Turtle Trading Rule Backtest Report

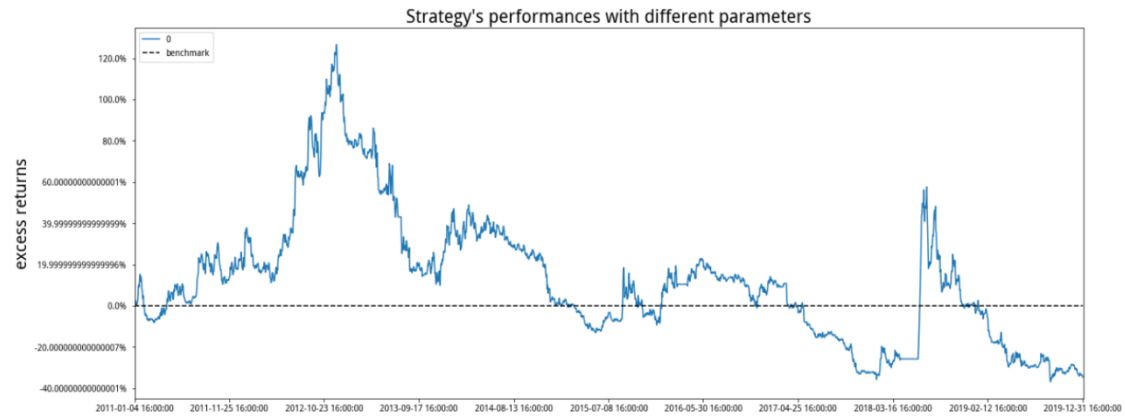
Because the core of Turtle trading is about stocks, it diversifies risk management by spreading money across different markets. Therefore, for the backtest, when considering the impact of other variables on the strategy, ensure that the single stock class (000063.XSHE) remains unchanged.

Back Test Process:

1. Use results of daily and minute backtest to observe the difference of turtle trading rules.
2. Observe turtle trading rule strategy returns under different time periods.
3. Observe the influence of the change of the proportion of the amount allocated by system 1 and 2 to the total amount on the strategy income.

1. According to the day test, and according to the minute test results:
    - The proportion of the amount allocated in system 1 to the total amount is 0.7, and the daily backtest is conducted from 2011.1 to 20119.12.31

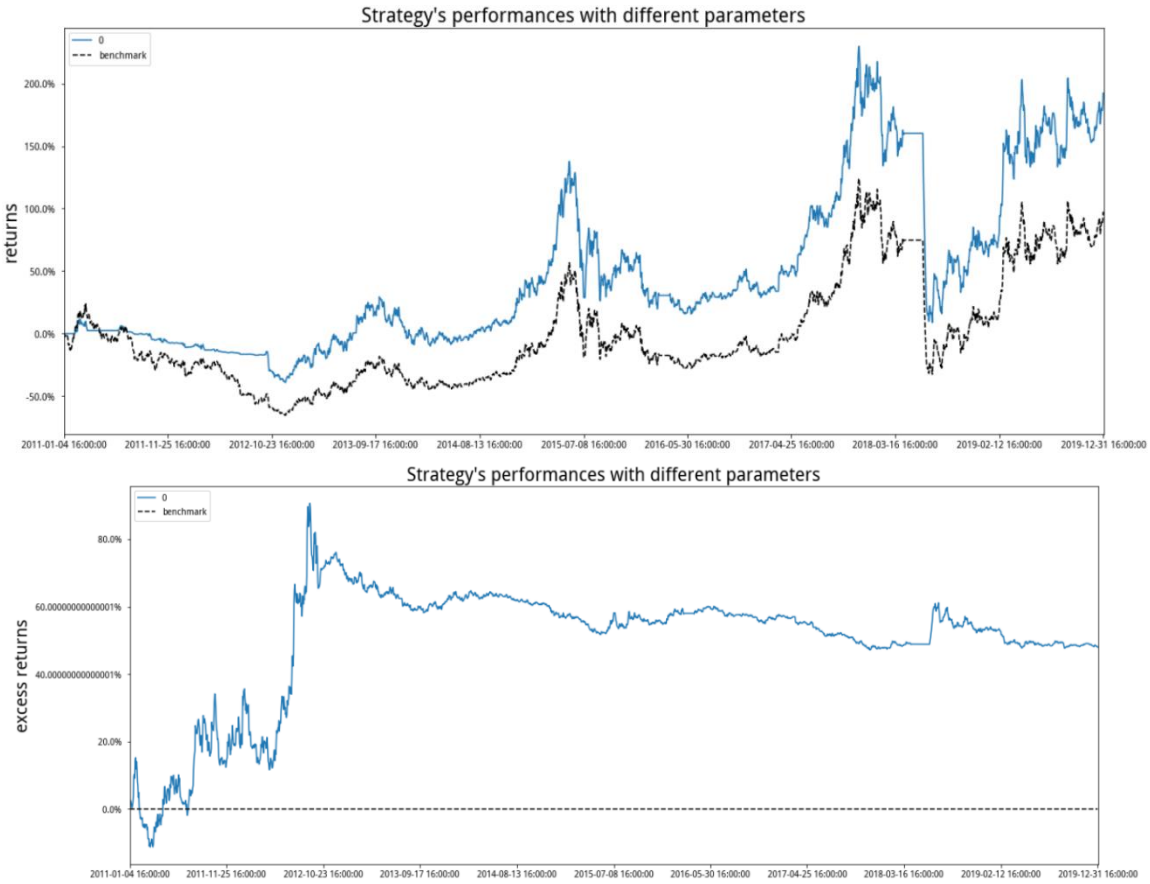
Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
0.29293	0.221282	-0.0461866	-0.34524	0.720785



