

证券研究报告

# 《基于海内外期货持仓报告的CTA策略》

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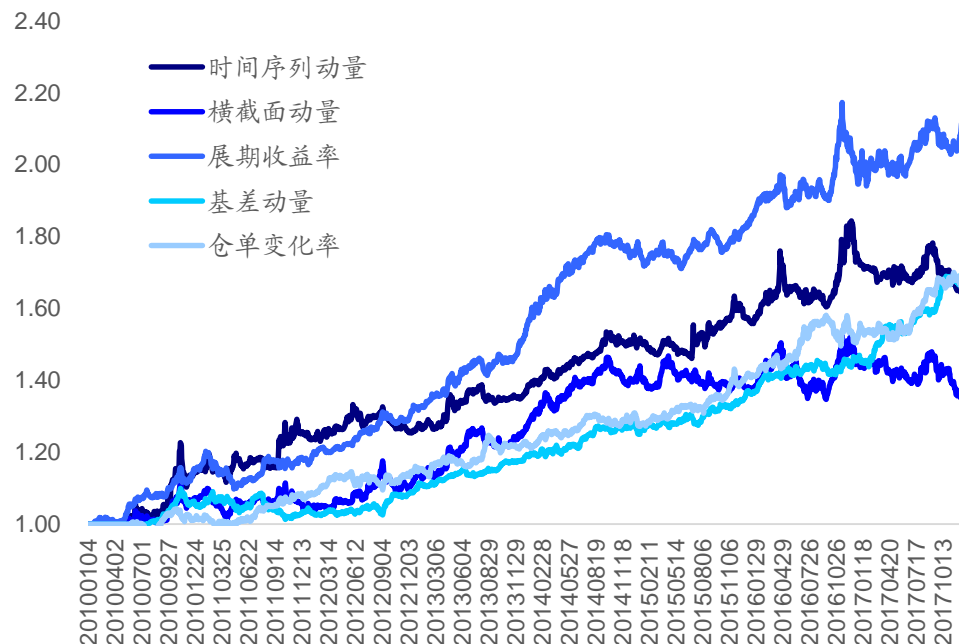
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2017年12月

在《FICC系列之五——商品期货因子挖掘与组合构建再探究》中构建了时间序列动量、横截面动量、展期收益率、基差动量、仓单变化率五个因子。

图：CTA因子净值

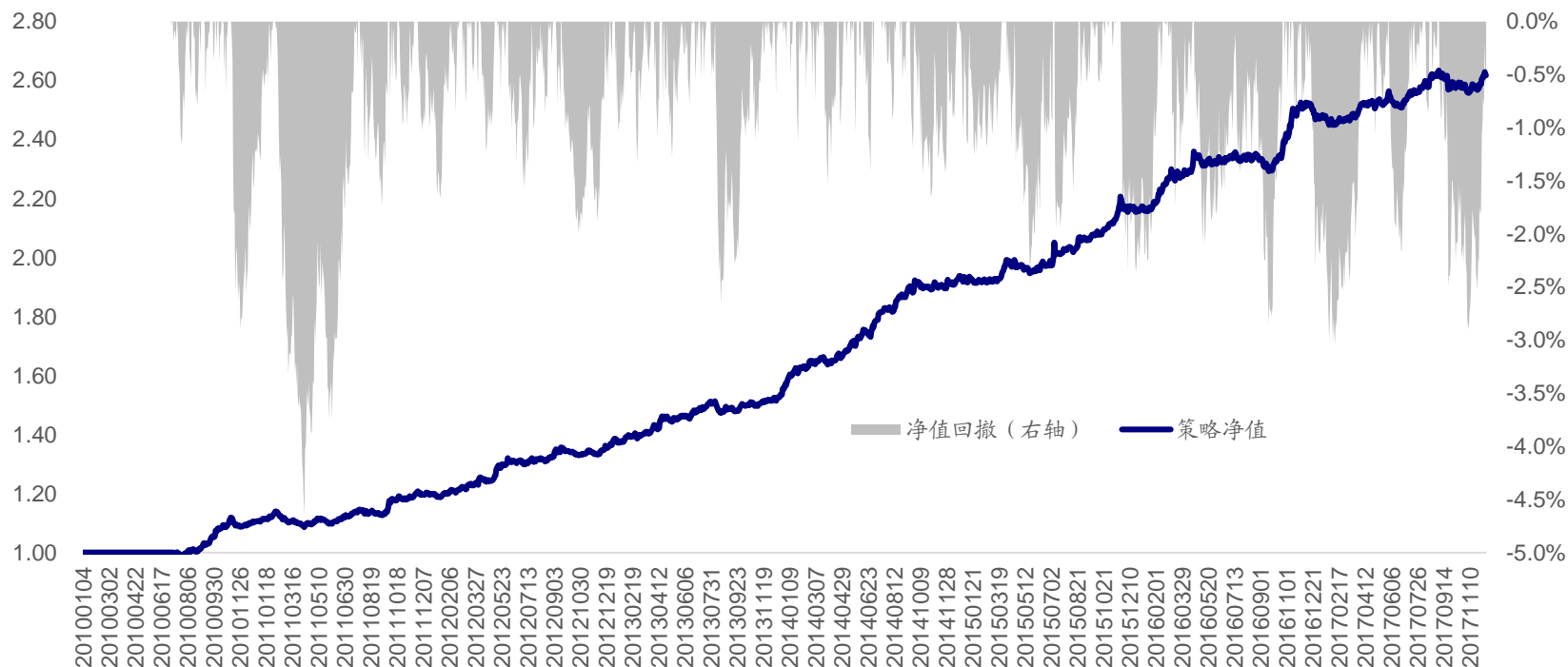


表：CTA因子间相关性

	时序动量	横截面动量	展期收益率	基差动量	仓单变化率
时序动量	1.00	0.70	0.19	-0.10	-0.01
横截面动量	0.70	1.00	0.45	-0.10	0.02
展期收益率	0.19	0.45	1.00	0.02	0.09
基差动量	-0.10	-0.10	0.02	1.00	0.23
仓单变化率	-0.01	0.02	0.09	0.23	1.00

使用时间序列动量、展期收益率、基差动量、仓单变化率四个因子，在5%的年化目标波动率下构建CTA因子组合，年化收益率为13.79%，年化波动率为5.25%，最大回撤为4.66%，夏普比率和calmar比率分别为2.63和2.96。

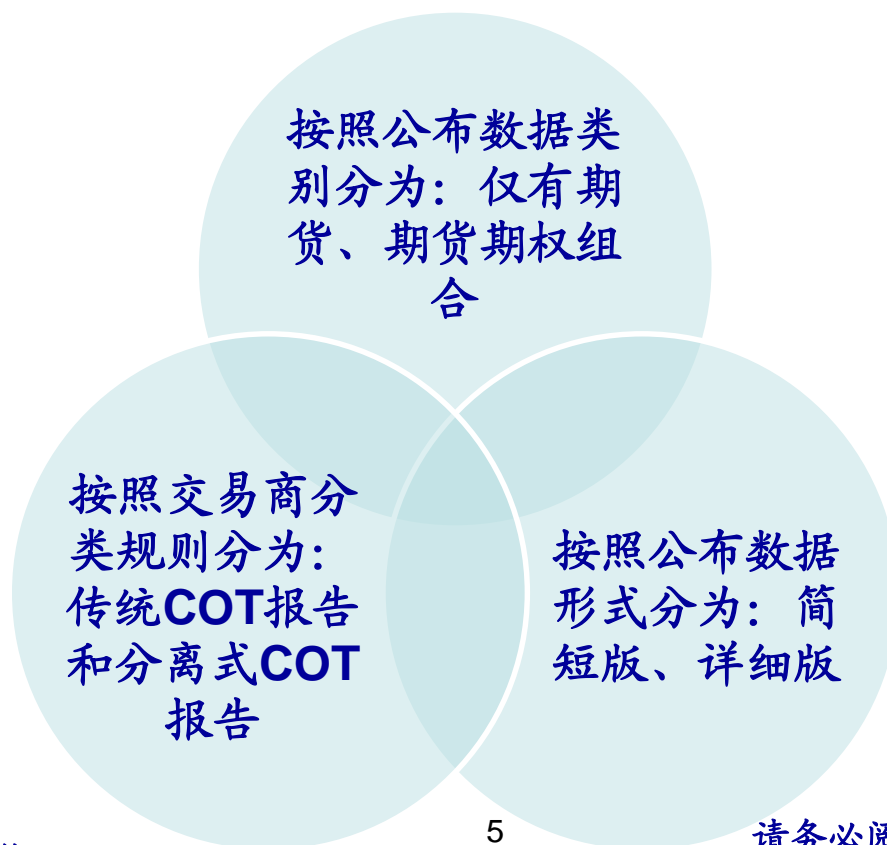
图：CTA多因子组合表现（2010.7-2017.11）



## 内容要点:

- 海外持仓报告介绍
- 基于海外持仓报告的CTA策略
- 国内持仓报告介绍
- 基于国内持仓报告的CTA策略

- 海外成交持仓表的代表是美国商品期货委员会（以下简称**CFTC**）公布的持仓报告（**Commitments of Traders**，以下简称**COT**）。
- **COT**报告会在美国东部时间每周五**15:30**公布，内容为当周二的持仓数据，覆盖品种包括农产品、石油、天然气、电力、金属等。





# 海外持仓报告介绍

- 传统的COT报告将持仓分为三类：商业持仓、非商业持仓和无需报告的持仓，分别对应套期保值持仓、基金持仓（投机者头寸）和散户持仓。

GOLD - COMMODITY EXCHANGE INC. Code-088691  
Commitments of Traders - Futures Only, October 31, 2017

: Total :		Reportable Positions								: Nonreportable Positions	
: Open :		Non-Commercial				Commercial		Total		: Long : Short	
: Interest :		Long	Short	Spreading		Long	Short	Long	Short		
: (CONTRACTS OF 100 TROY OUNCES)											
All :	531,918:	268,710	75,615	89,354		128,371	339,019	486,435	503,988:	45,483	27,930
Old :	531,918:	268,710	75,615	89,354		128,371	339,019	486,435	503,988:	45,483	27,930
Other:	0:	0	0	0		0	0	0	0:	0	0
: Changes in Commitments from: October 24, 2017											
:	5,244:	-6,811	-8,521	8,784		2,903	2,898	4,876	3,161:	368	2,083
: Percent of Open Interest Represented by Each Category of Trader											
All :	100.0:	50.5	14.2	16.8		24.1	63.7	91.4	94.7:	8.6	5.3
Old :	100.0:	50.5	14.2	16.8		24.1	63.7	91.4	94.7:	8.6	5.3
Other:	100.0:	0.0	0.0	0.0		0.0	0.0	0.0	0.0:	0.0	0.0
: # Traders : Number of Traders in Each Category											
All :	343:	176	94	84		47	50	269	187:		
Old :	343:	176	94	84		47	50	269	187:		
Other:	0:	0	0	0		0	0	0	0:		
: Percent of Open Interest Held by the Indicated Number of the Largest Traders											
: By Gross Position By Net Position											
		4 or Less Traders		8 or Less Traders		4 or Less Traders		8 or Less Traders			
		Long:	Short	Long	Short:	Long	Short	Long	Short		
All :		22.5	37.3	33.8	53.6	17.3	34.3	26.5	47.3		
Old :		22.5	37.3	33.8	53.6	17.3	34.3	26.5	47.3		
Other:		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

# 海外持仓报告介绍

- 分离式COT报告把可报告的交易者分为四类：生产商/贸易商/加工商/用户、掉期商、资金管理、其他可报告，同时还有旧版的无需报告的散户头寸。

GOLD - COMMODITY EXCHANGE INC.

