## 期货CTA策略复现： 高频价量因子CPV[[1]](#footnote-1)

### 策略概述

每日通过计算股指期货日内调整后持仓量与价格走势的相关性给出交易信号，并在次日开盘时进行交易。调整后持仓量与价格走势相同（相关系数大于0）则看多，否则看空。

#### 持仓量调整

由于中金所2015年9月出台规定平今仓手续费为非平今仓手续费的15倍，T+0交易者倾向于在当日收盘，同时留一手多单和一手空单，隔日根据行情判断看多或看空，日中平仓，收盘前再开仓，保持留一手多单和一手空单。如下例所示。



表 1 T+0交易者仓位演示

T+0交易者的这种交易方式使得每日的持仓量变化呈现“U“型，而实际上持仓量的下降意味着T+0投资者入场，持仓量上升意味着T+0交易者出场。因此在交易量的基础上对持仓量进行调整，“化谷为峰”，从而使得调整后持仓量与市场的多空意图一致。

**【持仓量调整路径】**

1. 计算日内 时刻与 时刻的持仓量的变化量与成交量的变化量；

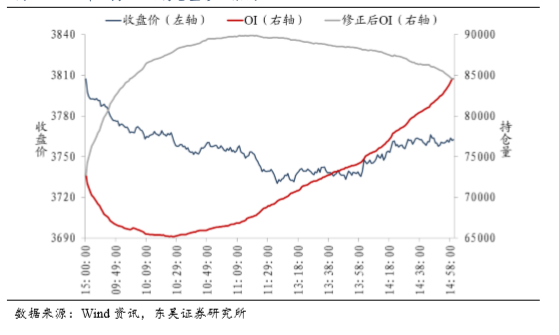
（2）以 时刻的成交量变化量，占当日总成交量的比例作为权重，将当日

总持仓量的变化量，按权重分配到 时刻，得到该时刻 T+1 交易者的持仓量变化量

（3）用 时刻的持仓量变化量 ，减去该时刻 T+1 交易者的持仓量变化量，得到该时刻 T+0 交易者的持仓量变化量；所得结果乘上“-1”，将T+0 交易者的“离场”（操作上为平仓）修正为“进场”：

（4）将修正后的 T+0 交易者的持仓量变化量，与 T+1 交易者的持仓量变

化量汇总，加到上一时刻的总持仓量 上，得到当前时刻的总持仓量

图 1 20200421持仓量调整路径实例

#### 2．策略逻辑

（1）修正日内分钟持仓量

（2）计算日内价量相关系数PV值：构造序列和序列，计算两个序列的相关系数PV

（3）每日收盘根据PV构建交易信号：PV值大于0，发出看多信号；PV值小于0，发出看空信号

（4）T+1开盘建仓，若连续两天信号相同，T+2开盘不平仓；若信号不相同，T+2开盘平仓反手。

#### 3．信号处理

（1）前后两个交易日间隔超过三天，剔除交易日信号。

（2）交割日信号剔除。

（3）交割日所在周的剩余交易日，仅当当月合约信号与次月合约信号相同时保留。其它情况剔除。

#### 4．其他细节

（1）每日只持有一手多单/一手空单。

（2）前一交易日没有信号：当日开盘平仓。

（3）非交割日所在周持有当月合约，交割日所在周持有下月合约。

（4）手续费：单边万0.23[[2]](#footnote-2).

#### 5. 数据来源

期货数据来自天软TinySoft

### 策略细节调整

#### CTA\_Modified\_1

1. 前一交易日没有信号 – 保持现有仓位不变 .

所有策略加入ATR止损：K=2，Rolling\_window=7

##### 各品种各策略净值曲线图及策略表现对比

* **IF 201707-202004**

表格 1 IF各策略表现

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **年化收益** | **年化波动** | **收益波动比** | **最大回撤** | **总交易天数** | **换仓次数** | **日度胜率** | **总手续费率** |
| CTA\_original | 25.87% | 20.72% | 1.25 | 25.44% | 561 | 338 | 53.95% | 1.80% |
| CTA\_Mod\_1 | **28.26%** | **18.77%** | **1.50** | **15.38%** | **627** | **306** | **54.61%** | **1.39%** |
| **MA60**  **（Benchmark）** | -9.46% | 21.62% | -0.44 | 40.25% | 642 | 208 | 52.6% | 4.17% |

经过调整的CTA策略CTA\_Modified\_1适用于回测期内的IF合约，其年化收益比原始策略增加2.38%，收益波动降低1.59%，收益波动比上升0.26。

