary model.

4.2.2 Significance test of ARIMA model

After establishing the model, it is required to test its significance, that is, to determine the degree of fitting of the model to the original data. The principle of test is whether the fitting model has basically extracted all the relevant information of the original data and whether the residual sequence is gaussian sequence. If the residual order is listed as white noise sequence, the fitting effect is good. Otherwise, if the model fails to fit, we need to try other models. The stationarity test of residual sequence is realized by function. If all P-values in LB test are greater than 0.05, then the sequence is white noise sequence. At the same time, significance test was also conducted on the parameters, and the results were shown in Table 2, indicating that the parameters were significantly non-zero.

Table 3: Significance test results

		Model fitting degree statistics	*Young-box Q (18)*			
model	*Number of predictive variables*	*R party smoothly*	*statistical*	*DF*	*significant*	*The number of outliers*
VAR00007 - model - 1	*0*	*0.635*	*12.941*	*17*	*0.740*	*3*

Finally, we also made the fitting diagram of the model, Table 3. It can be seen that the fitting line is very close to the original data line, and the fitting effect is good. In the end, the model ARIMA (0,1,1) was confirmed.

4.2.3 Prediction steps and analysis

According to the above established model and its preliminary prediction results, we optimize the prediction results of ARIMA model and use the multi-cycle comprehensive average for prediction, which can make the prediction results more accurate and stable. The specific steps are as follows:

We take the predicted price of the next working day, so the actual price of the next working day is,$P_{t+1}P_t$

$$a_t = \frac{|P_{t+1} - P_t|}{P_t} \times 100\%$$

Relative error which said, in order to make the prediction results more accurate, according to the principle of the prediction model, the prediction of the future financial product prices, but it is based on historical prices to predict the change rule, and the stock market price change rule and the data has a lot to do with the way of statistics, in order to make the prediction results more accurate, more practical feasible model, Therefore, we used the comprehensive average of multiple periods to predict and optimize the preliminary results. The specific operation steps are as follows:a_t

Firstly, we need to select the historical data in the early stage of prediction. Here, we select the data with T as the cycle as the original comparison number set.

Predict the price of the next cycle through the prediction model established above, so as to obtain the predicted value of the next cycle. For example, in n cycles, the price is,... $P_{t1}P_{t2}P_{t3}P_{tn}$;

Calculate the average value according to the predicted value of each cycle:

$$P_{t1} = \frac{\sum_{i=1}^{n} P_{ti}}{n}$$

Model solution:

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According to the above model, the data accuracy and feasibility of the known data in the topic should be verified first, and the price after 15 trading days should be predicted. Because the historical data is too small, there is no prediction condition, so extraction and...$t_1 t_2 t_n$Take 1, 2...N;

When t_1 =1, it means that the historical data is used as the original data to predict the stock trading strategy;

When t_2 =2, it refers to the historical data of every other day as the original prediction of stock trading strategy;

When t_n =n in the historical data, the original data of the previous n days are estimated, and the historical price of gold coins and bitcoin is substituted into the price of the next trading day for prediction, as shown in Table 4. The price forecast of the 1573 day is randomly selected as an example:

Table 4: Comparison of forecast and actual value of gold coins and Bitcoin

cycle	$t_{1=1}$	$t_{2=2}$	$t_{3=3}$	$t_{4=4}$	*The average*	*The actual value*
Gold COINS Predictive value	*1323.806*	*1313.52*	*1318.46*	*1304.501*	*1315.46*	*1323.25*
Bitcoin forecast value	*11038.86*	*10897.03*	*10920.43*	*10817.58*	*10918.72634*	*10919.65*

If the model is used to predict the price of each stock trading day in the future, the predicted value can be compared with the actual value, then the model established above is effective. Therefore, when doing stock trading, the price of the next trading day can be obtained by the above prediction model.

