

yumingming@xyzq.com.cn
 S0190514100003

gongmin@xyzq.com.cn
 S0190119020038

2019 10 17

Wind	A	AdaBoost	Wind	A	AdaBoost
1.	2.	3.	1.	2.	3.
3.	4.	51	1	-1	51
					500
		AdaBoost	2014	10	27
		41.31%	1.41		
		24.67%	0.98		
			7.66%	0.26	
		AdaBoost			
		1.	2.	3.	
			4.		
		2015	6	1	2019
		0.72			8
		13.16%	0.70	Wind	A
					-11.18%

1	.....	- 4 -
1.1	.....	- 4 -
1.2	.....	- 6 -
1.3	.....	- 7 -
1.3.1	.....	- 7 -
1.3.2	.....	- 8 -
1.4	.....	- 9 -
1.4.1	.....	- 9 -
1.4.2	.....	- 11 -
2 AdaBoost	.....	- 12 -
2.1 AdaBoost	.....	- 12 -
2.2 AdaBoost	.....	- 13 -
2.3 AdaBoost	.....	- 15 -
3	.....	- 17 -
3.1	.....	- 17 -
3.2	Wind A	- 17 -
3.3 AdaBoost	.....	- 18 -
3.4	.....	- 19 -
4	.....	- 21 -

.....	- 4 -
.....	- 6 -
.....	- 7 -
.....	- 8 -
.....	- 8 -
.....	- 9 -
.....	- 9 -
.....	- 10 -
.....	- 10 -
..	- 11 -
..	- 11 -
.....	- 12 -
.....	- 13 -
.....	- 14 -
.....	- 14 -
.....	- 15 -
.....	- 15 -
.....	- 16 -
..	- 16 -
..	- 16 -
.....	- 18 -
.....	- 18 -