Code-088691

Disaggregated Commitments of Traders - Futures Only, October 31, 2017

		Reportable Positions											Nonreportable Positions		
		Producer/Merchant/Processor/User		Swap Dealers			Managed Money			Other Reportables					
		Open Interest	Long	Short	Long	Short	Spreading	Long	Short	Spreading	Long	Short	Spreading	Long	Short
:(CONTRACTS OF 100 TROY OUNCES)															
Positions															
All	531,918:	17,081	200,789	86,265	113,205	25,025	182,652	16,687	69,029	86,058	58,928	20,325:	45,483	27,930	
Old	531,918:	17,081	200,789	86,265	113,205	25,025	182,652	16,687	69,029	86,058	58,928	20,325:	45,483	27,930	
Other:	0:	0	0	0	0	0	0	0	0	0	0	0:	0	0	
Changes in Commitments from: October 24, 2017															
	5,244:	-1,279	-234	1,889	839	2,293	-10,049	-7,646	8,839	3,238	-875	-55:	368	2,083	
Percent of Open Interest Represented by Each Category of Trader															
All	100.0:	3.2	37.7	16.2	21.3	4.7	34.3	3.1	13.0	16.2	11.1	3.8:	8.6	5.3	
Old	100.0:	3.2	37.7	16.2	21.3	4.7	34.3	3.1	13.0	16.2	11.1	3.8:	8.6	5.3	
Other:	100.0:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0:	0.0	0.0	
Number of Traders in Each Category															
All	343:	19	24	14	21	19	79	33	36	97	61	48:			
Old	343:	19	24	14	21	19	79	33	36	97	61	48:			
Other:	0:	0	0	0	0	0	0	0	0	0	0	0:			
Percent of Open Interest Held by the Indicated Number of the Largest Traders															
		By Gross Position				By Net Position									
		4 or Less Traders		8 or Less Traders		4 or Less Traders		8 or Less Traders							
		Long:	Short	Long	Short:	Long	Short	Long	Short						
All		22.5	37.3	33.8	53.6	17.3	34.3	26.5	47.3						
Old		22.5	37.3	33.8	53.6	17.3	34.3	26.5	47.3						
Other:		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						

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➤ 本文选取**26种**外盘期货作为回测样本，并按照商品属性将其划分为**5个**类别。

表：外盘期货品种分类

细分类别	品种
农产品	可可、咖啡豆、玉米、棉花、橙汁、燕麦、大米、大豆、豆粕、豆油、白糖、小麦
能源	汽油、燃料油、轻质原油、天然气
牲畜	成牛、瘦肉猪、小牛
金属	铜、黄金、白银、钯、铂
其他	牛奶、木材

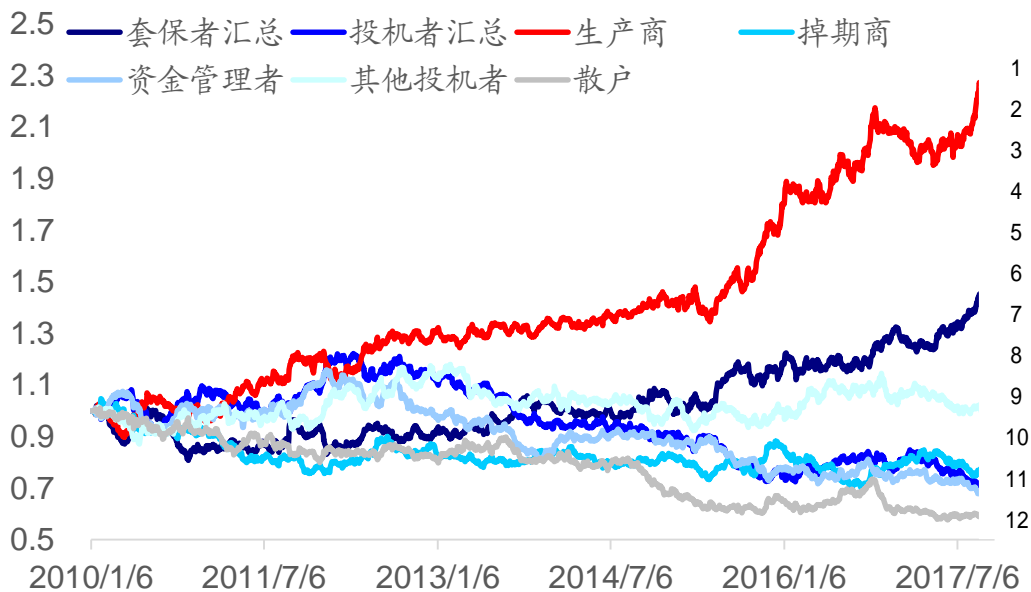
➤ 截选以上品种**2010/1/1-2017/10/31**的日结算价格数据和**COT**数据。其中日结算价格采用近月合约拼接，并进行前复权处理；**COT**报告数据为周频，包括传统式和分离式总共**7类**交易者持仓情况。

# 净多头持仓占比策略

- 将期货品种以过去R周净多头持仓占比（（多头-空头）/（多头+空头））排序，做多净多头占比最大的前15%品种，做空净多头占比最小（即净空头占比最大）的前15%品种，持有H周调仓。
- 基于生产商的净多头占比策略显著优于其他策略表现，R=H=1时，年化收益为10.98%，夏普比率为1.08，最大回撤为13.55%，calmar比率为0.81。不同参数下策略表现较为稳定。

图：不同类别交易者净值表现

图：不同参数组下生产者净多头占比策略的年化收益



资料来源：CFTC, Bloomberg, 海通证券研究所

	1	2	3	4	5	6	7	8	9	10	11	12
1	10.98%	7.88%	10.09%	8.42%	6.72%	9.00%	9.37%	4.03%	6.17%	6.94%	6.61%	5.60%
2	7.90%	8.85%	9.98%	8.57%	6.73%	9.21%	9.77%	5.90%	7.91%	7.28%	7.41%	6.98%
3	9.26%	10.64%	9.87%	9.99%	6.83%	8.80%	11.70%	6.89%	8.03%	6.62%	6.81%	7.10%
4	9.04%	10.83%	8.31%	9.38%	7.88%	7.07%	10.72%	7.20%	6.99%	8.29%	7.15%	6.15%
5	8.92%	10.69%	8.49%	9.06%	6.67%	6.56%	10.78%	6.79%	6.78%	8.14%	7.97%	5.23%
6	9.74%	9.49%	9.97%	8.46%	7.28%	8.60%	8.04%	6.72%	7.42%	8.89%	7.99%	6.55%
7	9.32%	8.61%	9.59%	8.90%	7.76%	7.89%	8.22%	8.46%	7.00%	8.91%	6.67%	6.32%
8	9.01%	9.24%	9.05%	8.28%	5.44%	8.02%	6.41%	7.30%	5.52%	7.09%	5.82%	6.99%
9	9.82%	9.19%	7.12%	8.27%	6.44%	8.46%	5.55%	7.68%	5.65%	8.32%	6.01%	6.69%
10	8.95%	7.31%	6.73%	6.85%	7.39%	8.62%	5.56%	4.89%	5.26%	7.75%	5.92%	6.75%
11	7.57%	6.18%	6.99%	6.75%	7.09%	8.43%	5.32%	3.83%	5.66%	6.32%	6.14%	5.32%
12	6.74%	6.71%	6.10%	6.54%	7.22%	6.68%	6.28%	2.85%	4.13%	5.14%	5.35%	4.74%

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➤ **Larry Williams (1997)** 提出了**COT**指标，定义为当前净持仓与**N**年内最小净持仓的差值除以**N**年内最大净持仓与最小净持仓的差值，公式如下：

$$COTIndex = \frac{CurrentNet - MinNet(inNyears)}{MaxNet(inNyears) - MinNet(inNyears)}$$

该指标用来分析市场的超买超卖程度。其中**N**通常取**3**年，对于不同类别交易者，需要分别带入不同类别的净头寸。

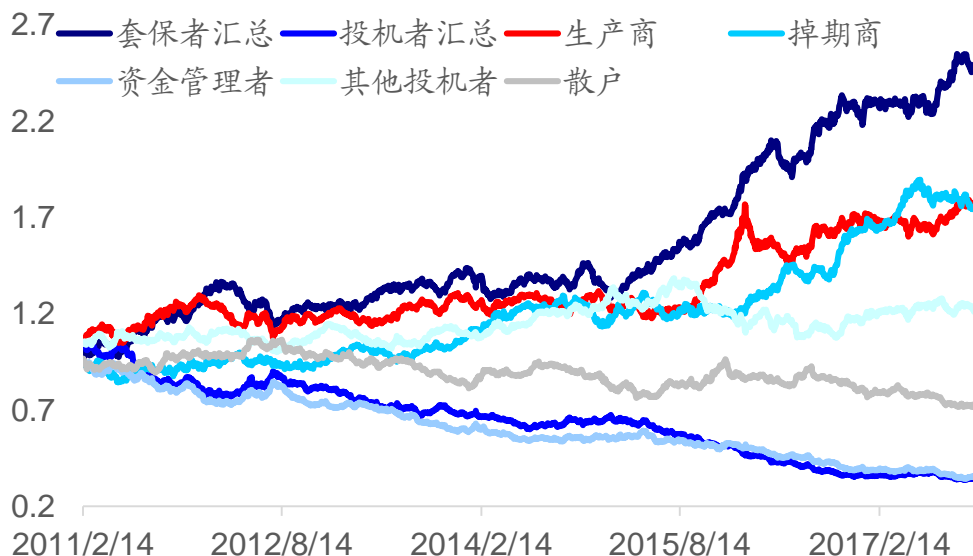
➤ **COT**指数可以应用于不同类型交易者的跟随策略。其基本逻辑为：

- 与套期保值者保持一致行动，即在商业头寸超买超卖时正向交易；
- 与散户保持相反的操作，即在非报告头寸超买超卖时反向交易；
- 与投机者保持相反的操作，即在非商业持仓超买超卖时反向交易。

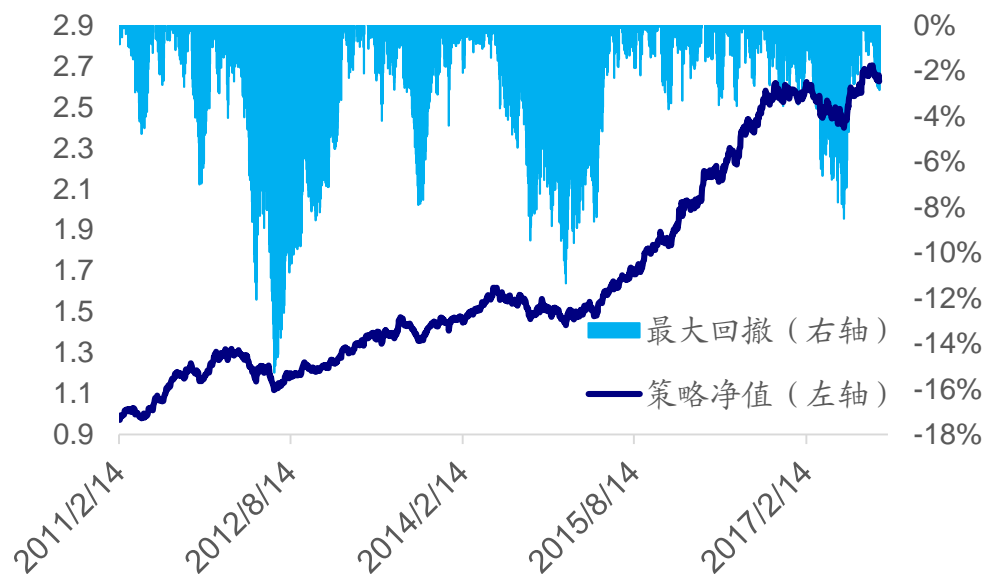
# COT指数策略

- 将期货品种按照基于过去R年极值区间计算的COT指数值进行排序，做多COT指数最大的前15%的品种，做空COT指数最小的前15%的品种，持有H周调仓。
- 投机者反向策略年化收益为15.95%，夏普比率为1.46，最大回撤为15.29%，calmar比率为1.04。

图：不同类别交易者净值表现



图：投机者COT指数反向策略净值表现 (R=H=1)



➤ 持有期较短时，COT指数策略在不同参数下表现相对稳定。

图：不同参数组下投机者COT指数反向策略表现（上图为年化收益率，下图为夏普比率）

年化收益率	1	2	3	4	5	6	7	8	9	10	11	12
1	15.95%	11.40%	13.09%	4.61%	8.84%	8.51%	7.42%	-1.33%	7.15%	8.49%	0.82%	4.68%
2	13.31%	10.67%	9.18%	6.23%	5.78%	6.50%	4.45%	1.27%	6.21%	6.77%	1.55%	1.68%
3	16.36%	14.07%	11.25%	7.79%	11.20%	8.74%	4.35%	0.68%	7.12%	7.78%	4.87%	4.37%
4	14.50%	10.67%	9.32%	5.19%	6.53%	2.85%	0.62%	-0.12%	9.64%	4.25%	8.86%	5.12%
5	16.50%	10.39%	13.88%	10.52%	6.49%	3.78%	7.41%	-0.52%	9.57%	6.90%	18.39%	7.49%