According to the above prediction model, the price of the next trading day can be obtained, but the price can only judge the direction of the next trading day, not reflect the specific trading strategy. In order to develop a scientific and reasonable strategy, it is necessary to use known historical data to statistics the distribution law of the corresponding rise and fall, so as to formulate a scientific investment strategy. In order to formulate strategies scientifically, we found that the trend of rise and fall was only meaningful in a short period of time, so we needed to mine the distribution law of rise and fall in historical data.

4.2.4 Prediction calculation and statistics

Gold and bitcoin are calculated according to the data given in the title. The steps are as follows:

Calculate the actual rise and fall of financial products in each trading day;

To financial products corresponding fall in the historical data mining, we use the MATLAB software for statistical data on topic given.

All orders of continuous rise and decline over 90% obtained are calculated as the comparison between all rise and decline obtained by statistics of each U rise and fall in historical data;u_1 $M_{0.9}M_{0.1}$

If the number of consecutive rises and falls of the product is, then the number of consecutive rises or falls of the product is denoted as, the maximum cumulative rise is, and the maximum cumulative fall is;$x_i u_1 M_u M_f$

Under ideal conditions, if each rise or fall in the same range, when the fall happens to fall, then each fall is to add positions, if the next day rise can be profitable.$u_i M_{0.1} M_{0.5}$

The amount of the first additional position is the amount of the second additional position isP_1

$$P_2 \times M_{0.5} + P_1 \times \left(\frac{M_{0.1}}{u_1}\right) M_{0.5} = 0$$

The amount of the third increase is

$$P_3 \times M_{0.5} + P_2 \times \left(\frac{M_{0.1}}{u_1}\right) M_{0.5} + P_1 \left(\frac{M_{0.1}}{u_1}\right)^2 \times M_{0.5} = 0$$

The amount of the NTH addition is

$$P_n \times M_{0.5} + P_{n-1} \times \left(\frac{M_{0.1}}{u_1}\right) M_{0.5} + \cdots P_1 \left(\frac{M_{0.1}}{u_1}\right)^{n-1} (M_{0.5}) = 0$$

According to the above model, it can be directly obtained and fitted by the linear regression model.

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$$y = a(e^t)$$

On this basis, when the position management model rises or falls x times in succession, the cumulative rise or fall is W.

$$Where,\ y_+ = ae^{b\left(\frac{W}{M_{0.1}}\times u_1\right)}$$

$$y_- = ae^{b\left(\frac{W}{M_{0.9}}\times u_1\right)}$$

To sum up, we can get the strategy of increasing positions and reducing positions and make the investment strategy more stable by combining the trend prediction obtained in the first part.$y_+ y_-$

Similarly, to solve the investment strategy of bitcoin, the initial investment amount of the two is

$$P_{gold} = \frac{P_{exchange}}{U_1} \times \frac{1}{2}$$

$$P_{bitcoin} = \frac{P_{exchange}}{U_2} \times \frac{1}{2}$$

Based on the data of the trading period from November 9, 2016 to October 9, 2021, we use model ARIMA (0,1,1) to forecast the data of the China-us exchange rate for the next statistical day. By using ARIMA(0,1,1) model and using historical data to simulate the above formulated strategy, the curve of profit value is shown in FIG. 7 and FIG. 8 below:

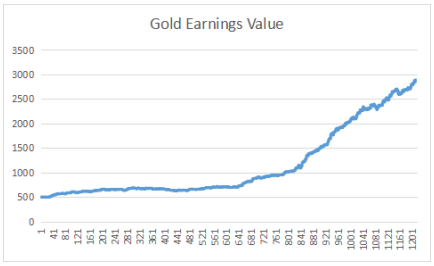

Figure 7: Profit value of gold coins

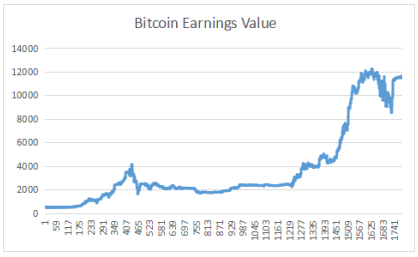

Figure 8: Profit value of Bitcoin

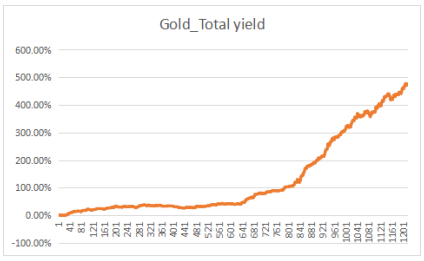

Figure 9: Yield of gold coins

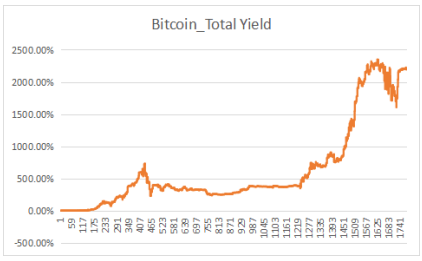

Figure 10: Yield of Bitcoin

Figure 7 and 8 show the data trend of gold coin return and bitcoin return respectively. Figure 9 and 10 show the data trend of gold coin return and bitcoin return respectively, that is, the trend simulated by ARIMA model (0,1,1).In the trend of stock trading, the income of gold coins and bitcoin is in line with the actual situation, that is, the income of gold coins and bitcoin increases steadily with the growth of time. The yield of gold is 473.873% after calculation, that is, the income of gold coins is 4.73873 times of the original cost. The yield of Bitcoin is calculated to be 2293.257%, that is, the yield of Bitcoin is about 23 percent of the original cost.

Finally, MATLAB was used to simulate the trade data on October 9, 2021, in which bitcoin gained $11,466.236 and gold gained $2,869.3872, so the total gain was calculated to be $14,335.6232.

4.3 Analysis of the best trade strategy

4.3.1 Basic requirements

After analyzing the problem, it can be concluded that the best trade strategy is not just a simple planning problem. Firstly, data mining of data statistics is used to collect effective information, and then trade strategy is rationally planned by using effective information. Second to interfere with the model of a certain strategy, the established model to prove that we can provide the best trade strategy,

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namely to interfere with the model of a certain strategy, need to meet the need of three conditions: the yield is high, the ability to avoid risk (trade strategy high safety coefficient) and a stable yield.

4.3.2 Trade strategy analysis

First of all, the return rate of stock trading is high, so we use the return rate of stock trading to directly reflect the advantages and disadvantages of trade strategy. It cannot be measured by the return rate. Obviously, the return rate varies greatly with the change of principal, while the return rate obviously reflects the income capacity of stock trading. The stock return rate is equal to the ratio of the amount of return to the original investment. The simulated return rate of investment is shown in Figure 11 and 12:

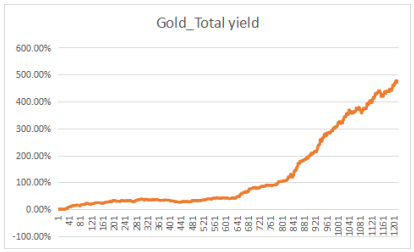

Figure 11: Gold yield

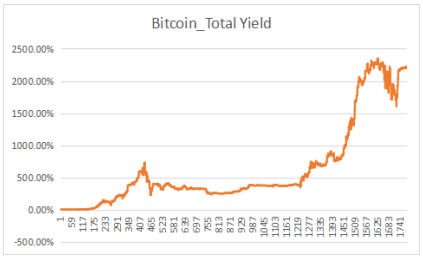

Figure 12: Bitcoin yield

Among them, the yield of gold is 473.873%, and the yield of bitcoin is 2293.257%.

Second stock market risk aversion ability must be better, in the process of economic, do not give up because of the existence of risk and the established goals, but to take various measures and means to try to reduce the probability of occurrence of a risk, could afford to reduce the economic loss, they have loss, decisive "cut meat to sell", "stop loss". Stock investment risk and market risk come from various factors and need to use the avoidance method comprehensively. Be sure to keep track of trends., in general, the greater its daily earnings changes, the greater the risk that the stock market, the stock market gains positively correlated with its ability to resist risk, then by comparing the stock market gains obvious degree to compare the stock market to evade the risk, we can compare the original daily earnings and using the model after comparing daily earnings.