19 -

..- 20 -

..- 20 -

.....- 20 -

p_k

$$Gini(p) = \sum_{k=1}^K p_k(1 - p_k) = 1 - \sum_{k=1}^K p_k^2$$

 C_k

$$Gini(D) = 1 - \sum_{k=1}^K \left(\frac{C_k}{D}\right)^2$$

 $D_1 \quad D_2$

$$Gini(D, A) = \frac{D_1}{D} Gini(D_1) + \frac{D_2}{D} Gini(D_2)$$

 $D, D_1 \quad D_2$

1. D
 2. D
 3. A a D
 4. A a
 5. $D_1 \quad D_2$ 1-4
- X
- X

sklearn

Entropy

Information Gain

 p_k

$$Entropy(D) = - \sum_{k=1}^K p_k \log_2(p_k)$$

$$Entropy(D) = - p_k \log_2(p_k) - (1 - p_k) \log_2(1 - p_k)$$

D A



A

$$Gain(A) = Entropy(D) - Entropy(D, A)$$

D、D₁ D₂

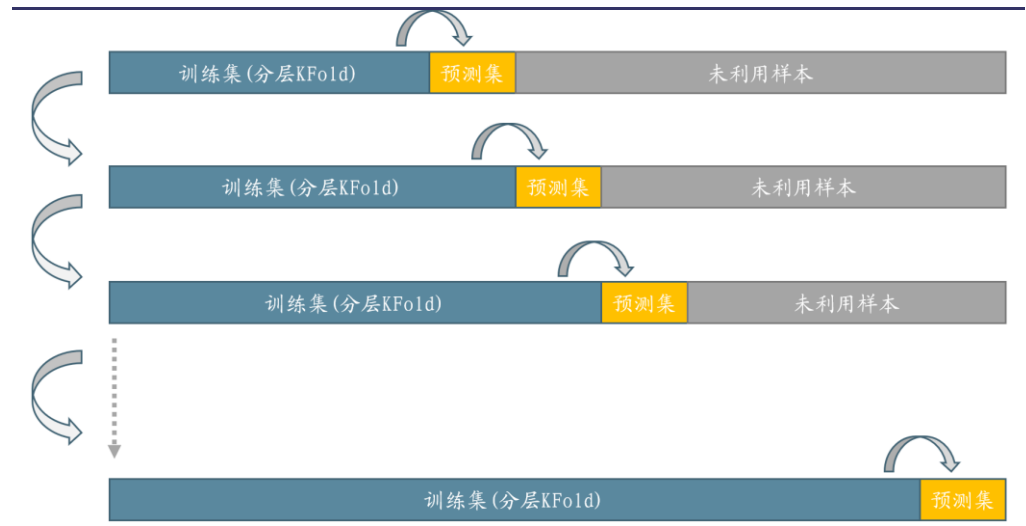
1.2

Wind,

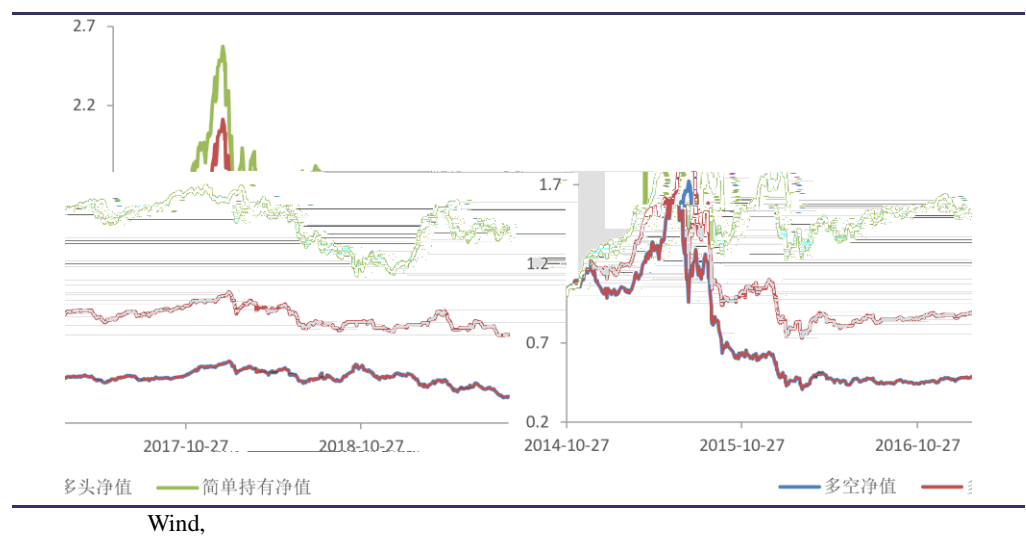
1.3

1.3.1

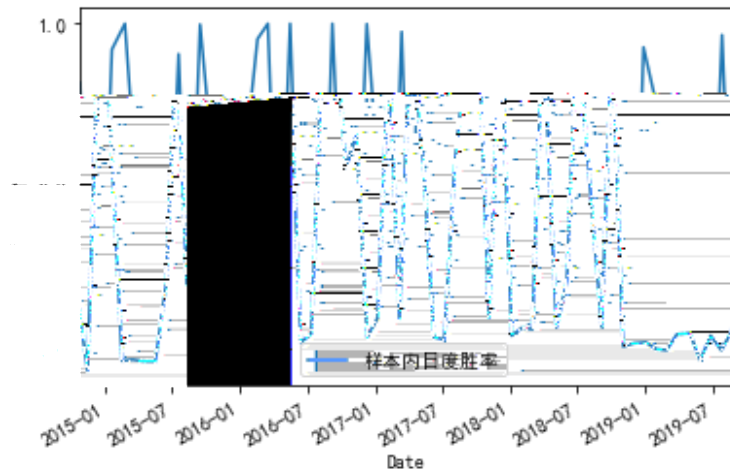




1.3.2



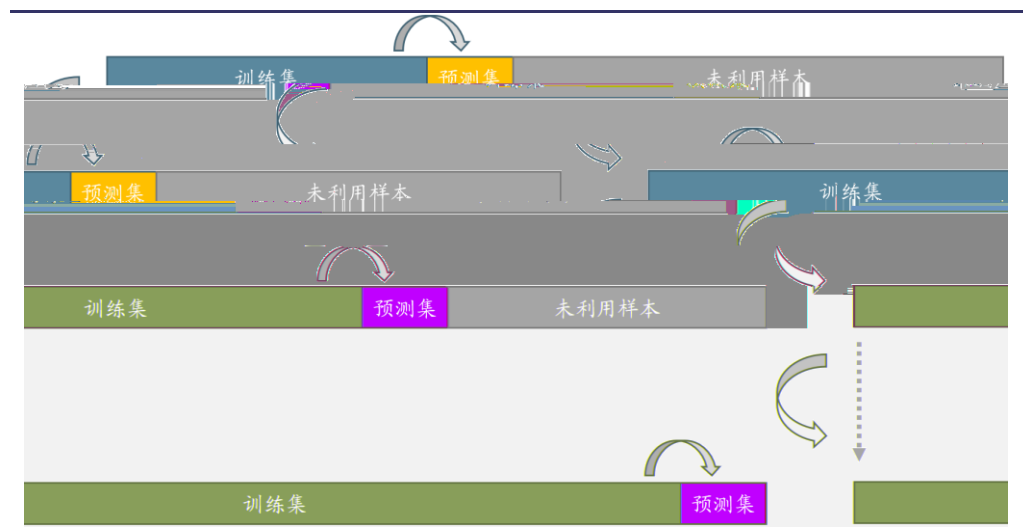
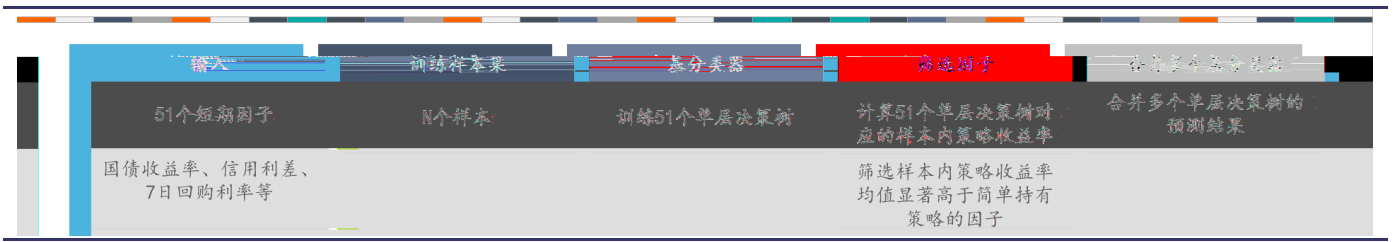
Wind,