夏普比率	1	2	3	4	5	6	7	8	9	10	11	12
1	1.46	1.04	1.18	0.42	0.82	0.79	0.67	-0.12	0.67	0.78	0.07	0.44
2	1.18	0.96	0.82	0.57	0.54	0.62	0.41	0.12	0.59	0.62	0.14	0.16
3	1.52	1.33	1.04	0.76	1.05	0.83	0.42	0.07	0.67	0.70	0.44	0.43
4	1.33	0.99	0.86	0.50	0.62	0.27	0.06	-0.01	0.92	0.39	0.80	0.51
5	1.49	0.94	1.25	0.97	0.61	0.35	0.70	-0.05	0.86	0.63	1.66	0.73



- 本文选取的外盘期货品种中，有相应内盘合约的有八种，分别为：黄金、白银、大豆、豆油、豆粕、玉米、棉花。其中玉米和大豆期货因为内外盘品种相关性较低，予以剔除。

表:内外盘品种相关性

	玉米	豆粕	豆油	铜	金	银	棉花	大豆
相关性（原始货币）	0.41	0.94	0.98	0.94	0.97	0.99	0.90	0.41
相关性（采用中间价调整）	0.53	0.94	0.99	0.96	0.99	0.99	0.91	0.51

- 剩余期货品种按基于过去R年极值区间计算的COT指数进行择时交易：每期COT报告公布后，计算每个期货品种的套保商（投机商）COT指数，如果COT指数高于80则做多（做空），低于20则做空（做多），COT指数下降（上升）到50以下时平掉多仓（空仓），COT指数上升（下降）到50以上时平掉空仓（多仓），持有H周调仓。

- 注意事项：根据COT报告公布的时间，内盘操作时间为周一上午开盘，以内盘次日开盘价（9:00 am）交易。

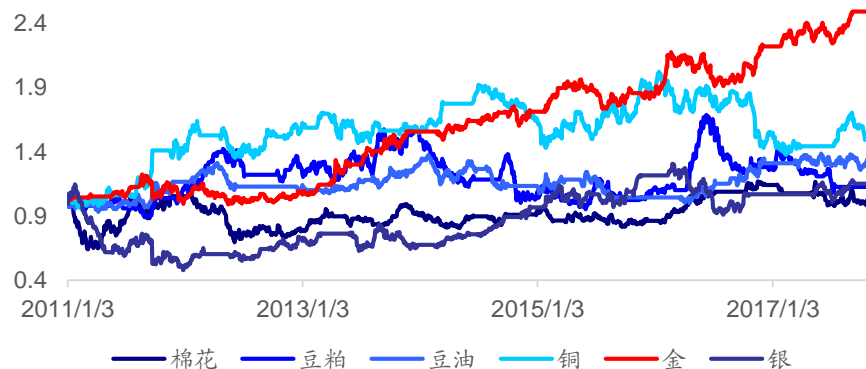
# 对内盘品种的影响

➤ 跟随掉期商的COT指数择时策略在内外盘共有期货上表现最好，策略年化收益为10.27%，夏普比率为1.06，最大回撤为9.26%，calmar比率为1.11。

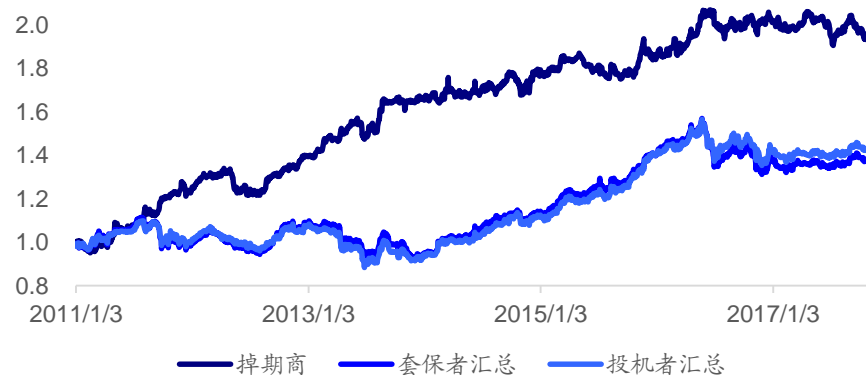
图：外盘不同类型交易者COT指数择时策略表现



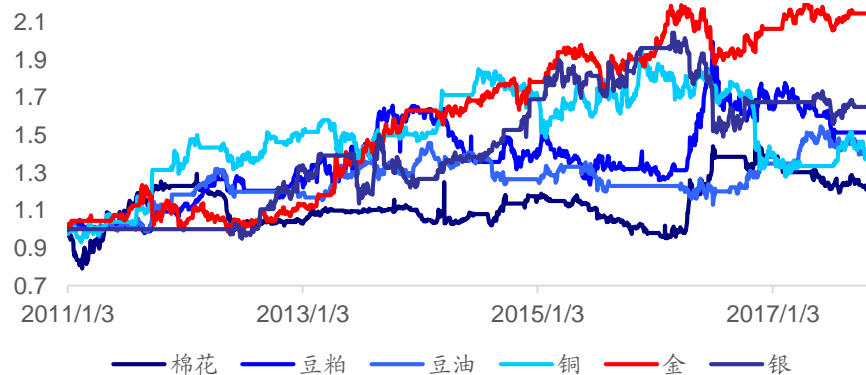
图：外盘不同类型交易者COT指数择时策略表现



图：内盘不同类型交易者COT指数择时策略表现



图：内盘不同类型交易者COT指数择时策略表现



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# 国内持仓报告介绍

我国商品交易所每个交易日盘后会公布每个期货合约的“结算会员成交持仓排名”，该排名以结算会员为单位，披露成交量、多头持仓量及空头持仓量数据。除了各大交易所均披露的会员持仓数据之外，郑商所还会披露每日套保持仓数据。

图：大商所铁矿石期货成交持仓汇总表（2017-10-31）

会员名称	成交量	成交量变动	多头持仓量	多头持仓量变动	空头持仓量	空头持仓量变动
一德期货	14528	1132	15444	-2020	31350	2116
上海东亚	6755	-1009	4662	438	6804	147
上海东证	1363	-537	1501	67	4209	-139
上海中期	10652	704	9770	91	4310	-449
上海大陆	37651	13594	9117	-475	7619	104
上海浙石	302	-194	358	45	118	17
东兴期货	3749	109	5766	348	4882	-183
东吴期货	4243	-2721	4641	-93	1962	-137
东方期货	3891	-903	1323	-280	1353	111
东方汇金	1482	-194	660	-122	239	-76
东海期货	8416	988	7941	668	6749	336
东航期货	26193	-6873	10237	-316	21577	163
东证期货	99308	-2938	33551	-2416	39320	1118
中信建投	61640	-2940	35248	1155	12844	730
中信期货	91208	6176	87911	-4982	122908	-3658
中原期货	3410	-1195	3539	-13	461	-21
中国国际	22211	-2038	16860	252	8087	-2357
中大期货	13875	2589	5359	-15	3683	418
中天期货	2352	435	1725	-96	471	58
中州期货	2834	10	1217	-123	1197	101

图：郑商所期货套保持仓明细（2017-10-31）

品种	买套保额度	期货买套保持仓量	卖套保额度	期货卖套保持仓量
SR	240,900	46,218	281,600	59,509
TA	390,000	7,575	1,669,000	154,762
ZC	14,050	0	14,050	1,750
MA	90,000	0	106,200	1,421
OI	36,000	900	225,200	29,490
CF	93,330	4,435	113,464	12,447
CY	6,000	0	0	0
RM	3,400	335	113,000	4,980
SF	2,500	0	2,000	0
SM	2,500	0	2,000	0

注：“套保额度”为期货和期权共用额度。

## 内容要点:

- 海外持仓报告介绍
- 基于海外持仓报告的CTA策略
- 国内持仓报告介绍
- 基于国内持仓报告的CTA策略



1. 回测区间：2010.01.01-2017.10.31；
2. 所有品种的保证金固定为20%；策略初始无杠杆，即调仓日使用20%的资金作为保证金买入期货合约，余下的现金不计算收益；
3. 交易成本：考察不扣费以及全品种按单边万分之二扣费两种情景；
4. 使用复权主力合约发出交易信号，使用主力合约交易，在切换日收盘时平掉当前仓位，在下一个主力合约上开仓，开平仓的合约价值相同；
5. 在每个调仓时点上剔除上市不足半年或过去20个交易日日均成交不足1万手的品种，时间序列类型因子交易全品种，横截面类型因子多空各包含前20%的品种；
6. 若调仓周期为H个交易日，则将资金等权分成 $\min(H, 5)$ 份，依次相隔 $[H/5]$ 个交易日建仓，将每个通道的净值相加得到策略的总净值，避免存在路径依赖。

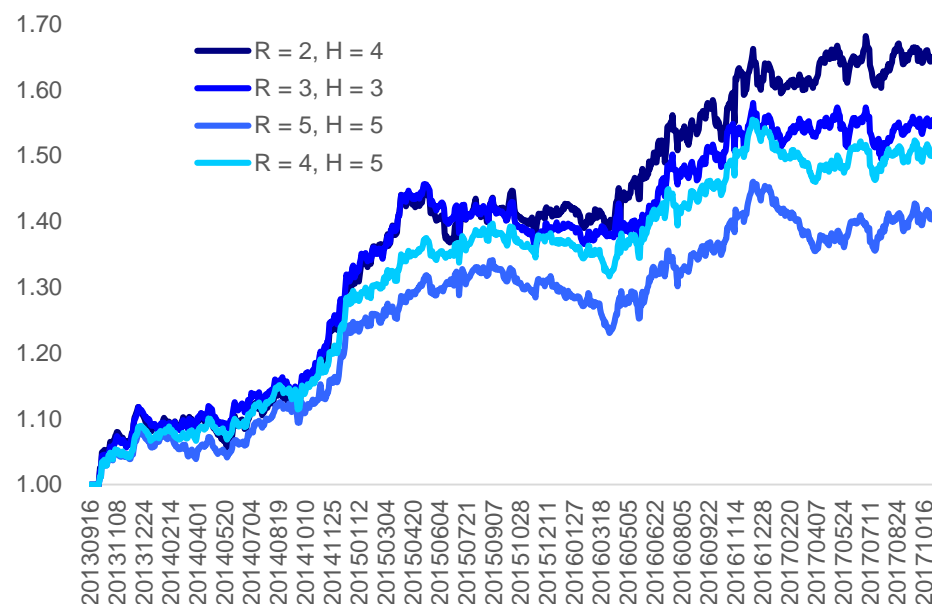
# 郑商所套保持仓因子表现

郑商所流动性相对较好且套保持仓数据连续的品种包括棉花、甲醇、菜籽油、菜粕、白糖、PTA。从时间序列上构建套保持仓量因子，即：若过去R个交易日套保净持仓增加则做多，套保净持仓减少则做空，向后持有H个交易日调仓。

表：不同参数组下套保持仓量因子的年化收益率与夏普比率

年化收益率	1	2	3	4	5	10	20	40
1	1.06%	5.24%	6.65%	12.03%	10.82%	4.64%	3.16%	3.13%
2	6.95%	4.74%	10.94%	12.88%	9.10%	5.46%	1.20%	3.93%
3	5.16%	6.69%	11.24%	10.85%	9.50%	5.54%	0.99%	3.50%
4	4.86%	7.85%	9.61%	9.72%	9.11%	4.48%	1.15%	3.92%
5	6.24%	8.34%	9.37%	10.37%	8.59%	3.58%	1.08%	3.50%
10	6.46%	6.18%	7.54%	6.73%	5.56%	1.75%	3.52%	-0.20%
15	5.12%	5.13%	4.45%	7.18%	5.18%	2.91%	1.98%	-2.37%
20	4.47%	2.86%	4.73%	5.17%	3.60%	2.73%	2.01%	-2.94%
夏普比率	1	2	3	4	5	10	20	40
1	0.11	0.56	0.71	1.28	1.19	0.54	0.38	0.36
2	0.88	0.57	1.31	1.50	1.06	0.67	0.15	0.46
3	0.76	0.91	1.47	1.37	1.19	0.72	0.12	0.42
4	0.78	1.17	1.34	1.31	1.21	0.61	0.15	0.48
5	1.06	1.34	1.41	1.50	1.21	0.50	0.14	0.44
10	1.11	1.20	1.39	1.18	0.95	0.26	0.51	-0.03
15	0.94	1.03	0.89	1.46	1.01	0.50	0.30	-0.32
20	0.90	0.58	1.03	1.14	0.77	0.52	0.33	-0.42