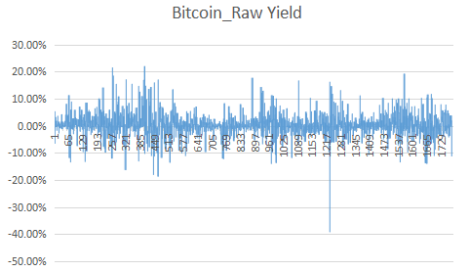

Figure 13: Daily return of original Bitcoin

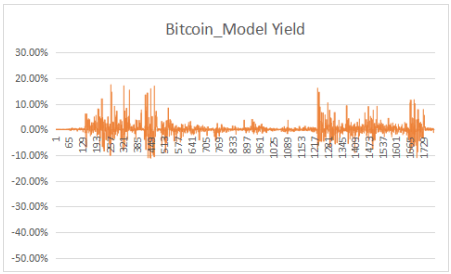

Figure 14: Daily return of Bitcoin after optimized model

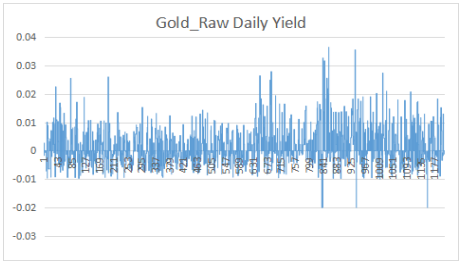

Figure 15: Daily return of original gold coins

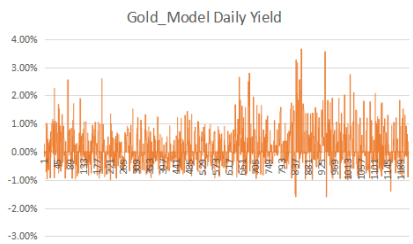

Figure 16: Daily return of Bitcoin after optimization mode

As shown in figure 13, 14, 15 and 16 four picture shown in the original daily earnings and using the model respectively after daily earnings, obviously after using the model of daily earnings more primitive daily income is more stable, less the outliers, data collection also more closely, can prove that we provide the best trade strategy ability to avoid risk in the stock market, the model better.

Then the loss is more than 4% of the number of its losses, calculate the original daily income is

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greater than the 4% average is 52.8%, and the optimized model is 36.4%, 16.4%, avoid risk ability is superior to the ordinary model risk ability is superior to the ordinary model, further can provide validation of the trade strategy to avoid risk in the stock market ability.

The last is the continuous income stability, the historical data of stock price changes are analyzed in detail, from which to understand the law of its cyclical changes, to understand the ability of continuous growth of income.

