A Method of Distinction Between Momentum Chasing or Contrarianism Trading

Lian He[1],[*]

[1]School of Business Administration, Zhuhai College of Jilin University, Zhuhai, Guangdong, 519041, China

[*]Lian He. Email: helian@jluzh.edu.cn

ABSTRACT. This paper explains a method of making distinction between momentum chasing and contrarianism trading. First, we randomly select a time series of some security in futures market, and the time frequency is one minute. Second, we convert the close price into index price, and calculate thirty-minute moving average of index price. Third, after curving fitting and derivation, we found all the extremum points. We study the continuous rising or falling percentage after a extremum point is confirmed, in order to study momentum chasing and contrarianism trading. The result shows that, setting 0.1% as condition, momentum chasing is major trading way when continuous rising or falling 0.1%, while contrarianism trading is major trading way when continuous rising or falling 1%.

1. INTRODUCTION

Momentum Chasing and Contrarianism Trading are two typical trading behaviors of investors. [1] Under normal circumstances, prices deviates the value center, which is the average value, shows certain characteristic of fluctuation trend. In this case, investors tend to make two completely different and opposite trading strategies based on this characteristic. [2] One is that, if the internal and external factors have not changed, the fluctuation trend that has come into being is unlikely to change in the short term, so trading should follow the trend. The other strategy is that according to the characteristics of mean regression, prices that have deviated from the value center will eventually move towards the value center, so trading should be against the trend. [3] Obviously, the lower the degree of deviation is, the greater the probability that investors conduct Momentum Chasing will be; conversely, the higher the degree of deviation is, the greater the probability that investors conduct Contrarian Trading will be. [4]

At present, there are many methods for studying Momentum Chasing and Contrarianism Trading, the most important of which is to examine the degree of deviation between the price and the value center centered on the mean. [5] However, the disadvantage of this method is the instability of the value centre. Because the moving average is affected by price fluctuations, it also presents some characteristics of fluctuation trends, which brings certain difficulty to the quantitative judgment of Momentum Chasing and Contrarianism Trading. For this reason, this article adopts a new method to quantify Momentum Chasing and Contrarianism Trading by confirming extremum points.

2. RESEARCH OBJECT

In the futures market, we randomly select a security (Rebar 2001, rb2001) that is being traded, and randomly intercept a time series. The start and end of this time series is 9:47 on October 8, 2019 and 15:16 on November 27, 2019. The trading frequency is 1 minute and the series contains 12,000 pieces of price information data. Each piece of price information reveals four prices in a 1-minute trading period, which are the open price, the high price, the low price, and the close price, as shown in Figure 1. We only take into consideration the close price.

In order to eliminate the impact of absolute prices on later research results, we first convert the close price into index and find its price index, that is, the relative price. The equation is as follows:

$$index = \frac{close\_1M_t}{close\_1M_{t-1}} \tag{1}$$

Second, considering that the "noise" generated by the short-term fluctuations of the price index will affect our judgment of the fluctuation trend characteristics of the price index, we perform a move average on the price index to find the moving average of the price index. The equation is as follows:

$$MA_{index} = \sum_{i=t}^{t-n+1} index_i \Big/ n \tag{2}$$

For example, we average each price index over its past 30 minutes to get a 30-minute moving average of the price index. Compared with the price index, the moving average curve of the price index after "noise" filtering is smoother, and its fluctuation trend characteristics are more obvious. As shown in Table 1, after excluding the time without data, we get the calculation results of the close price information, the price index and its moving average for each 10 minutes from the start to the end of the time series.
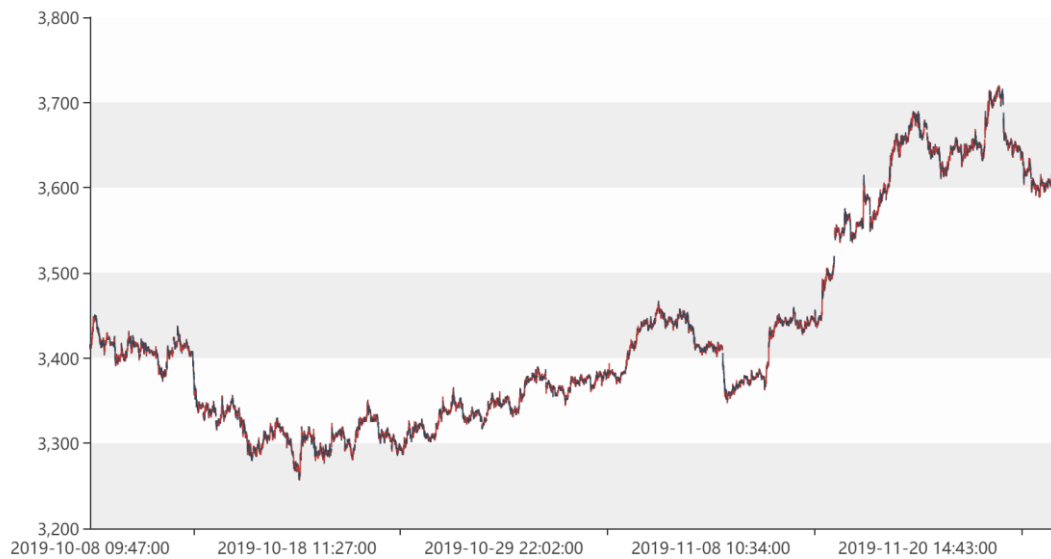