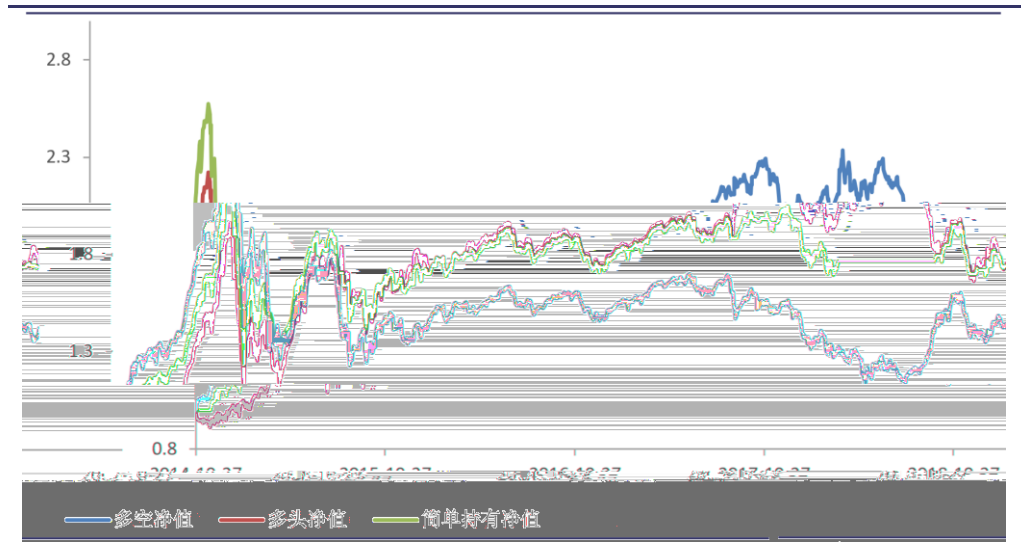
Wind,

1.4

1.4.1

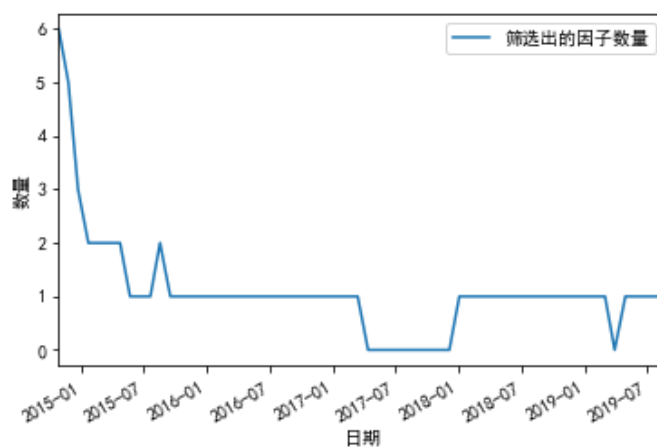


1.4.2



Wind,

Wind,



Wind,

2 AdaBoost

2.1

$$(x_1, y_1), (x_2, y_2), \dots, (x_N, y_N)$$

1. $w_i = \frac{1}{N}, i = 1, 2, 3, \dots, N。$

2. $m = 1 \dots M$

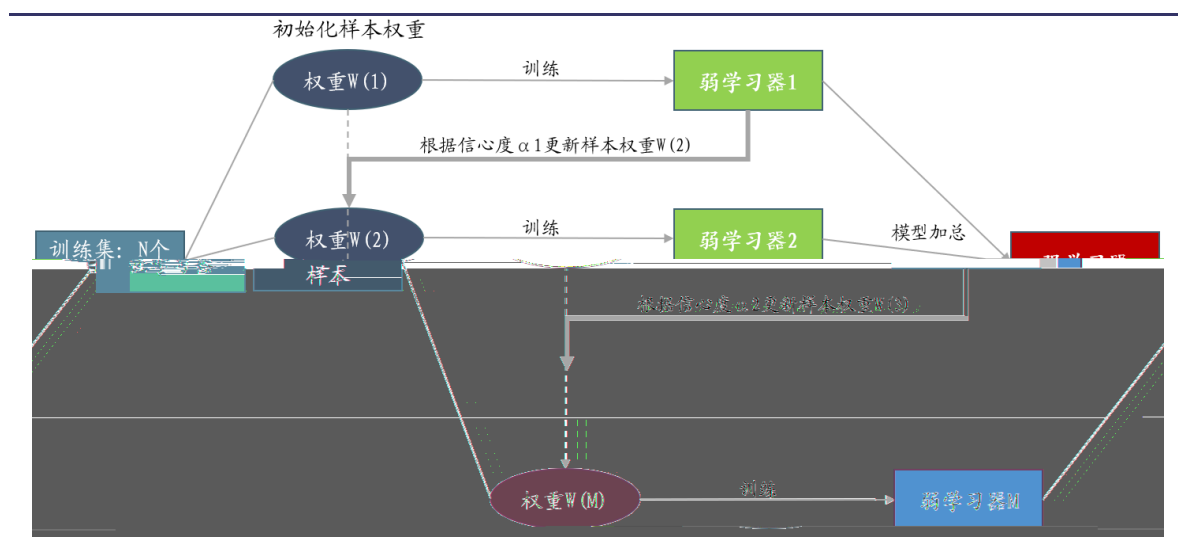
w_i $G_m(x)$

$$err_m = \frac{\sum_{i=1}^N w_i I(y_i \neq G_m(x_i))}{\sum_{i=1}^N w_i}$$

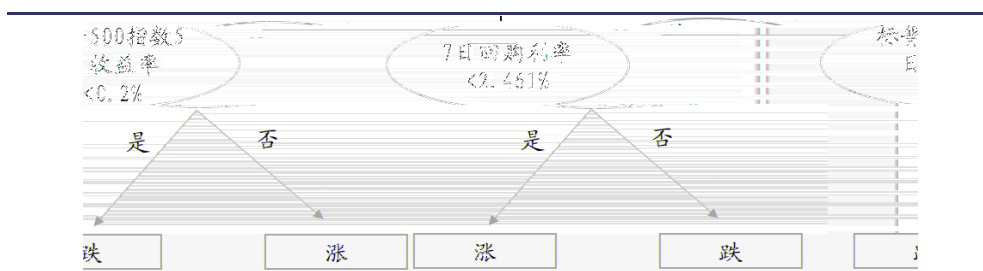
$$\alpha_m = \ln \left(\frac{1 - err_m}{err_m} \right)$$