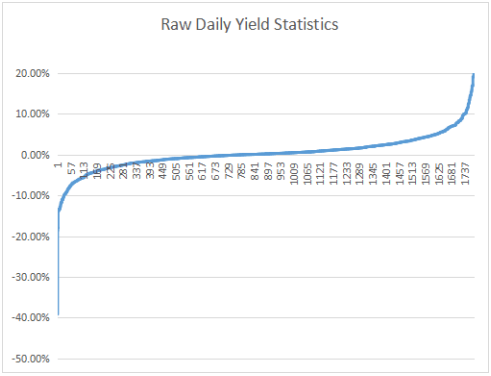

Figure 17: Original Bitcoin daily return Data

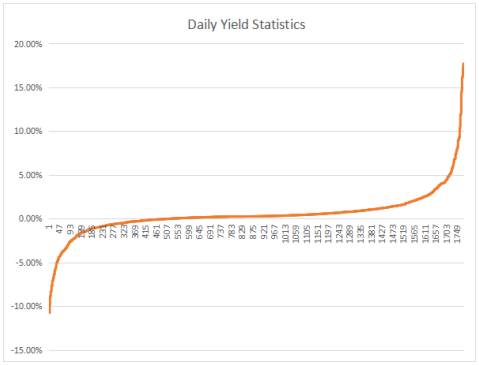

Figure 18: Bitcoin daily return data after model processing

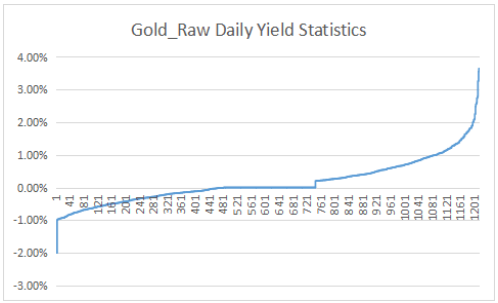

Figure 19: Daily revenue data of original coins

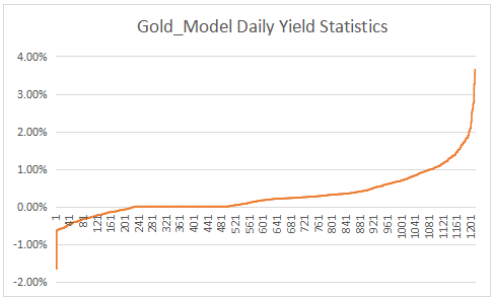

Figure 20: Daily revenue data of original coins

As shown in FIG. 17, 18, 19 and 20, the optimized model maintains the continuous daily return of gold coins at 18.9%, while the optimized model maintains the daily return of Bitcoin at 31.5%, which indicates the continuous growth ability of returns.

Finally, the comprehensive return rate is 2267.21%, the risk avoidance ability is better than the ordinary model 16.4%, the daily steady return tends to (1.89%-3.15%) three aspects of numerical and visual analysis, prove that the mathematical model has reached the optimal investment results.

4.4 Transaction cost sensitivity analysis

4.4.1 Transaction cost value

The sensitivity analysis of the model is carried out, that is, the transaction costs of stocks, gold coins and bitcoin are adjusted and the yield rate generated is analyzed. According to the above model, it can be directly obtained and fitted with the linear regression model.

$$y = k(e^t)$$

On this basis, when the position management model rises or falls x times in succession, the cumulative rise or fall is W.

$$Where, y_+ = ke^{b\left(\frac{W}{M_{0.1}} \times u_1\right)}$$

$$y_- = ke^{b\left(\frac{W}{M_{0.9}} \times u_1\right)}$$

The investment strategy can be more stable by adding and reducing positions and combining with the trend prediction.y_-y_+ The results of changing the transaction costs of stocks, gold coins and Bitcoin are shown in Table 5:

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Table 5: Changes of yield rate generated by it in different trading prices

Gold cost	*k*	*b*	*The yield*	*The cost of Bitcoin*	*k*	*b*	*The yield*
0.3%	*0.7568*	*0.3571*	*474.274%*	*0.3%*	*0.7568*	*0.3575*	*2465.737%*
0.5%	*0.6505*	*0.4301*	*464.639%*	*0.5%*	*0.6505*	*0.4301*	*2358.285%*
0.7%	*0.5642*	*0.5722*	*456.873%*	*0.7%*	*0.5642*	*0.5722*	*2293.257%*
1.3%	*0.1293*	*2.046*	*435.528%*	*1.3%*	*0.1293*	*2.046*	*2154.639%*
1.5%	*0.07247*	*2.625*	*413.865%*	*1.5%*	*0.07247*	*2.625*	*2104.564%*

4.4.2 Analysis of transaction cost influencing strategy results

In formula (11), (12) by means of changing position after the transaction cost management function fitting statistics, found that when the transaction cost rises, the first constant coefficient k decreases with the increase of transaction cost, and the second index coefficient increases with increasing along with the transaction cost, b in transaction cost increases, should choose more aggressive investment strategy, In order to get a higher yield. Compared with the original transaction cost, when the financial product continues to rise or fall, the strategy adopted is more sensitive to the situation of large rise or decline, and the decision should reduce the proportion of adding or reducing positions in the case of small rise or decline;