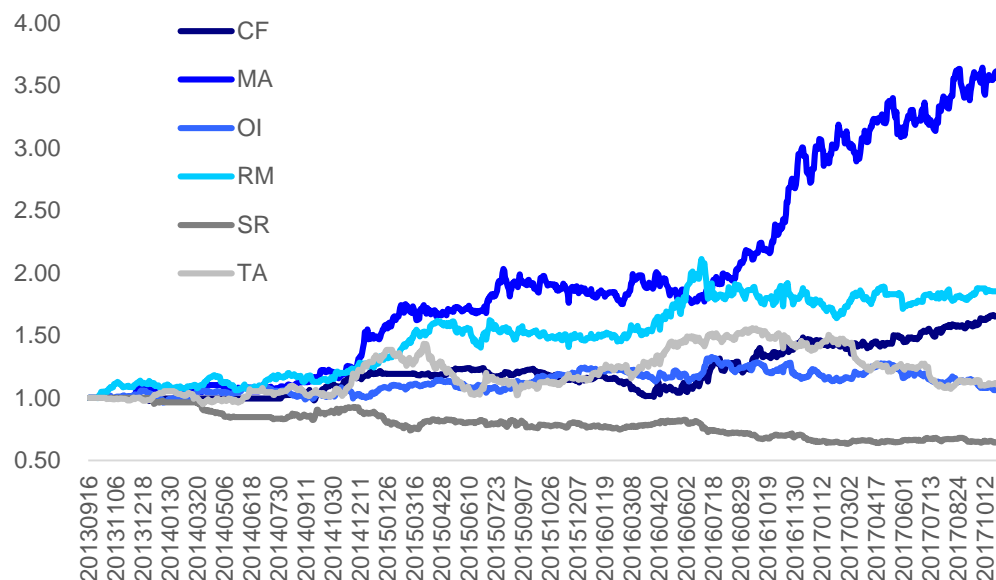
图：套保持仓量因子在各参数组下的净值曲线



# 不同品种表现

表现最好的品种为甲醇，年化收益率为**36.73%**，夏普比率和calmar比率高达**1.83**和**2.66**，菜粕和棉花表现次之，PTA和菜油取得正收益，而白糖表现最差，年化收益率为**-10.09%**。

图：不同品种在参数组（R:4,H:2）下的净值曲线

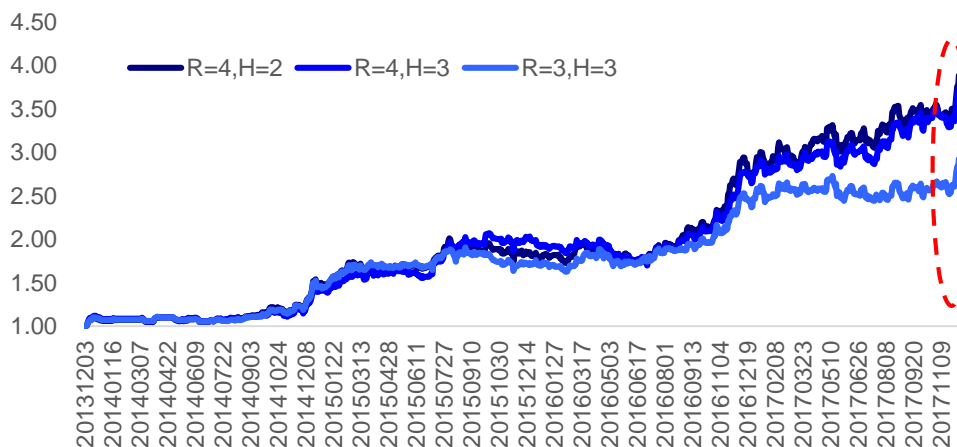


表：不同品种收益风险特征

	甲醇	菜粕	棉花	PTA	菜油	白糖
年化收益率	36.73%	16.23%	13.03%	3.93%	1.43%	-10.09%
最大回撤	13.78%	22.38%	18.56%	24.74%	20.17%	36.92%
夏普比率	1.83	0.84	0.82	0.23	0.11	-0.80
calmar比率	2.66	0.73	0.70	0.16	0.07	-0.27

# 不同品种表现

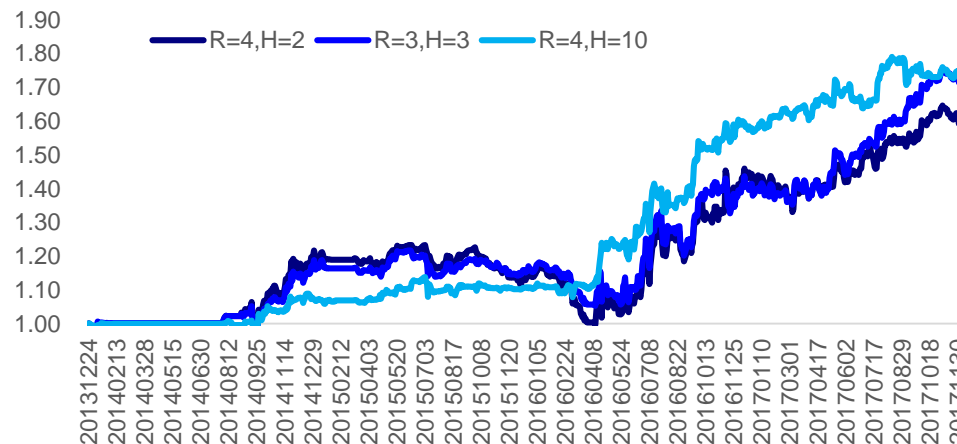
图：甲醇在参不同数组下的净值曲线



表：甲醇在不同参数数组下的夏普比率

	1	2	3	4	5	10	20	40	60
1	0.62	0.74	1.01	1.57	1.61	0.48	0.21	-0.43	-0.20
2	0.79	0.78	1.36	1.87	1.45	0.78	0.13	-0.37	-0.22
3	0.91	1.09	1.60	1.93	1.48	0.79	0.06	-0.47	-0.35
4	1.09	1.27	1.47	1.81	1.29	0.61	-0.01	-0.48	-0.39
5	1.22	1.36	1.53	1.65	1.19	0.38	-0.10	-0.50	-0.39
10	1.06	1.40	1.35	1.25	0.77	-0.07	-0.11	-0.88	-0.56
15	1.21	0.83	0.45	1.05	0.84	-0.04	-0.07	-0.97	-0.64
20	0.63	0.93	1.28	0.94	0.70	0.41	0.04	-1.21	-0.66

图：棉花在参不同数组下的净值曲线



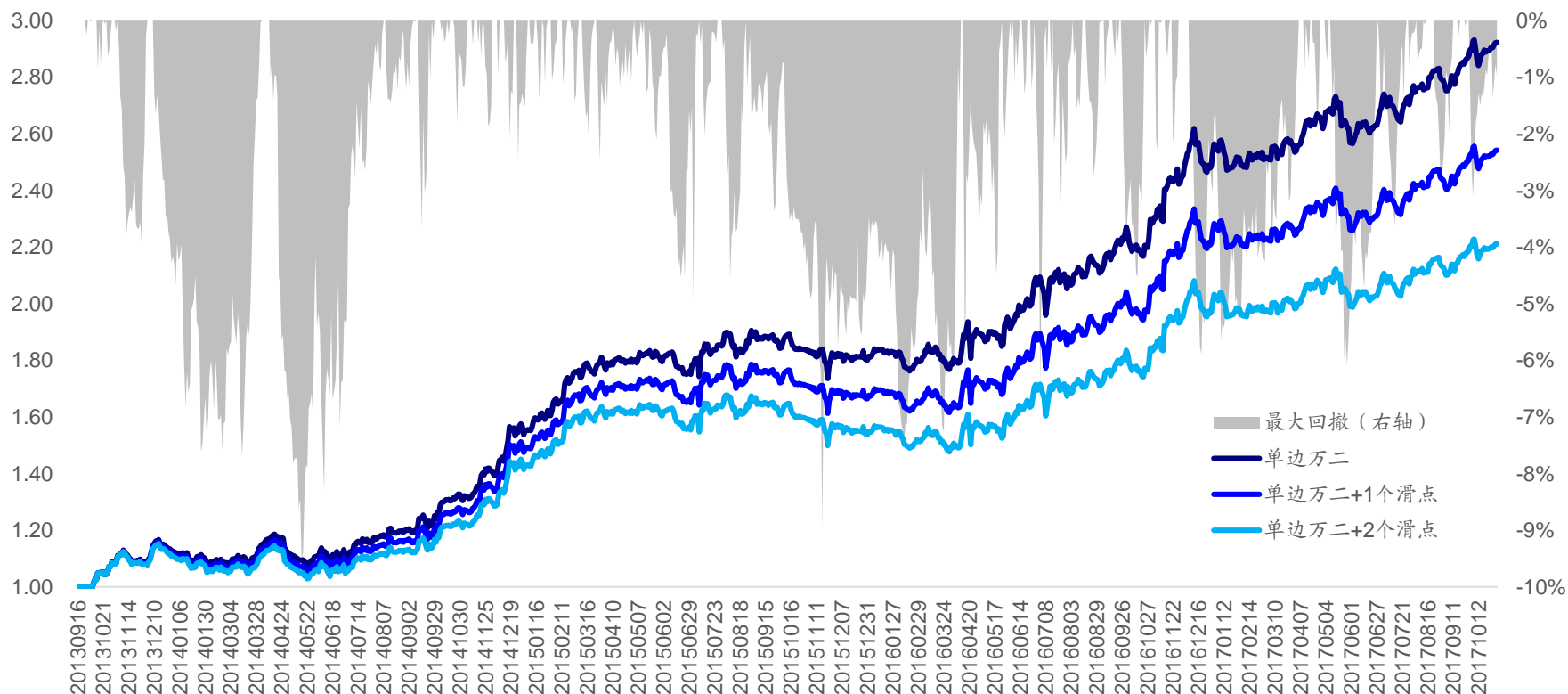
表：棉花在不同参数数组下的夏普比率

	1	2	3	4	5	10	20	40	60
1	-0.12	-0.16	0.48	0.70	1.00	0.59	0.23	0.35	0.35
2	0.04	0.29	0.50	0.74	0.66	0.57	0.18	0.35	0.27
3	0.34	0.68	0.96	0.64	0.82	0.55	0.21	0.28	0.33
4	0.45	0.92	0.87	0.82	0.92	0.52	0.30	0.26	0.31
5	0.91	1.03	0.95	0.85	0.90	0.58	0.30	0.20	0.24
10	0.87	1.19	1.12	1.31	1.25	0.77	0.48	0.05	0.07
15	0.52	0.42	0.78	0.94	0.94	0.81	0.04	-0.28	-0.08
20	0.07	0.63	0.56	0.80	0.50	0.28	-0.16	-0.33	-0.21

# 品种优选后的策略表现

若仅交易表现最好的甲醇、菜粕和棉花三个品种，策略可以取得**29.84%**的年化收益率，夏普比率和calmar比率高达**2.20**和**3.14**。随着交易成本的提高，策略表现依然稳健。