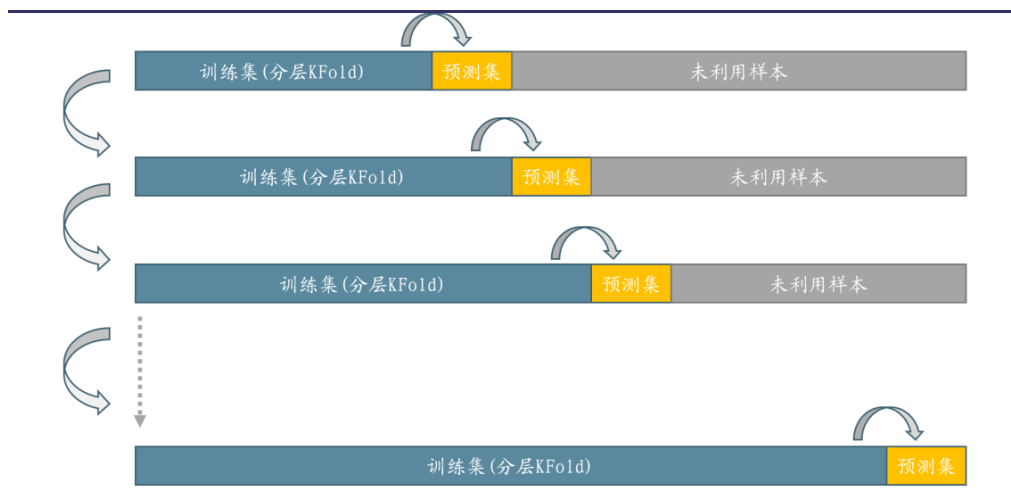
$$w_i \leftarrow w_i \cdot \exp \left[\alpha_m \cdot I(y_i \neq G_m(x_i)) \right], i = 1, 2, 3, \dots, N$$