When the transaction cost decreases, it can be found that the first constant coefficient K increases while the second exponential coefficient B decreases. Compared with the original transaction cost, the transaction strategy adopted will be more conservative. Compared with the original transaction cost, it is more sensitive to the general range of rise or fall, and the decision should reduce the proportion of adding or reducing positions when the range of rise or fall. To sum up, the model has significant changes with the change of transaction cost A %, which proves that the application of this model has strong expansibility and high applicability to stock market trade problems [10].

5. Analysis and test of the model

5.1 Error analysis

(1) The value of gold coins and bitcoin may change greatly over time, leading to the inaccuracy of the long-term prediction of our model, resulting in errors.

(2) Due to the limitation of data set, we can consider many factors in ARIMA model, such as the influence of official policies, enterprise operation and local economic development level on stock market trading. If a broader data set is adopted, the optimal trading strategy can be better simulated.

(3) Due to the volatility of the actual stock market, there is a deviation between the situation reflected by the model and the actual situation;

5.2 Sensitivity analysis

In question 3, the sensitivity of the model is analyzed with the change of transaction cost, and it is concluded that there is a significant change after the change of A %, which proves that the model has a strong market response ability, the model has a strong application expansibility, and has a high applicability to the stock market trade problem.

6. Strengths and weakness

6.1 Advantages of the model

As the data is preprocessed before the prediction model, the accuracy of the obtained model results will be greatly improved.

In every process related to the data, we paid special attention to small and unbalanced data sets. For example, after data difference, significance test will be conducted to further improve the accuracy of results [11].

Sensitivity test was carried out on the transaction cost, and after the change of transaction costs a %

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yield has a significant change, shows the model market reaction ability, on the other hand also can be concluded that this model application scalability is stronger, the stock market financial trade issues have high applicability, can be applied to the actual situation of the majority of traders and produce excellent results.

6.2 Weaknesses of the model

Due to the single index of data, it cannot be perfectly applied to the ARIMA-GARCH model for further optimization of the model.

As the change of finance and trade may be obvious over time, if the prediction period is too long, the prediction results will be inaccurate;

Due to the single data source, the accuracy of the results of the stock market trade model is reduced when it is affected by policies and news.

7. Conclusion

The stock trader carries on the scientific and reasonable transaction, can maximize its total income. In this paper, the daily price flow is used to determine whether traders should trade the assets in their portfolios, and the value of the investment in financial products is predicted by establishing the forecast model of the future output value of different investment financial projects.

Through the establishment of time series ARIMA model for prediction analysis. First of all, missing values and outliers are preprocessed for the attached data, and then the first order difference is used for data stationarity processing. Secondly, BIC criterion judgment and significance test were carried out for the model, and time linear optimization of ARIMA model was carried out by multi-period comprehensive prediction method. Extract the characteristic information of the trade of stock financial products and formulate the stock position management strategy. Use historical data to solve the yield curve simulated by the strategy formulated above [12].

Use data mining of data statistics to collect effective information, and then use the information to make reasonable planning of trade strategy. Secondly, certain strategic interference is carried out on the model, and finally, numerical and visual analysis is carried out on the three aspects of high comprehensive return rate, excellent risk avoidance ability and stable daily return, proving that the mathematical model has reached the optimal investment results. In order to determine the sensitivity of the transaction price and how it affects the strategy and result, this paper adjusts the transaction price of the portfolio of stocks, gold coins and bitcoin, which shows that this model has strong market response ability. On the other hand, it can also be concluded that this model has strong application expansibility and has high applicability to financial and trade problems in the stock market

Finally, this paper evaluates the advantages and disadvantages of the model, analyzes and improves the error of the model, so that the overall model can provide better guidance practice when dealing with the stock market trading.

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