图：品种优选后的组合净值曲线





将前N名会员看成一个整体，分析其交易行为，N取5、10、20，用参数TopN\_type (1,2,3) 表示，构建如下10类会员持仓因子。

$$\text{因子1: } \frac{(\text{多头持仓量} - \text{空头持仓量})_t}{(\text{多头持仓量} - \text{空头持仓量})_{t-R}} - 1$$

$$\text{因子2: } \frac{(\text{多头持仓量} - \text{空头持仓量})_t}{\text{总持仓量}_t} - \frac{(\text{多头持仓量} - \text{空头持仓量})_{t-R}}{\text{总持仓量}_{t-R}}$$

$$\text{因子3: } \frac{(\text{多头持仓量} - \text{空头持仓量})_t}{(\text{多头持仓量} + \text{空头持仓量})_t}$$

$$\text{因子4: } \frac{\text{多头持仓量}_t}{\text{多头持仓量}_{t-R}} - 1$$

$$\text{因子5: } - \left( \frac{\text{空头持仓量}_t}{\text{空头持仓量}_{t-R}} - 1 \right)$$

$$\text{因子6: } \frac{\text{多头持仓量}_t}{\text{总持仓量}_t} - \frac{\text{多头持仓量}_{t-R}}{\text{总持仓量}_{t-R}}$$

$$\text{因子7: } - \left( \frac{\text{空头持仓量}_t}{\text{总持仓量}_t} - \frac{\text{空头持仓量}_{t-R}}{\text{总持仓量}_{t-R}} \right)$$

$$\text{因子8: } \text{sign} \left( \text{sign} \left( \frac{\text{多头持仓量}_t}{\text{多头持仓量}_{t-R}} - 1 \right) + \text{sign} \left( \frac{\text{空头持仓量}_{t-R}}{\text{空头持仓量}_t} - 1 \right) \right)$$

$$\text{因子9: } \text{sign} \left( \frac{\text{多头持仓量}_t}{\text{多头持仓量}_{t-R}} - 1 \right)$$

$$\text{因子10: } \text{sign} \left( \frac{\text{空头持仓量}_{t-R}}{\text{空头持仓量}_t} - 1 \right)$$

# 扣费前会员持仓因子表现 (1-5)

topN_type=1								topN_type=2								topN_type=3							
因子1	1	2	3	4	5	10	20	1	2	3	4	5	10	20	1	2	3	4	5	10	20		
1	-6.67%	-1.66%	-6.84%	-5.28%	-5.18%	-5.19%	-4.43%	-3.41%	-3.39%	-4.45%	-4.42%	-4.35%	-2.36%	-3.73%	-5.56%	-2.73%	-3.78%	-0.36%	-4.63%	-2.64%	-4.67%		
2	-4.91%	-3.57%	-5.07%	-4.84%	-5.62%	-3.45%	-4.83%	-0.64%	-1.32%	-4.61%	-4.54%	-5.16%	-2.41%	-3.85%	-2.96%	-1.39%	-2.56%	-3.93%	-3.44%	-3.25%	-4.26%		
3	-2.64%	-4.12%	-4.98%	-4.73%	-4.19%	-2.59%	-3.27%	0.03%	-3.42%	-4.67%	-4.03%	-3.45%	-2.38%	-4.26%	-2.23%	-1.25%	-0.97%	-1.13%	-3.74%	-2.13%	-5.38%		
4	-4.60%	-3.38%	-3.60%	-4.79%	-1.99%	0.55%	-4.34%	-1.95%	-3.66%	-3.75%	-4.10%	-1.88%	-2.70%	-3.42%	-1.45%	-1.09%	-0.14%	-4.07%	-1.13%	-2.81%	-3.57%		
5	-2.12%	-1.20%	-3.40%	-2.56%	-3.25%	-1.60%	-0.09%	-3.01%	-1.67%	-1.97%	-0.79%	-2.66%	-2.16%	-2.42%	-2.36%	-2.26%	2.80%	1.25%	-1.66%	-3.01%	-3.10%		
10	-1.23%	-0.34%	-1.74%	-0.72%	-1.54%	0.05%	-1.86%	-1.00%	0.19%	-0.24%	1.42%	-0.30%	-2.90%	-2.71%	-0.01%	-0.58%	3.13%	1.19%	-1.16%	-0.06%	-3.81%		
15	-2.34%	-1.94%	-4.58%	-2.33%	-4.39%	-3.97%	-1.52%	-0.81%	-0.65%	-2.31%	-0.98%	-5.05%	-2.64%	-0.59%	-1.60%	-3.72%	-2.14%	0.91%	-1.72%	-3.35%	-1.28%		
20	-3.66%	-2.83%	-4.79%	-1.91%	-1.94%	-0.98%	-0.32%	-2.38%	-1.54%	-2.13%	-1.90%	-1.66%	-3.18%	-1.01%	-2.97%	-3.37%	-1.11%	-3.13%	-3.31%	-3.51%	-2.13%		
因子2																							
1	10.30%	8.16%	7.81%	7.79%	6.84%	4.18%	3.14%	11.01%	10.86%	8.09%	9.77%	7.79%	6.78%	2.56%	11.32%	9.77%	10.33%	9.81%	7.47%	4.87%	2.24%		
2	5.50%	6.35%	6.33%	6.45%	6.18%	4.35%	1.74%	6.38%	7.91%	5.91%	5.81%	7.78%	4.97%	0.90%	5.72%	6.42%	8.81%	5.51%	7.14%	4.03%	0.76%		
3	1.26%	3.47%	1.37%	5.54%	7.88%	0.96%	0.36%	1.20%	4.18%	2.29%	4.81%	5.89%	3.00%	-0.89%	4.20%	6.09%	6.89%	4.56%	6.53%	3.47%	-0.20%		
4	6.66%	5.33%	2.94%	4.64%	6.25%	4.01%	0.89%	6.24%	5.89%	5.35%	5.63%	6.88%	2.67%	-1.67%	6.70%	4.49%	4.11%	6.45%	4.68%	2.37%	0.00%		
5	3.68%	2.74%	3.80%	2.90%	3.55%	2.25%	-0.01%	5.41%	2.29%	4.29%	3.50%	3.99%	2.40%	0.47%	2.33%	1.93%	3.77%	2.98%	4.73%	0.64%	-0.25%		
10	1.01%	2.61%	2.28%	3.18%	2.66%	1.96%	-1.02%	2.17%	3.22%	1.76%	1.52%	3.21%	0.86%	-0.51%	1.82%	2.55%	1.76%	0.69%	2.19%	-1.34%	0.55%		
15	0.99%	-0.29%	1.19%	0.76%	0.00%	0.84%	-0.11%	0.55%	-1.08%	-0.27%	1.09%	-0.87%	-0.87%	-3.50%	-0.94%	0.03%	1.29%	-2.40%	-0.35%	-0.03%	-2.02%		
20	4.84%	2.12%	-0.05%	2.59%	1.95%	1.17%	-1.16%	5.47%	1.88%	0.55%	0.80%	0.30%	0.04%	-0.41%	5.23%	0.90%	-0.82%	-0.47%	-0.75%	-0.19%	-0.38%		
因子3																							
1	4.03%	3.92%	3.94%	3.85%	3.81%	4.05%	4.16%	4.59%	4.46%	4.49%	4.39%	4.46%	4.61%	4.76%	3.69%	3.62%	3.60%	3.59%	3.64%	3.76%	4.31%		
2	3.59%	3.58%	3.35%	3.38%	3.35%	3.64%	3.64%	3.39%	3.34%	2.67%	3.12%	2.71%	3.30%	3.60%	3.39%	3.35%	2.65%	3.29%	2.72%	3.61%	4.00%		
3	1.98%	1.95%	1.94%	1.62%	3.78%	1.86%	3.98%	1.45%	1.46%	1.43%	1.87%	4.28%	2.08%	4.47%	3.63%	3.63%	3.65%	2.22%	3.33%	2.28%	3.66%		
4	1.99%	1.93%	1.99%	1.99%	3.05%	2.18%	2.20%	3.71%	3.63%	3.65%	3.66%	3.51%	0.99%	4.03%	3.35%	3.29%	3.36%	3.35%	2.83%	2.66%	3.73%		
5	0.91%	0.94%	0.94%	1.00%	1.01%	1.08%	1.27%	1.21%	1.13%	1.13%	1.17%	1.15%	1.28%	1.28%	1.79%	1.80%	1.80%	1.87%	1.92%	1.76%	2.08%		
10	1.42%	1.42%	1.42%	1.54%	1.54%	1.59%	1.61%	1.32%	1.32%	1.32%	1.28%	1.28%	1.51%	1.72%	1.64%	1.67%	1.67%	1.79%	1.79%	1.66%	1.95%		
15	1.84%	1.84%	1.84%	1.84%	1.80%	1.80%	0.70%	1.21%	1.21%	1.21%	1.21%	1.18%	1.32%	0.89%	1.00%	1.00%	1.00%	1.00%	1.02%	1.00%	0.92%		
20	1.36%	1.36%	1.36%	1.36%	1.36%	1.34%	0.99%	0.51%	0.51%	0.51%	0.51%	0.51%	0.48%	0.42%	1.55%	1.61%	1.61%	1.61%	1.61%	1.61%	1.42%		
因子4																							
1	0.56%	1.20%	2.56%	2.85%	0.78%	-1.54%	-2.08%	-0.48%	0.71%	0.34%	2.35%	0.15%	-2.26%	-2.56%	-2.73%	-1.71%	-1.25%	0.03%	-0.30%	-3.75%	-2.59%		
2	1.55%	4.38%	2.22%	3.07%	0.33%	0.38%	-1.30%	0.47%	1.85%	0.93%	2.23%	0.01%	0.04%	-2.90%	0.02%	0.22%	-0.34%	0.07%	-0.38%	-2.31%	-2.72%		
3	-1.58%	1.44%	0.50%	3.04%	2.07%	-1.20%	-0.78%	-1.32%	1.75%	-0.28%	0.32%	0.56%	-2.02%	-1.08%	-1.65%	0.63%	-0.15%	-0.57%	0.55%	-3.32%	-0.42%		
4	2.98%	3.70%	0.60%	3.09%	1.73%	-1.88%	-0.26%	2.84%	2.42%	-0.25%	0.01%	1.55%	-2.56%	-2.59%	2.60%	1.12%	-0.02%	-0.70%	0.40%	-2.88%	-2.37%		
5	-0.26%	-2.16%	-0.66%	-0.43%	-1.60%	-2.66%	-1.92%	-1.49%	-2.40%	-3.02%	-1.87%	-2.27%	-3.43%	-1.60%	-3.35%	-3.50%	-2.53%	-2.63%	-3.01%	-6.28%	-1.17%		
10	-1.47%	-1.68%	-2.44%	-2.61%	-3.38%	-0.25%	-0.01%	-0.61%	-1.41%	-4.59%	-3.83%	-3.13%	-2.58%	0.32%	0.26%	-2.88%	-3.56%	-3.55%	-3.55%	-4.48%	-0.25%		
15	-1.17%	-2.57%	-0.46%	-1.84%	-3.02%	-1.10%	-1.65%	-1.19%	-3.46%	-2.41%	-3.98%	-3.98%	-2.02%	-1.81%	-1.34%	-3.80%	-3.08%	-4.16%	-3.41%	-2.99%	-2.71%		
20	3.11%	0.66%	-0.71%	-0.98%	-1.66%	2.56%	0.13%	3.52%	-0.43%	-1.34%	-1.83%	-1.32%	0.59%	-0.44%	3.26%	-1.85%	-0.79%	-3.19%	-3.09%	-2.65%	0.48%		
因子5																							
1	11.17%	9.44%	7.46%	5.47%	7.41%	9.14%	5.71%	13.77%	8.97%	8.22%	6.09%	7.52%	9.85%	4.15%	13.64%	7.67%	9.22%	7.02%	7.97%	9.49%	4.94%		
2	6.36%	5.96%	4.20%	5.74%	5.41%	6.72%	3.48%	6.16%	5.66%	6.71%	5.66%	5.69%	6.83%	2.80%	5.40%	3.65%	5.18%	5.30%	5.00%	5.00%	2.88%		
3	1.66%	4.53%	2.41%	3.92%	4.87%	4.71%	2.52%	3.14%	4.86%	3.96%	3.20%	5.05%	5.78%	1.38%	3.80%	3.51%	2.57%	3.19%	4.27%	6.10%	2.52%		
4	4.16%	2.20%	2.63%	4.70%	4.60%	5.87%	2.22%	2.57%	2.95%	3.46%	5.20%	4.57%	6.07%	1.54%	2.35%	0.07%	3.74%	3.98%	4.03%	5.41%	2.79%		
5	2.08%	5.17%	5.51%	6.23%	5.58%	5.28%	2.53%	4.99%	5.09%	7.10%	5.53%	6.31%	6.45%	1.51%	5.30%	4.45%	6.46%	5.82%	5.57%	8.27%	2.91%		
10	0.78%	2.72%	3.39%	3.11%	2.53%	2.83%	-0.52%	2.63%	4.13%	4.42%	4.12%	3.17%	3.08%	-2.20%	3.50%	5.08%	5.76%	5.42%	4.37%	3.17%	-0.44%		
15	-0.12%	1.65%	4.34%	5.97%	4.75%	2.67%	1.10%	1.51%	2.32%	3.03%	4.65%	4.35%	2.83%	-0.82%	2.20%	3.77%	3.58%	3.60%	3.55%	1.77%	1.86%		
20	-1.33%	-0.87%	-0.23%	0.01%	-1.06%	-1.27%	-0.21%	0.35%	-0.08%	0.31%	0.73%	0.61%	-0.77%	-0.95%	1.28%	1.11%	0.75%	1.56%	1.05%	-0.18%	-0.45%		