Conclusion: Since the returnee strategy has stop-profit and stop-loss, a cap on opening positions and a 2% allowable risk, the strategy's return and loss do not fluctuate much, with a volatility of only 22%.

- The proportion of one allocation amount in the total amount of the system is 0.7, and test in minutes from 2011.1.1 to 2019.12.31.

Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
1.92279	0.382735	0.235959	0.480094	0.669991



Conclusion:

According to the minute back test, turtle trading rules more timely detection of the breakthrough signal, timely according to the stock trend to buy, add, stop loss and clearance. This makes the strategy yield, Sharpe ratio, and excess yield higher than the daily retest strategy. Turtle strategy is essentially a trend-following strategy based on the volatility of a specific stock market. In details, if the current stock price rises above the limit, it is expected that the stock will rise in the future, and choose to buy or add positions according to the trend forecast. If the current stock price breaks down the prescribed line, then the stock is expected to fall in the future, choose to stop losses or leave the market. As a result, the trend of strategic returns is very similar to that of non-strategic holdings when backtested by minute. However, in the back test, the back test

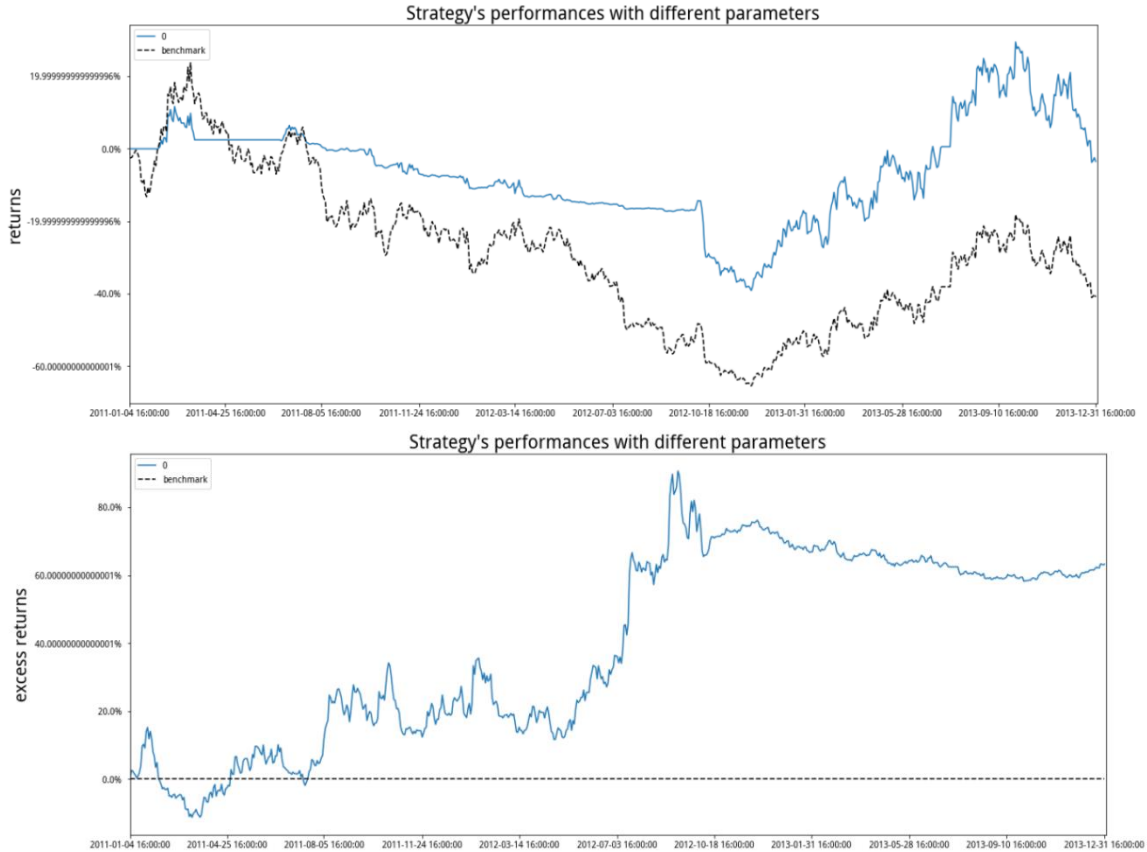
engine is based on static historical data, so it can simulate matchmaking. But in a real session, if the K line is not finished, then the highest stock price may be dynamic. That is, the average range of price fluctuations caused by a particular market in a single trading day is variable. Since the channel ceiling was yesterday, if prices repeatedly move up and down the channel minute that day, it may lead to repeated buying.