$$G(x) = \text{sign} \left[\sum_{m=1}^M \alpha_m G_m(x) \right]$$

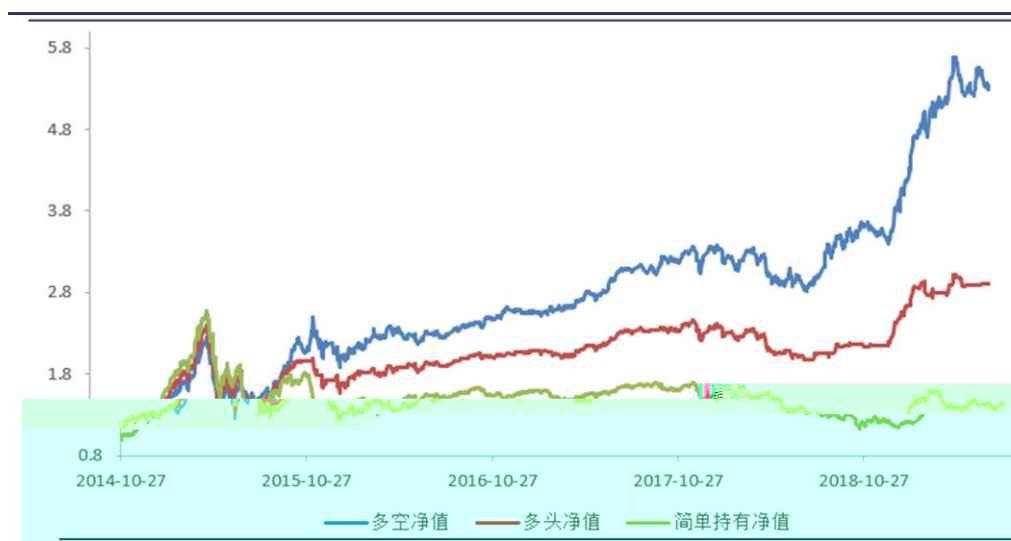


2.2





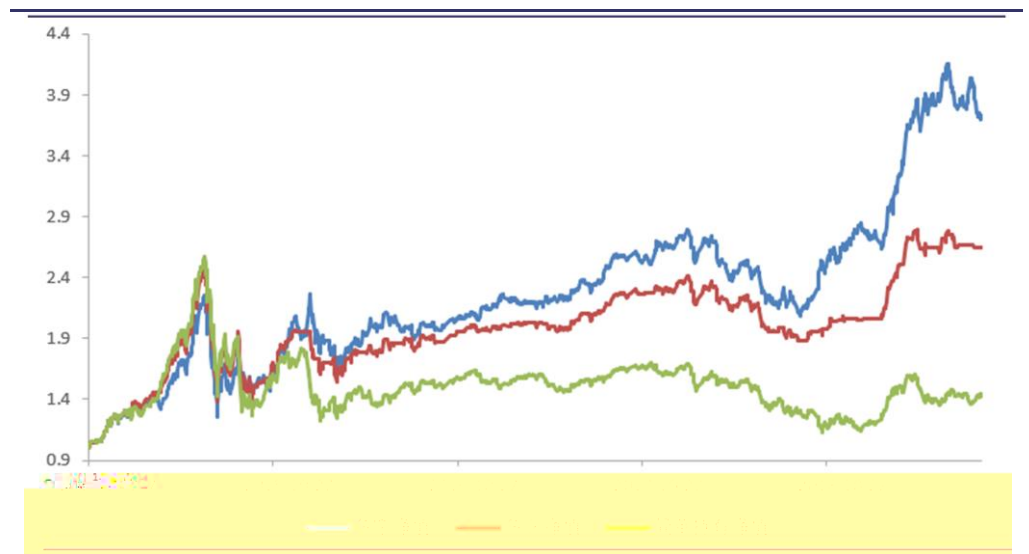
2.3



Wind,

请务必阅读正文之后的信息披露和重要声明

Wind,



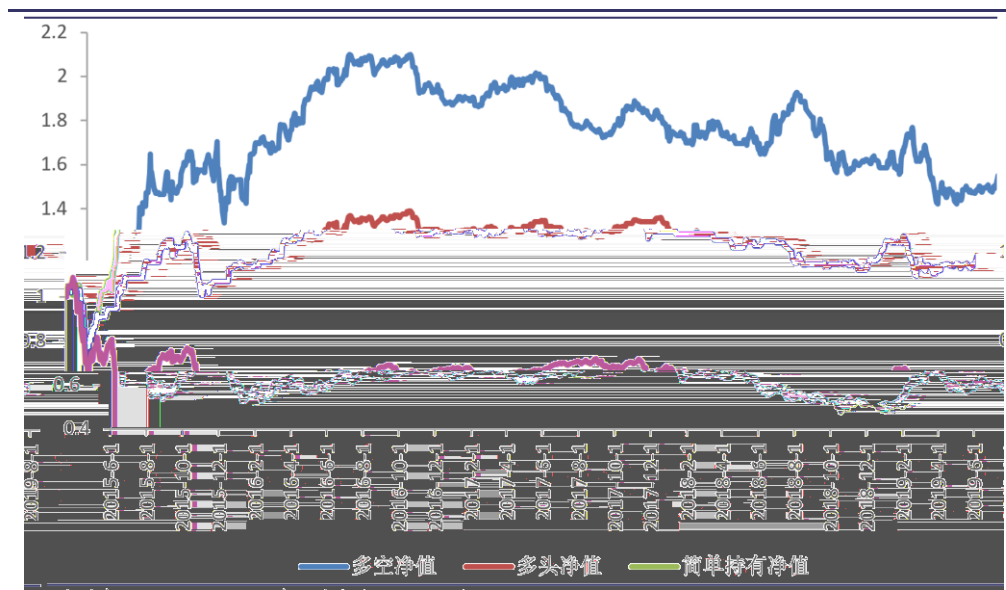