# 扣费前会员持仓因子表现 (6-10)

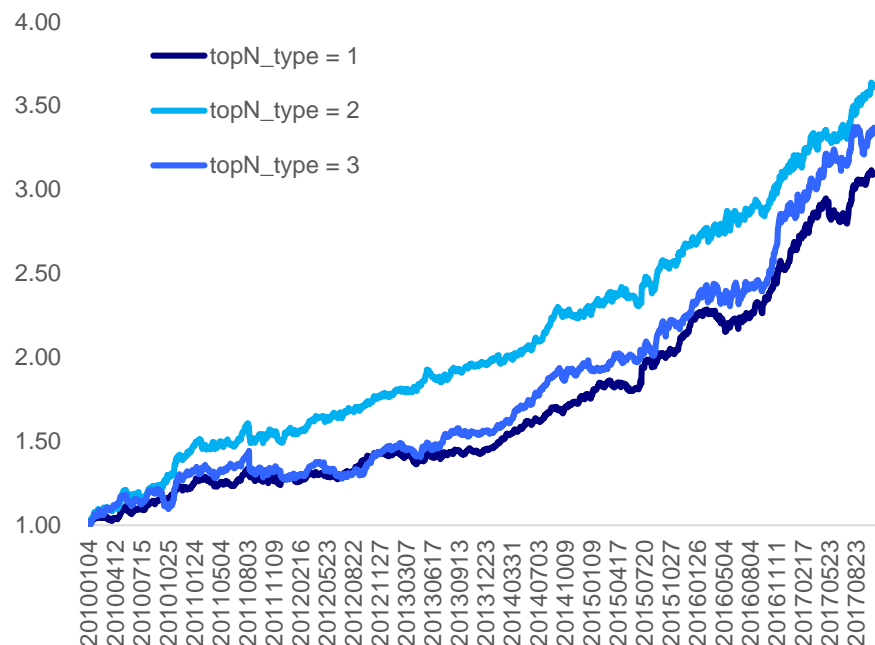
topN_type=1								topN_type=2								topN_type=3							
因子6	1	2	3	4	5	10	20	1	2	3	4	5	10	20		1	2	3	4	5	10	20	
1	8.06%	8.71%	7.96%	8.14%	5.12%	5.49%	1.62%	5.18%	9.26%	8.02%	8.59%	8.22%	6.01%	1.25%		6.05%	8.64%	7.67%	7.73%	8.17%	6.16%	-0.07%	
2	6.03%	7.44%	6.60%	4.94%	3.79%	2.65%	-0.36%	5.94%	8.25%	6.58%	5.92%	7.19%	4.02%	0.29%		5.45%	7.60%	7.35%	6.49%	6.78%	4.48%	-0.88%	
3	1.04%	3.97%	3.46%	5.34%	4.50%	1.52%	-1.26%	1.55%	3.25%	1.74%	3.48%	5.22%	3.25%	0.45%		2.21%	4.74%	3.15%	4.59%	4.45%	2.77%	-0.75%	
4	4.10%	4.72%	3.06%	4.20%	3.07%	0.54%	-1.01%	3.54%	6.94%	2.80%	4.97%	6.04%	1.49%	0.04%		2.77%	3.91%	3.17%	5.52%	5.84%	0.77%	-0.29%	
5	2.87%	1.98%	2.08%	2.32%	2.26%	0.47%	-1.57%	3.55%	2.03%	3.07%	2.49%	3.82%	1.62%	-0.55%		2.88%	1.45%	3.15%	1.69%	3.60%	1.27%	-2.50%	
10	0.38%	4.47%	1.71%	1.40%	-0.21%	-1.27%	-1.56%	3.07%	3.49%	2.01%	1.80%	2.16%	0.17%	-0.53%		3.61%	2.44%	2.58%	0.93%	3.71%	-1.53%	-1.74%	
15	-0.27%	0.51%	1.33%	-1.61%	-1.24%	-1.61%	-2.18%	-0.17%	-0.83%	0.72%	-1.54%	-2.64%	-2.68%	-2.22%		-0.18%	-0.03%	-1.05%	-0.92%	-1.10%	-2.30%	-2.64%	
20	2.78%	5.61%	0.88%	2.04%	0.14%	0.91%	-0.34%	5.41%	3.15%	2.08%	1.29%	-0.14%	0.97%	-0.71%		2.09%	3.20%	0.95%	-0.54%	0.28%	-0.14%	-1.61%	
因子7	1	2	3	4	5	10	20	1	2	3	4	5	10	20		1	2	3	4	5	10	20	
1	7.18%	5.43%	3.08%	3.37%	2.68%	4.92%	3.45%	9.44%	6.40%	3.33%	5.14%	4.63%	5.24%	2.95%		7.00%	5.52%	4.09%	3.76%	3.59%	5.36%	3.47%	
2	3.46%	1.10%	1.84%	2.34%	1.28%	4.12%	0.91%	3.78%	2.28%	2.77%	1.19%	2.58%	3.48%	-0.35%		2.43%	3.66%	3.44%	0.90%	1.23%	3.29%	0.78%	
3	0.76%	2.53%	0.37%	1.63%	4.46%	1.26%	0.67%	2.24%	3.18%	0.97%	2.35%	4.51%	3.01%	0.24%		1.42%	5.02%	3.04%	1.48%	2.79%	3.36%	0.02%	
4	4.22%	0.42%	2.32%	3.93%	4.17%	3.61%	0.21%	5.46%	2.25%	2.38%	2.86%	2.57%	3.34%	-0.67%		5.00%	2.97%	2.01%	1.99%	3.04%	2.65%	1.19%	
5	2.46%	1.96%	1.73%	1.64%	2.13%	2.79%	-0.21%	2.80%	1.58%	1.75%	0.26%	3.63%	1.84%	1.30%		1.87%	0.17%	0.64%	0.19%	2.97%	1.38%	0.69%	
10	-0.38%	-0.24%	-0.22%	1.39%	0.11%	-0.35%	-1.61%	3.15%	1.92%	0.49%	1.24%	2.64%	0.23%	0.21%		1.79%	2.29%	0.24%	1.52%	2.61%	-0.38%	0.52%	
15	-0.13%	-0.64%	1.04%	1.63%	2.46%	1.51%	-2.02%	0.04%	-0.11%	0.81%	0.36%	2.81%	0.68%	-0.97%		-1.19%	-0.52%	0.23%	0.73%	1.35%	3.81%	0.82%	
20	1.18%	-1.69%	-1.55%	-0.25%	-2.92%	-2.20%	-2.75%	3.93%	-1.55%	-0.55%	0.99%	0.37%	-0.95%	-0.85%		7.26%	-0.36%	-0.47%	0.27%	0.10%	0.10%	2.63%	
因子8	1	2	3	4	5	10	20	1	2	3	4	5	10	20		1	2	3	4	5	10	20	
1	15.53%	10.22%	8.67%	11.16%	15.17%	8.44%	5.85%	17.85%	13.31%	5.92%	10.73%	13.81%	8.39%	5.85%		16.73%	16.50%	12.65%	7.87%	8.90%	6.82%	6.08%	
2	6.68%	7.92%	5.49%	6.01%	9.05%	6.28%	4.02%	4.14%	9.34%	4.47%	9.44%	9.22%	6.80%	4.92%		6.50%	9.97%	9.43%	6.01%	2.22%	5.15%	-0.78%	
3	8.49%	11.92%	8.79%	6.59%	6.07%	0.63%	0.93%	5.16%	11.72%	11.27%	9.56%	9.48%	4.32%	1.26%		8.90%	15.83%	16.89%	4.41%	5.32%	-0.11%	2.51%	
4	9.66%	6.61%	6.45%	8.06%	6.37%	4.79%	4.43%	7.04%	5.66%	5.58%	5.29%	9.56%	-0.80%	5.19%		11.48%	9.59%	13.20%	-0.54%	3.60%	-4.23%	0.59%	
5	7.25%	6.77%	3.92%	5.15%	7.10%	0.52%	2.22%	9.43%	4.50%	2.78%	5.24%	8.19%	-1.68%	-0.52%		5.27%	5.81%	0.61%	3.69%	5.62%	-4.76%	-4.51%	
10	2.49%	8.33%	3.63%	5.04%	3.95%	-3.09%	2.61%	2.74%	7.98%	1.50%	4.56%	2.83%	-1.74%	3.21%		-0.82%	8.24%	-0.53%	2.55%	3.65%	0.39%	0.71%	
15	1.46%	0.86%	1.10%	3.99%	2.03%	3.05%	2.07%	0.47%	-3.68%	0.33%	-0.92%	-3.19%	-1.60%	1.86%		1.73%	-3.34%	-2.56%	-3.91%	1.31%	-1.90%	2.13%	
20	2.59%	5.89%	-0.64%	5.96%	3.49%	2.00%	5.21%	0.28%	1.08%	-4.95%	-0.93%	3.67%	5.72%	4.02%		2.98%	-0.43%	-9.43%	-0.09%	1.28%	6.76%	3.96%	
因子9	1	2	3	4	5	10	20	1	2	3	4	5	10	20		1	2	3	4	5	10	20	
1	1.44%	0.56%	0.00%	1.42%	0.10%	-1.47%	-1.87%	0.32%	-0.92%	-1.95%	0.10%	-0.41%	-2.47%	-2.30%		-1.11%	-1.43%	-1.99%	-2.22%	-2.64%	-3.61%	-1.85%	
2	0.50%	1.77%	-0.83%	0.19%	-0.82%	-0.70%	-1.11%	-0.74%	0.41%	-1.34%	-0.47%	-1.07%	-0.52%	-1.32%		-0.60%	0.42%	-2.67%	-1.14%	-3.70%	-1.57%	-2.30%	
3	1.30%	3.31%	2.25%	-0.62%	-0.20%	-3.14%	-1.36%	-0.06%	2.17%	1.85%	0.49%	-0.32%	-1.95%	-0.96%		0.86%	2.69%	2.66%	-2.21%	-1.79%	-2.89%	-1.76%	
4	2.51%	1.61%	0.85%	-0.31%	-0.60%	-1.29%	-1.99%	1.97%	0.18%	-0.60%	-1.31%	-0.53%	-2.57%	-2.75%		2.30%	1.00%	1.04%	-2.59%	-1.76%	-3.75%	-3.70%	
5	-0.17%	-2.02%	-1.21%	-0.86%	-0.83%	-3.36%	-3.72%	-1.31%	-2.08%	-2.00%	-1.95%	-1.95%	-4.23%	-3.26%		-3.50%	-2.34%	-2.23%	-2.34%	-2.51%	-4.12%	-3.29%	
10	0.53%	-0.06%	-0.53%	-0.59%	-1.72%	-3.16%	-1.39%	-0.26%	-0.32%	-1.26%	-1.29%	-2.42%	-2.65%	-0.23%		-1.09%	-0.84%	-1.83%	-2.09%	-1.75%	-2.45%	-1.21%	
15	-1.21%	-0.44%	0.11%	-0.08%	-1.17%	-1.30%	-1.10%	-2.30%	-2.44%	-2.13%	-3.10%	-3.33%	-3.09%	-1.11%		-2.28%	-1.94%	-2.33%	-2.78%	-2.16%	-2.53%	-1.73%	
20	2.76%	1.93%	-1.29%	0.15%	-0.80%	-1.81%	-0.53%	0.72%	0.21%	-3.18%	-2.40%	-1.61%	-0.92%	-0.86%		1.48%	-0.19%	-4.15%	-3.74%	-3.34%	-2.06%	-2.76%	
因子10	1	2	3	4	5	10	20	1	2	3	4	5	10	20		1	2	3	4	5	10	20	
1	9.78%	7.62%	6.18%	6.63%	8.50%	6.89%	5.87%	11.06%	9.37%	6.48%	6.03%	7.26%	6.43%	4.59%		9.85%	9.40%	8.02%	6.58%	6.32%	5.97%	3.42%	
2	4.48%	3.35%	5.13%	3.20%	6.08%	4.71%	3.78%	2.59%	4.16%	4.85%	4.39%	6.60%	3.79%	2.56%		3.18%	3.20%	6.15%	4.42%	5.96%	3.20%	2.58%	
3	4.51%	4.22%	3.01%	3.57%	3.93%	3.30%	2.42%	3.47%	4.52%	3.08%	4.17%	4.32%	3.66%	1.24%		3.31%	4.40%	3.16%	3.84%	3.95%	2.60%	2.02%	
4	4.90%	2.05%	2.39%	4.08%	2.96%	4.29%	4.38%	2.53%	2.78%	2.02%	3.49%	4.40%	2.87%	3.63%		2.58%	3.56%	3.61%	3.43%	3.36%	3.16%	4.17%	
5	5.45%	5.21%	3.07%	3.13%	3.26%	3.98%	5.59%	6.55%	4.71%	2.41%	3.05%	5.04%	3.82%	3.54%		5.71%	4.02%	2.63%	3.58%	4.62%	2.73%	3.35%	
10	1.42%	4.35%	2.64%	3.02%	2.54%	1.51%	3.10%	2.00%	3.89%	1.72%	3.27%	2.56%	2.12%	1.88%		1.39%	3.33%	2.06%	3.35%	2.16%	2.41%	1.74%	
15	1.67%	0.08%	-0.06%	2.25%	1.79%	3.16%	3.46%	2.15%	1.96%	2.64%	2.08%	1.77%	2.35%	3.18%		2.14%	1.07%	1.60%	1.08%	1.68%	1.01%	2.80%	
20	-0.79%	1.47%	0.75%	3.53%	2.49%	2.88%	3.01%	-0.82%	0.82%	-0.41%	1.87%	2.91%	3.12%	2.67%		-0.71%	0.28%	0.74%	3.23%	3.16%	3.71%	3.80%	