2. Observe turtle trading rule strategy returns under different time periods

   Since the minute-by-minute backtest strategy yields better returns, the following are minute-by-minute backtests.

- 2011.1.1-2013.12.31

Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
-0.0347304	0.275058	-0.189469	0.632808	0.454872



- 2014.1.1-2016.12.31

Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
0.199519	0.1727240	0.139019	-0.203225	0.159589

- 2017.1.1-2019.12.31

Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
0.573309	0.202928	0.629004	-0.290926	0.16245

Conclusion:

From January 1, 2017 to December 31, 2019, the trend of strategic returns from June, 2016 did not fall along with non-strategic stock prices, but was relatively flat. Because the buying and selling units of stocks were determined according to the maximum loss rate that a trade could bear and the average fluctuation range of stock prices in a specific market, the strategic returns did not fluctuate dramatically. However, in the retest from January 2011 to December 31, 2019, the strategy return from June 2015 to July 2016 showed the same trend as the non-strategy return, with a sharp decline, from about 155% to 25%, a total decline of about 83.87% of strategy return. Such a sharp drop violates the risk limit set by the law on trading overseas returnees, so the strategy needs to improve. To be specific, from January 2011 to December 31, 2019, the strategy income was in the red from June 2012 to December 2014. This is reflected in the back-test from January 2011 to December 31, 2013, when the strategy yield was -0.0347304 < 0. Hence, the total value of stocks and cash currently held, as well as the cash available to spend, is adjusted to be smaller. This directly makes units smaller, resulting in a relatively small upper limit of units that can be purchased, which makes the number of required warehouses for systems 1 or 2 greater than the upper limit of units that can be

purchased, so there was no additional warehouse operation after October 2012. Therefore, in the backtest from January 2011 to December 31, 2019, after October 2012, the trend of strategy return was very close to the trend of non-strategy return. As a result, the turtle strategy can be well reflected in the backtest of 2017.1.1 to 2019.12.31, but not well reflected in the backtest of 2011.1.1 to 2019.12.31.