Figure 1 Price trend of rb2001 (Candlestick Chart)

Table 1 Close price, price index and its moving average of rb2001

dates	close _1M	close_1M _index	close_1M _index_MA_30	dates	close _1M	close_1M _index	close_1M _index_MA_3 0
2019-10-08 10:31:00	3430	1.004981	1.001367	……			
2019-10-08 10:32:00	3429	1.004688	1.001543	2019-11-27 14:53:00	3616	1.059478	1.059605
2019-10-08 10:33:00	3432	1.005567	1.001738	2019-11-27 14:54:00	3618	1.060064	1.059615
2019-10-08 10:34:00	3432	1.005567	1.001904	2019-11-27 14:55:00	3609	1.057427	1.059498
2019-10-08 10:35:00	3434	1.006153	1.002061	2019-11-27 14:56:00	3608	1.057134	1.059391
2019-10-08 10:36:00	3431	1.005274	1.002207	2019-11-27 14:57:00	3603	1.055669	1.059225
2019-10-08 10:37:00	3435	1.006446	1.002393	2019-11-27 14:58:00	3602	1.055377	1.059068
2019-10-08 10:38:00	3433	1.005860	1.002559	2019-11-27 14:59:00	3595	1.053326	1.058834
2019-10-08 10:39:00	3432	1.005567	1.002735	2019-11-27 15:00:00	3596	1.053619	1.058629
2019-10-08 10:40:00	3434	1.006153	1.002910	2019-11-27 15:16:00	3596	1.053619	1.058424

Although the fluctuation trend of the price index moving average is considerably obvious, its smoothing effect is still not ideal, which will affect our judgment of the extremum point in the later period. For this reason, we consider curve fitting to the price index moving average. However, we have found that it is almost impossible to perform curve fitting on the price index moving average over the entire time series. We have to choose, either to sacrifice accuracy to obtain the fitting result, or to pursue precision without obtaining the fitting result.

Therefore, we only select the moving average of the price index generated in the last 120 minutes of the time series and perform curve fitting on it. We use a polynomial linear regression model for curve fitting, and the fitting results are shown in Table 2.

Table 2 Polynomial linear regression fitting results

Dep. Variable:	y		R-squared:			0.972
Model:	OLS		Adj. R-squared:			0.971
Method:	Least Squares		F-statistic:			657.3
No. Observations:	120		Prob (F-statistic):			2.19e-85
Df Residuals:	113		Log-Likelihood:			850.27
Df Model:	6		AIC:			1687.
Covariance Type:	nonrobust		BIC:			1667.
	Coef	std err	t	P>|t|	[0.025	0.975]
const	1.0560	0.000	7139.466	0.000	1.056	1.056
x1	0.0003	3.31e-05	9.045	0.000	0.000	0.000
x2	-3.044e-05	2.35e-06	-12.951	0.000	-3.51e-05	-2.58e-05
x3	1.159e-06	7.24e-08	16.007	0.000	1.02e-06	1.3e-06
x4	-1.924e-08	1.08e-09	-17.751	0.000	-2.14e-08	-1.71e-08
x5	1.453e-10	7.77e-12	18.707	0.000	1.3e-10	1.61e-10
x6	-4.099e-13	2.13e-14	-19.218	0.000	-4.52e-13	-3.68e-13
Omnibus:	77.015		Durbin-Watson:			0.075
Prob(Omnibus):	0.000		Jarque-Bera (JB):			8.558
Skew:	0.039		Prob(JB):			0.0139
Kurtosis:	1.694		Cond. No.			6.73e+12

$$MA_{index} = 1.0560 + 0.0003x - (3.044e - 05)x^2 + (1.159e - 06)x^3 - (1.924e - 08)x^4 + (1.453e - 10)x^5 - (4.099e - 13)x^6$$

$$R^2 = 0.972$$

According to the curve fitting results, we can get the polynomial regression equation of the 30-minute price index moving average.

On this basis, we can find each extreme point on the moving average of the price index by first order derivative equaling zero. However, extreme points are not necessarily extremum points. The difference between them is that the change between the left and right sides of the extreme point requires a certain cumulative percentage before it is confirmed as an extremum point. It can be seen that the extremum point must be an extreme point, but the extreme point is not necessarily the extremum point.