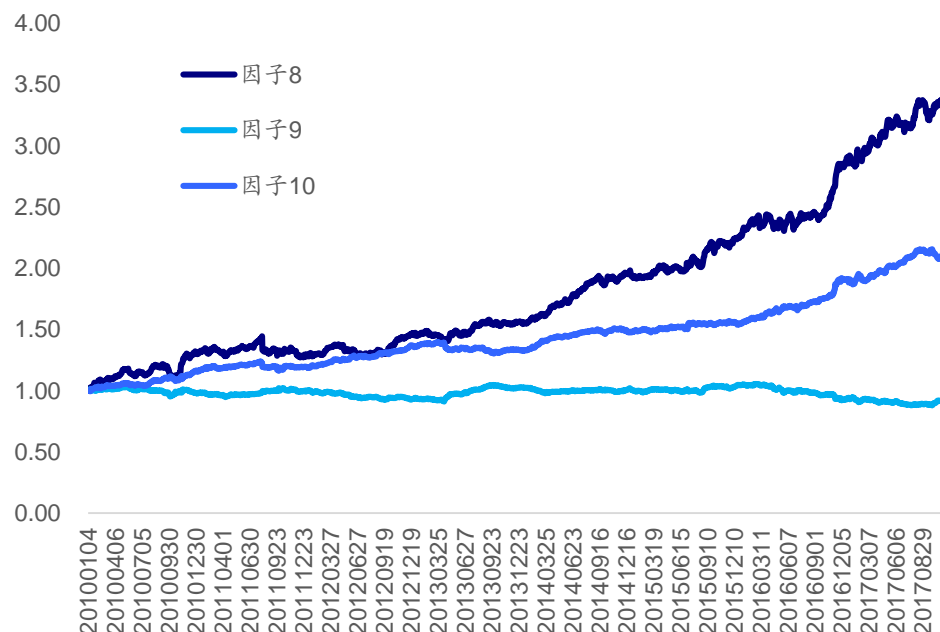
# 扣费前会员持仓因子表现

因子2、5、6、7、8、10表现突出，其中因子8——多空持仓量增减因子表现最好，当使用前十名的会员持仓数据计算时，因子取得**17.85%**的年化收益率，夏普比率高达**2.13**，calmar比率高达**2.43**。该因子的收益主要由空头端贡献，而多头端反而贡献负收益。

图：因子8在参数组（R:1,H:1）下的净值曲线



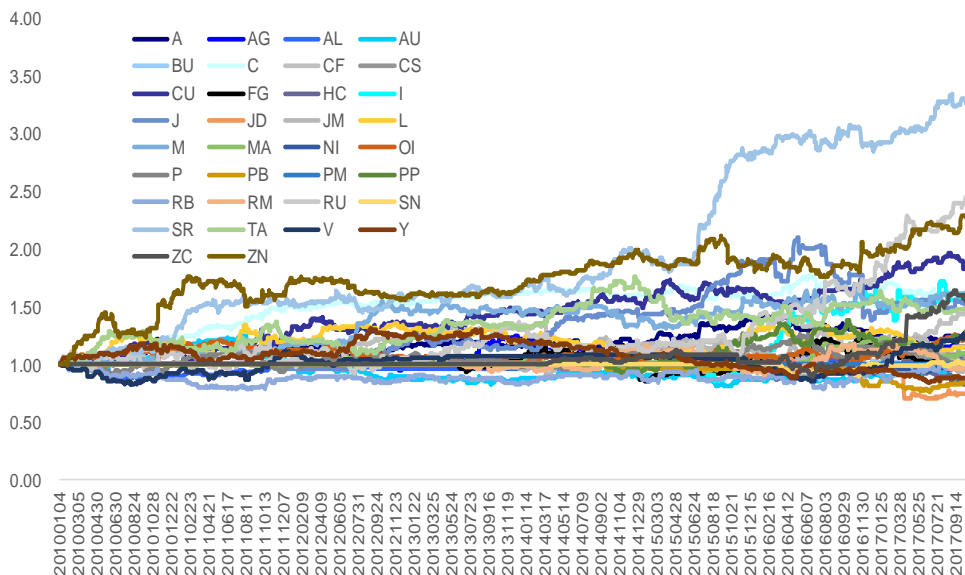
图：因子8-10在参数组（topN\_type:3,R:1,H:1）下的净值曲线



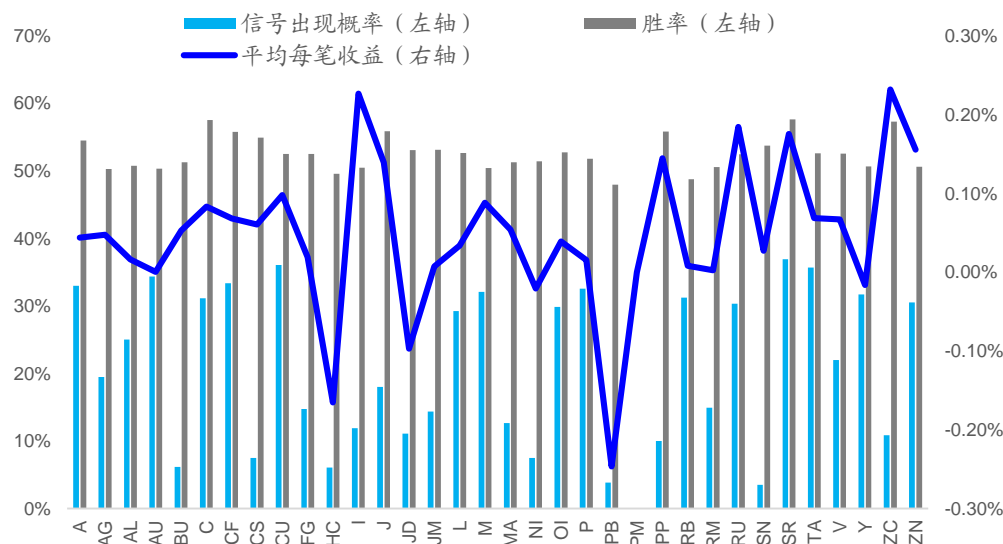
# 不同品种的表现

分品种来看，白糖表现最好，胜率为**57.63%**，平均每笔收益为**0.18%**。动力煤、铁矿石等品种同样表现较好，而表现不佳的品种则包括沪铅、热轧卷板等。

图：因子8中不同品种在参数组（topN\_type:2,R:1,H:1）下的净值曲线



图：因子8中不同品种在参数组（topN\_type:2,R:1,H:1）下的表现统计





# 扣费后会员持仓因子表现

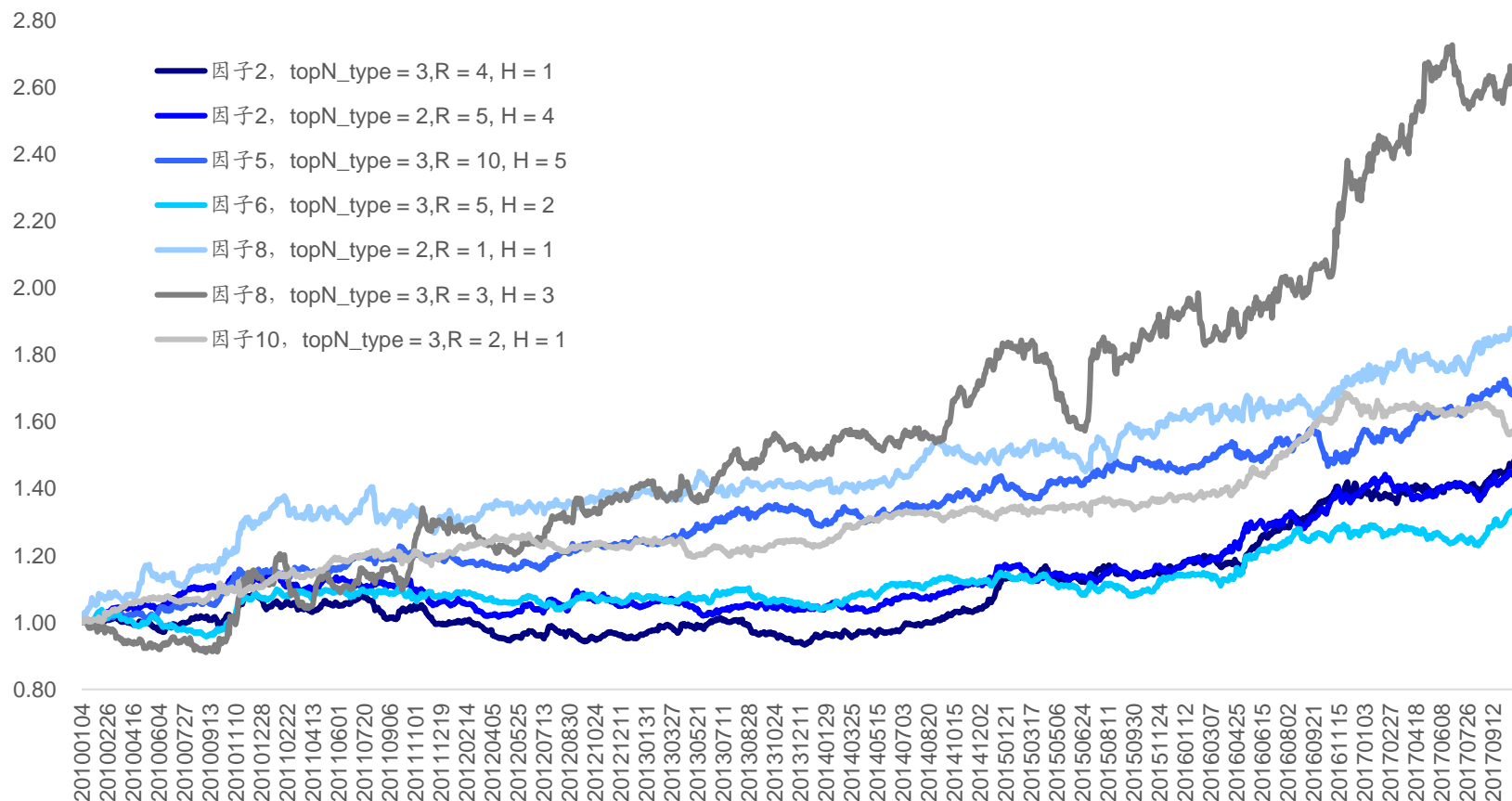
扣费后因子表现明显下降，当topN\_type=3时因子8表现最好，在大多数参数组下均能取得正收益，最优参数区域为R=1:3，H=1:4，平均收益率和夏普比率分别为7.44%和0.74。