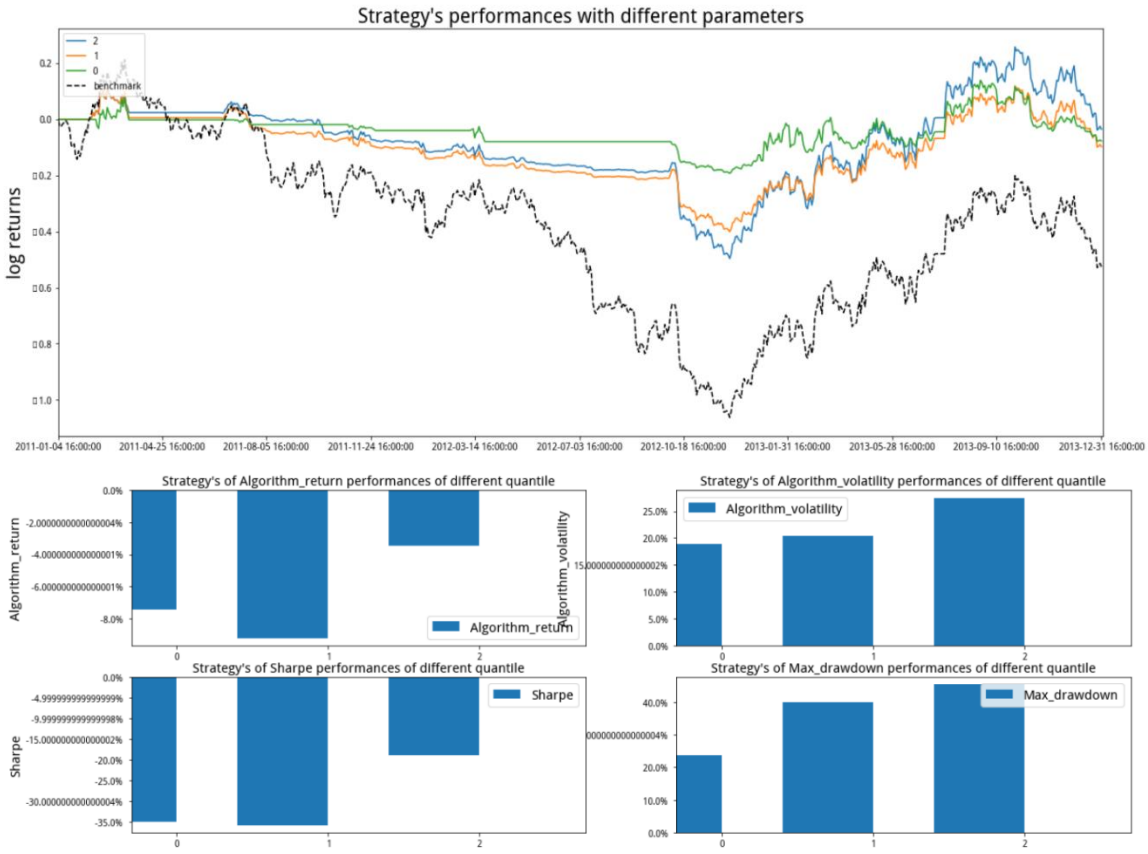
Similarly, for the backtest period from January 2014 to December 31, 2016, the strategy yield curve was very different from the period from January 2011 to December 31, 2019.2011. Since the volatility of 0.172724 obtained from January 1, 2014 to December 31, 2016 was very small, and there was no significant upward trend when the non-strategic return increased significantly, which reflected that the turtle strategy in this period had successfully stopped earning. Therefore, the turtle strategy can be well reflected in the back test from January 2014 to December 31, 2016, but not well reflected in the back test from January 2011 to December 31, 2019.2011.

Therefore, the turtle strategy will be affected by the loss of the earlier strategy in the long period of back test, and cannot be applied to the later period of back test.

3. Observe the influence of the change of the proportion of the amount allocated by system 1 and 2 to the total amount on the strategy income:

- The ratio of the amount allocated in system 1 to the total amount. ratio=[0.2,0.5,0.7]
- 2011.1.1 - 2013.12.31

	ratio	Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
0	0.2	-0.0743334	0.189636	-0.349528	0.565817	0.238224
1	0.5	-0.0924617	0.204119	-0.357152	0.535152	0.400187
2	0.7	-0.0347304	0.275058	-0.189469	0.632808	0.454872



Conclusion:

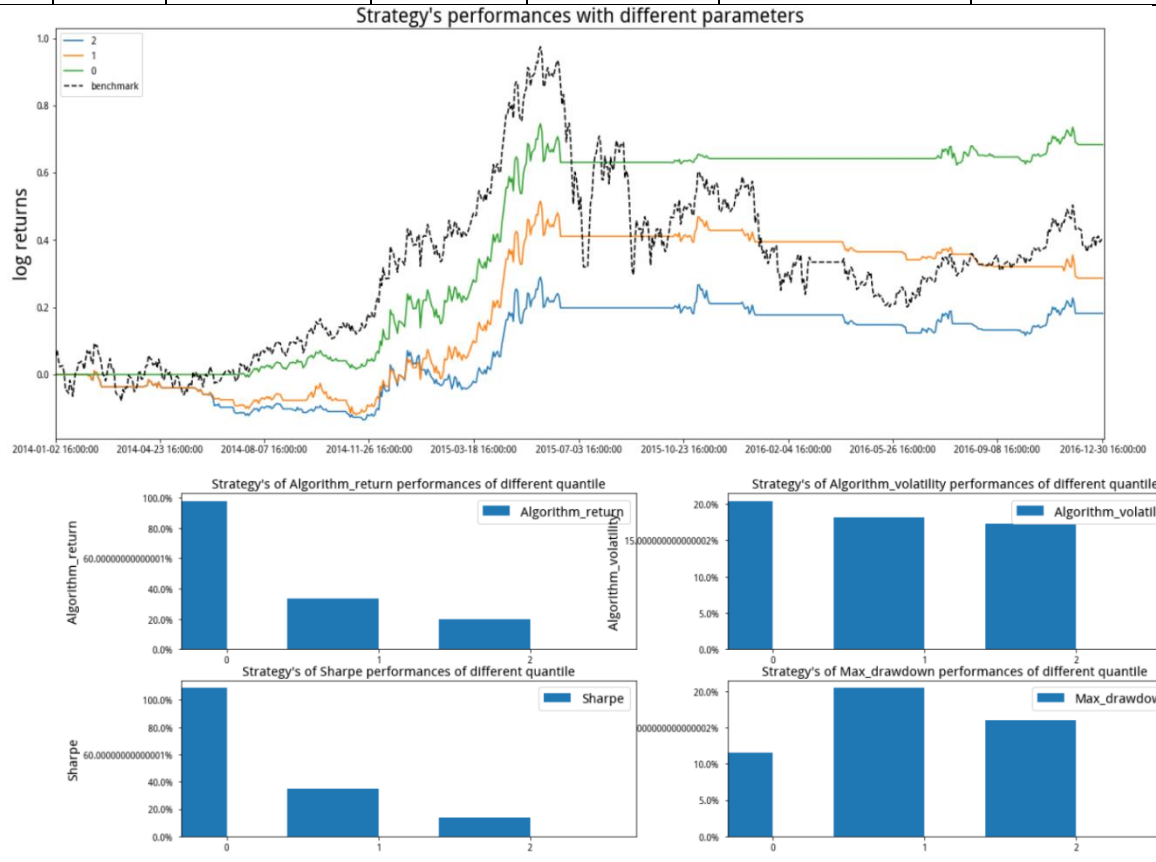
When the ratio=0.2, the turtle strategy yield is -7% and the strategy is in the loss state. The Sharpe ratio of -35% means that for every 1% increase in investment risk, there is an excess return of -35%, or a 35% excess loss per unit of risk. The maximum retracement rate of the strategy is 24%, which indicates that the maximum retracement range of the strategy return is 24% when the stock price falls to the lowest value within the specified period. Strategy volatility is 19%.

When ratio=0.5, the strategy return rate of returnee is -9%, which is the maximum strategy loss rate under the three parameters. Sharpe ratio -36%, is the unit risk to bring the most excess loss. The maximum retracement rate and volatility of the strategy are 40% and 20%, respectively.

When ratio=0.7, the strategy yield and Sharpe ratio are -3% and -2% respectively, and the strategy loss is less than the other two situations. However, the maximum retracement rate and volatility of the strategy are the largest in the three cases, so the strategy is relatively unstable.

- 2014.1.1 - 2016.12.31

	ratio	Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
0	0.2	0.980809	0.20454	1.08796	0.315743	0.115582
1	0.5	0.332107	0.18117	0.346343	-0.115154	0.204581
2	0.7	0.199519	0.172724	0.139019	-0.203225	0.159589



Conclusion:

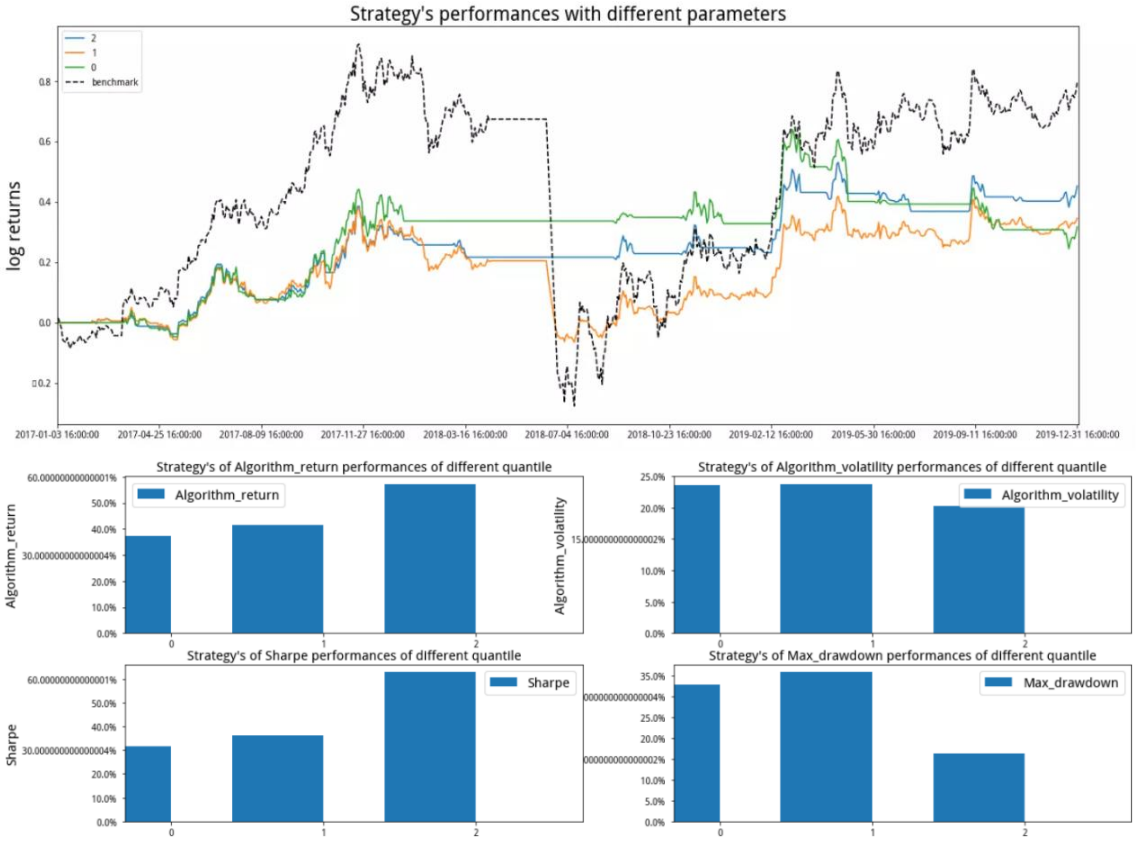
When the ratio=0.2, the turtle strategy returns 98%. Sharpe ratio 1.088, reflecting how much 1.088 excess return will be generated for each unit of total risk the strategy takes, 1.088 > 1. Therefore, the rate of return of the strategy in this situation is higher than the volatility risk. The maximum retracement rate is 12%, which reflects that the maximum retracement range of strategy income is 12% when the stock price falls to the lowest value within the specified period. However, the strategy volatility of 20% is the largest compared with the other two coefficients, indicating that when 20% of the capital is invested in the system, the strategy return changes the most compared with other conditions.

When ratio=0.5, the strategy yield is 33%. Sharpe ratio 0.346343, reflecting the excess return per unit total risk strategy is 35%. The maximum retracement rate is 20%, which indicates that the maximum retracement range of the strategy return is 20% when the stock price falls to the lowest value within the specified period. Volatility is 18%.

When ratio=0.7, strategy return of 20% is the lowest compared with the other two cases. The 14% Sharpe ratio is also the lowest, so the unit risk strategy has the lowest excess reward.

- 2017.1.1 - 2019.12.31:

	ratio	Rate of Return	Volatility	Sharpe ratio	Excess return rate	Maximum retracement rate
0	0.2	0.37432	0.236307	0.316849	-0.380608	0.326749
1	0.5	0.413853	0.237922	0.360367	-0.362791	0.357952
2	0.7	0.573309	0.202928	0.629004	-0.290926	0.16245



Conclusion:

When the ratio=0.2, the turtle strategy yield is 37%, which is the lowest compared with other situations. Sharp's ratio of 32% was the lowest compared with other conditions. Therefore, in this case, the strategy income ability is weak. Strategy volatility and maximum retracement rate were 23.6% and 33%, respectively. When the ratio=0.5, the strategy yield is 41% and the Sharpe ratio is 36%. The maximum retracement rate of the strategy is 36%, which is the largest compared with other cases. Moreover, the volatility of the strategy is 23.8%, which is the largest compared with other cases. Therefore, the strategy is unstable compared with other cases.

When the ratio=0.7, the strategy yield is 57% and the Sharpe ratio is 63%. The maximum retracement rate of the strategy is 16%, and the volatility is 20%.