For example, we set an extreme point as an extremum point with the change between the left and right sides of an extreme point reaching 0.1%. According to this condition, after filtering the extreme points, we finally get an extremum point, as shown in Figure 2.
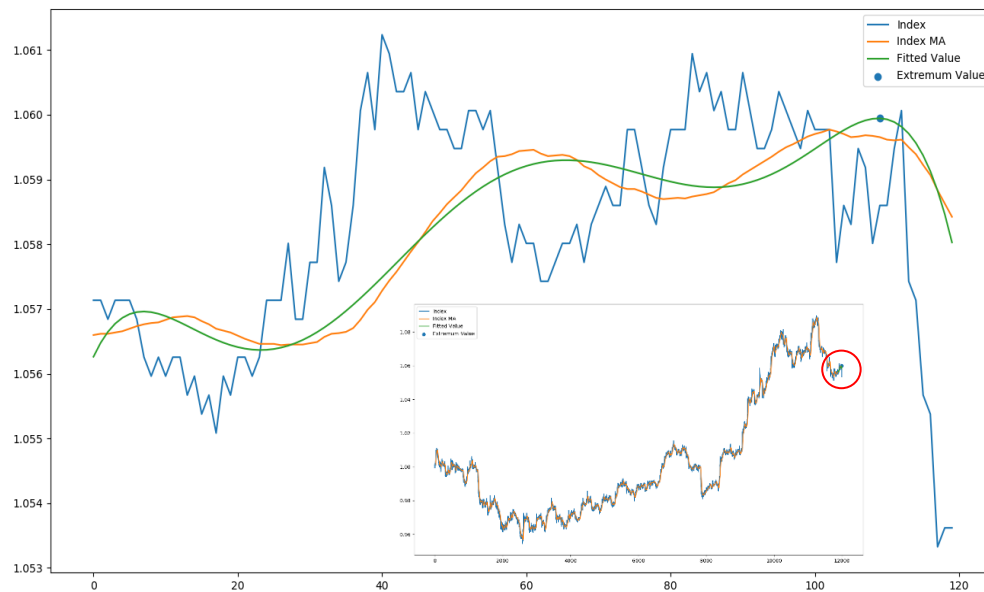
Figure 2 Curve fitting and extremum point confirmation of rb2001

The key point that we need to analyze is that, if we set the change of extreme point's left and right sides reaching 0.1% as the condition of confirming extremum point, what is the probability of the price index continuing to increase (or decrease) by 0.1%, 0.2%, 0.3% ... in the same direction of movement, when the extremum point is confirmed? With this question, we perform step-by-step tests in time series.

The step-by-step test procedures are as follows: first, take 120 minutes as the time window, and successively select the price information in the time window as a sample according to time series. Second, perform indexing according to Equation (1). Third, according to Equation (2), calculate the 30-minute moving average of the price index. Fourth, obtain the polynomial regression equation by curve fitting. Fifth, obtain the extreme points by first order derivative equaling zero. Sixth, set the change of extreme point's left and right sides reaching 0.1% as the condition of extremum point confirmation, filter the extreme points, and obtain the extremum point. Seventh, shift the time window by one time unit (1 minute) according to the time series, and repeat the first step.

After step-by-step testing, we can approximately get every extremum point on the 30-minute price index moving average. Then, we calculate the change between two adjacent extremum points, and work out the frequency of the price index continuing to increase (or decrease) by 0.1%, 0.2%, 0.3% ... in the same direction. After summarizing, we get the results shown in Table 3.

As shown in Table 3, after confirming the extremum point, the probability that the price index continues to increase (or decrease) by 0.1% in the same direction of movement reaches 78.79%. This result means that after the extremum point is confirmed, the probability of success in Momentum Chasing is as high as 78.79%, or we may say, most of the transactions at this time in the market are Momentum Chasing. On the other hand, the probability that the price index continues to increase (or decrease) by 1% in the same direction is only 14.39%. This means that after the extremum point is established, the probability of success in Momentum Chasing is only 14.39%, but conversely, the probability of success in Contrarianism Trading is as high as 85.61%, that is to say, most of the transactions at this time in the market are Contrarianism Trading.

Table 2 Probability of Momentum Chasing at the condition of 0.1%

	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.01
0.001	**0.7879**	0.5985	0.4924	0.3939	0.3258	0.2652	0.2197	0.2045	0.1591	0.1439

References

[1] Carlo Da Dalt, David Feldman, Gerald Garvey, et al., Contrarians or Momentum Chasers? Individual Investors Behavior when trading exchange-traded funds, Futures Markets, vol. 39, 2019, pp. 553-578.

[2] Narasimhan Jegadeesh, Sheridan Titman, Profitability of Momentum Strategies: An Evaluation of Alternative Explanations, Journal of Finance, vol. 2, 2001, pp. 699-720.

[3] Lian He, Comparative Study on Two Kinds of Market Fluctuation Analysis Methods. Singapore Management and Sports Science Institute, Singapore, Information Technology Application Research Association, Hong Kong. Proceedings of 2017 2nd International Conference on Education Research and Reform (ERR 2017) V19, 2017, pp. 95-99.

[4] Harrison Hong, Jeremy C. Stein, A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets, Journal of Finance, vol. 6, 1999, pp. 2143-2184.

[5] William F. Sharpe, Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. Journal of Finance, vol. 19, 1964, pp. 425-442.