Wind,

Wind,

3

3.1

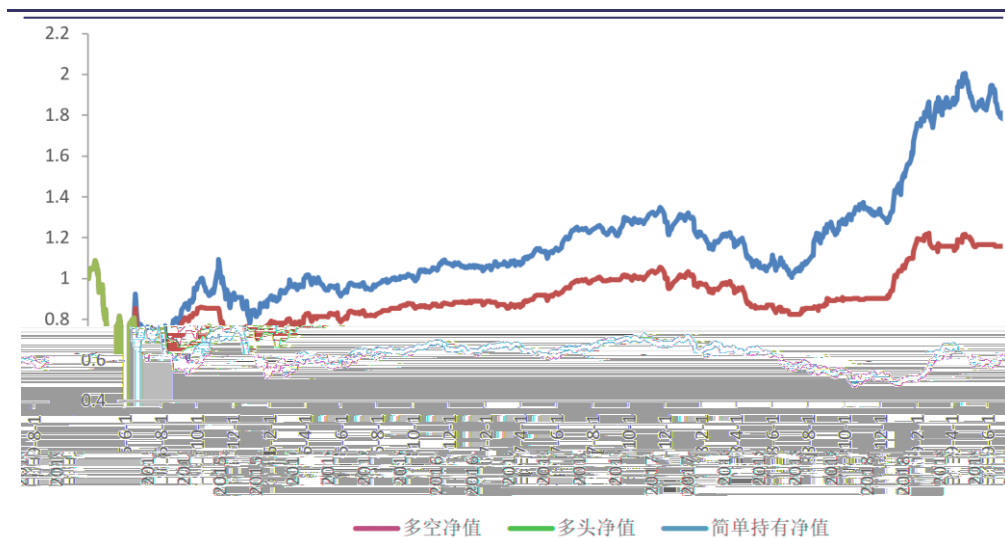
3.2



Wind,

Wind,

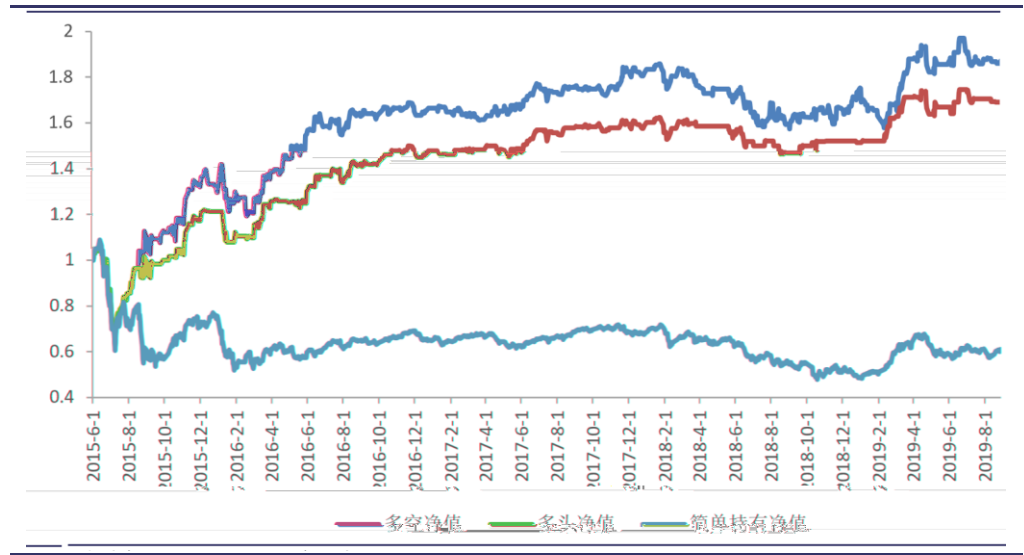
3.3



Wind,

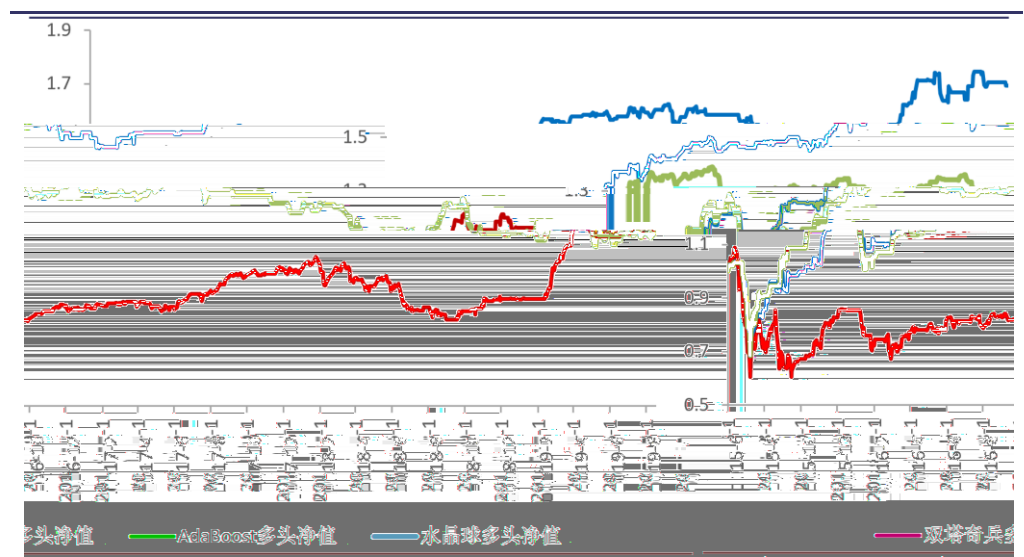
Wind,

3.4



Wind,

Wind,



Wind,

“ ”