topN_type=1							topN_type=2						topN_type=3					
因子2	1	2	3	4	5	10	1	2	3	4	5	10	1	2	3	4	5	10
1	2.12%	2.31%	2.85%	3.37%	2.82%	1.16%	2.70%	4.72%	3.04%	5.20%	3.60%	3.59%	2.87%	3.58%	5.01%	5.08%	3.22%	1.60%
2	1.51%	2.21%	2.86%	3.37%	3.39%	2.23%	2.30%	3.68%	2.45%	2.72%	4.90%	2.78%	1.64%	2.21%	5.19%	2.37%	4.22%	1.80%
3	-1.38%	0.76%	-1.36%	3.06%	5.52%	-0.69%	-1.45%	1.43%	-0.49%	2.33%	3.55%	1.24%	1.46%	3.25%	3.97%	2.03%	4.17%	1.71%
4	4.57%	3.24%	0.85%	2.49%	4.29%	2.53%	4.17%	3.75%	3.18%	3.45%	4.83%	1.18%	4.56%	2.34%	1.95%	4.19%	2.71%	0.83%
5	1.98%	1.03%	2.08%	1.17%	1.79%	0.94%	3.69%	0.62%	2.57%	1.74%	2.20%	1.05%	0.64%	0.25%	2.00%	1.24%	2.89%	-0.67%
因子5	1	2	3	4	5	10	1	2	3	4	5	10	1	2	3	4	5	10
1	3.19%	3.76%	2.72%	1.40%	3.62%	6.22%	5.56%	3.31%	3.50%	1.98%	3.74%	6.98%	5.46%	2.10%	4.51%	2.95%	4.20%	6.68%
2	2.44%	1.97%	0.95%	2.83%	2.79%	4.69%	2.23%	1.70%	3.42%	2.79%	3.07%	4.83%	1.58%	-0.23%	1.97%	2.44%	2.42%	3.06%
3	-0.94%	1.89%	-0.26%	1.54%	2.69%	3.07%	0.52%	2.21%	1.29%	0.84%	2.88%	4.17%	1.14%	0.88%	-0.07%	0.89%	2.17%	4.48%
4	2.10%	0.19%	0.57%	2.61%	2.67%	4.41%	0.52%	0.93%	1.44%	3.15%	2.71%	4.63%	0.33%	-1.87%	1.77%	1.95%	2.21%	4.00%
5	0.46%	3.49%	3.81%	4.51%	3.85%	4.00%	3.32%	3.43%	5.37%	3.83%	4.57%	5.16%	3.62%	2.78%	4.78%	4.13%	3.88%	6.96%
因子6	1	2	3	4	5	10	1	2	3	4	5	10	1	2	3	4	5	10
1	-0.02%	2.75%	2.90%	3.57%	1.01%	2.26%	-2.74%	3.22%	2.92%	3.98%	3.93%	2.68%	-2.02%	2.59%	2.44%	3.01%	3.88%	2.76%
2	2.07%	3.25%	3.15%	1.86%	1.04%	0.50%	1.98%	3.98%	3.13%	2.80%	4.29%	1.78%	1.45%	3.33%	3.81%	3.32%	3.87%	2.18%
3	-1.56%	1.25%	0.69%	2.88%	2.25%	-0.21%	-1.10%	0.52%	-1.02%	0.99%	2.94%	1.49%	-0.47%	1.98%	0.35%	2.09%	2.15%	0.98%
4	2.04%	2.61%	0.95%	2.03%	1.14%	-0.95%	1.48%	4.75%	0.70%	2.82%	4.06%	-0.01%	0.70%	1.82%	1.05%	3.28%	3.81%	-0.75%
5	1.20%	0.31%	0.40%	0.63%	0.52%	-0.82%	1.84%	0.35%	1.35%	0.77%	2.02%	0.26%	1.19%	-0.26%	1.40%	-0.03%	1.80%	-0.11%
因子7	1	2	3	4	5	10	1	2	3	4	5	10	1	2	3	4	5	10
1	-0.78%	-0.35%	-1.73%	-0.93%	-1.28%	1.72%	1.21%	0.54%	-1.58%	0.71%	0.54%	1.99%	-1.11%	-0.39%	-0.94%	-0.73%	-0.47%	2.00%
2	-0.41%	-2.86%	-1.47%	-0.64%	-1.45%	1.94%	-0.15%	-1.74%	-0.65%	-1.76%	-0.18%	1.26%	-1.46%	-0.45%	-0.01%	-2.06%	-1.55%	1.02%
3	-1.88%	-0.17%	-2.35%	-0.77%	2.15%	-0.50%	-0.44%	0.46%	-1.80%	-0.11%	2.21%	1.25%	-1.24%	2.27%	0.23%	-0.95%	0.51%	1.56%
4	2.16%	-1.60%	0.22%	1.78%	2.19%	2.07%	3.34%	0.19%	0.26%	0.70%	0.65%	1.82%	2.94%	0.92%	-0.11%	-0.17%	1.09%	1.09%
5	0.79%	0.29%	0.02%	-0.06%	0.38%	1.42%	1.14%	-0.11%	0.06%	-1.44%	1.86%	0.50%	0.21%	-1.50%	-1.02%	-1.54%	1.16%	0.02%
因子8	1	2	3	4	5	10	1	2	3	4	5	10	1	2	3	4	5	10
1	6.47%	2.92%	2.24%	5.00%	9.12%	3.64%	8.29%	5.35%	-0.88%	4.12%	7.29%	2.99%	6.90%	7.74%	4.77%	0.65%	1.93%	0.84%
2	2.35%	3.47%	1.54%	2.25%	5.42%	3.24%	-0.20%	4.67%	0.34%	5.33%	5.29%	3.42%	1.87%	5.12%	4.90%	1.81%	-1.73%	1.52%
3	5.46%	8.80%	5.70%	3.74%	3.39%	-1.62%	2.19%	8.51%	7.98%	6.50%	6.54%	1.85%	5.71%	12.39%	13.33%	1.39%	2.38%	-2.69%
4	7.32%	4.33%	4.15%	5.68%	4.14%	2.82%	4.72%	3.34%	3.21%	2.88%	7.18%	-2.73%	8.94%	7.09%	10.56%	-2.90%	1.28%	-6.19%
5	5.39%	4.90%	2.11%	3.27%	5.14%	-1.06%	7.48%	2.60%	0.91%	3.29%	6.18%	-3.31%	3.34%	3.80%	-1.27%	1.71%	3.64%	-6.45%
因子10	1	2	3	4	5	10	1	2	3	4	5	10	1	2	3	4	5	10
1	4.67%	4.22%	3.42%	4.23%	6.31%	5.32%	5.91%	5.90%	3.70%	3.67%	5.17%	4.92%	4.78%	5.94%	5.26%	4.23%	4.25%	4.52%
2	1.89%	0.79%	3.06%	1.40%	4.46%	3.54%	0.09%	1.58%	2.82%	2.63%	4.99%	2.64%	0.67%	0.70%	4.13%	2.69%	4.41%	2.12%
3	2.70%	2.43%	1.28%	2.06%	2.56%	2.30%	1.70%	2.75%	1.31%	2.67%	2.97%	2.68%	1.60%	2.67%	1.42%	2.34%	2.63%	1.64%
4	3.54%	0.68%	1.03%	2.67%	1.74%	3.35%	1.16%	1.45%	0.71%	2.12%	3.18%	1.99%	1.21%	2.21%	2.27%	2.09%	2.16%	2.29%
5	4.27%	4.06%	1.93%	1.97%	2.15%	3.12%	5.37%	3.59%	1.32%	1.94%	3.90%	2.98%	4.55%	2.88%	1.57%	2.44%	3.45%	1.92%

# 扣费后会员持仓因子表现

整体看来，会员持仓因子对交易成本较为敏感，且衰减速度较快，随着观察期和持有期的延长，因子收益逐渐下降。

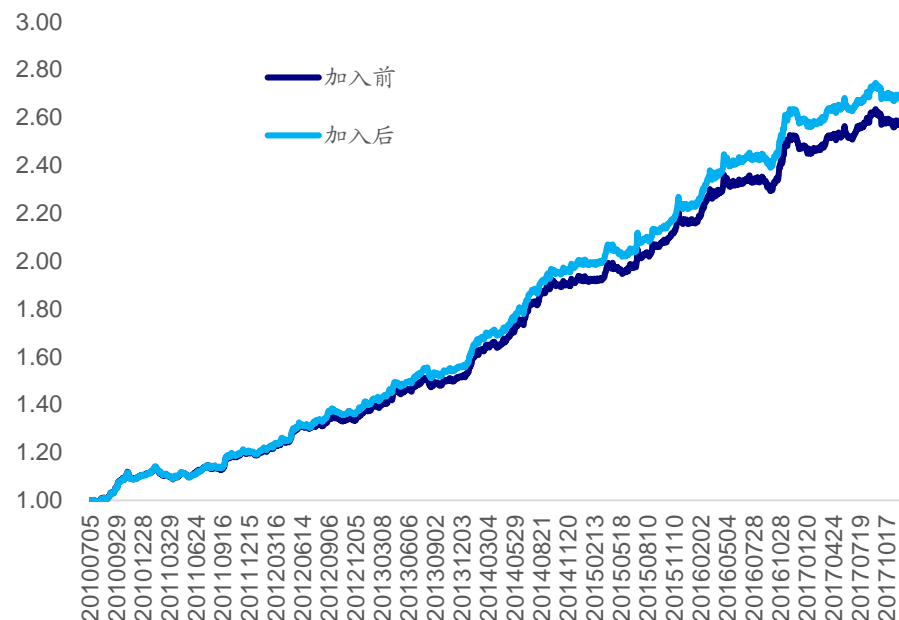
图：会员持仓因子在较优参数下的净值曲线



# 组合加入会员持仓因子后的表现

组合加入会员持仓因子后表现有所提升，年化收益率为**14.43%**，年化波动率为**5.21%**，最大回撤为**4.70%**，夏普比率和calmar比率分别为**2.78**和**3.07**。

图：组合加入会员持仓因子前后的净值曲线



图：组合加入会员持仓因子前后表现对比

	加入前	加入后
年化收益率	13.79%	14.43%
年化波动率	5.25%	5.21%
最大回撤	4.66%	4.70%
夏普比率	2.63	2.78
calmar比率	2.96	3.07

- 海内外期货市场持仓报告在商品期货交易中具有非常重要的价值，可以用来分析不同类型交易者的交易行为。
- 实证发现，海外**CFTC**持仓报告中不同会员表现差异较大，根据净多头占比和**COT**指标构建的套保者跟随或投机者反向策略能够取得显著收益，同时基于**CFTC**报告构建的掉期商**COT**指数择时策略在内盘部分品种上表现良好。
- 而根据国内持仓报告构建的会员持仓因子同样具有显著的正收益，但对交易成本较为敏感，且衰减速度较快。
- 基于郑商所套期保值持仓量数据构建的套保持仓因子在郑商所部分品种上表现较优，扣费后可以取得**21.31%**的年化收益率、**1.57**的夏普比率和**1.79**的**calmar**比率。

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姚石

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