* **IH 201707-202004**

表格 2 IH各策略表现

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **年化收益** | **年化波动** | **收益波动比** | **最大回撤** | **总交易天数** | **换仓次数** | **日度胜率** | **总手续费率** |
| CTA\_original | **28.99%** | 20.92% | 1.39 | **25.35%** | 567 | 363 | 54.40% | 1.69% |
| CTA\_Mod\_1 | 28.00% | **19.40%** | **1.44** | 22.21% | 634 | 329 | 52.76% | **1.60%** |
| **MA60**  **（Benchmark）** | -12.17% | 23% | -0.54 | 49.04% | 642 | 205 | 52.46% | 3.4% |

调整后策略在IH上表现不佳。

* **IC 201707-202004**

表格 3 IC各策略表现

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **年化收益** | **年化波动** | **收益波动比** | **最大回撤** | **总交易天数** | **换仓次数** | **日度胜率** | **总手续费率** |
| CTA\_original | 17.79% | 18.92% | 0.94 | **20.12%** | 559 | 332 | 52.32% | 2.22% |
| CTA\_Mod\_1 | **20.00%** | **18.04%** | **1.109** | 22.63% | 628 | 292 | **52.46%** | **1.71%** |
| **MA60**  **（Benchmark）** | -2.18% | 20.83% | -0.10 | 25.03% | 642 | 209 | 51.45% | 16.32% |

策略调整后表现变好，但IC合约的整体年化收益率较低。

### 测试：设定信号阈值

在原始策略基础上添加信号判断的阈值。比如当PV值大于0.005时产生看多信号，PV小于0.005时产生看空信号。回测结果如下：

**表格 4 IF阈值策略表现**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| SL\_CTA\_original\_0 | 25.87% | 20.72% | 124.90% | 53.91% | 57.69% | 25.44% | 1.71% | 561 | 338 |
| SL\_CTA\_original\_0.005 | 27.79% | 20.17% | 137.78% | 54.14% | 58.38% | 24.10% | 1.55% | 542 | 334 |
| SL\_CTA\_original\_0.01 | 28.51% | 19.62% | 145.30% | 54.49% | 58.72% | 22.60% | 1.47% | 522 | 327 |
| SL\_CTA\_original\_0.03 | 23.31% | 20.76% | 112.28% | 54.16% | 56.77% | 21.57% | 1.79% | 444 | 310 |
| SL\_CTA\_original\_0.05 | 15.86% | 22.92% | 69.18% | 53.65% | 55.39% | 21.99% | 2.41% | 355 | 269 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 是否止损\_CTA策略\_阈值 | 年化收益 | 年化波动 | 收益波动比 | 日度胜率 | 交易胜率 | 最大回撤 | 总费率 | 总交易天数 | 总换仓次数 |
| SL\_CTA1\_0 | 28.26% | 18.77% | 150.57% | 54.62% | 57.84% | 15.38% | 1.39% | 627 | 306 |
| SL\_CTA1\_0.005 | 28.32% | 18.40% | 153.95% | 54.49% | 57.86% | 16.10% | 1.35% | 623 | 299 |
| SL\_CTA1\_0.01 | 31.33% | 17.33% | 180.80% | 55.36% | 59.23% | 13.29% | 1.15% | 624 | 287 |
| SL\_CTA1\_0.03 | 25.60% | 20.31% | 126.07% | 53.75% | 56.28% | 15.23% | 1.27% | 613 | 247 |
| SL\_CTA1\_0.05 | 21.20% | 24.17% | 87.69% | 52.49% | 54.87% | 27.02% | 1.26% | 601 | 195 |

**表格 5 IH阈值策略表现**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| SL\_CTA\_original\_0 | 28.99% | 20.92% | 1.39 | 54.40% | 54.55% | 25.35% | 1.69% | 567 | 363 |
| SL\_CTA\_original\_0.005 | 25.81% | 21.73% | 1.19 | 53.25% | 54.04% | 26.35% | 1.92% | 538 | 359 |
| SL\_CTA\_original\_0.01 | 24.69% | 21.06% | 1.17 | 53.50% | 54.26% | 23.10% | 1.99% | 513 | 352 |
| SL\_CTA\_original\_0.03 | 20.30% | 22.56% | 0.90 | 53.24% | 53.13% | 19.71% | 2.27% | 431 | 320 |
| SL\_CTA\_original\_0.05 | 17.24% | 22.16% | 0.78 | 51.34% | 53.33% | 22.48% | 2.57% | 373 | 300 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| SL\_CTA1\_0 | 28.00% | 19.40% | 1.44 | 52.76% | 53.80% | 22.21% | 1.60% | 634 | 329 |
| SL\_CTA1\_0.005 | 26.00% | 19.82% | 1.31 | 51.34% | 53.00% | 23.50% | 1.69% | 632 | 317 |
| SL\_CTA1\_0.01 | 24.09% | 19.71% | 1.22 | 52.14% | 52.96% | 21.04% | 1.77% | 630 | 304 |
| SL\_CTA1\_0.03 | 23.16% | 19.13% | 1.21 | 51.79% | 51.94% | 15.45% | 1.57% | 613 | 258 |
| SL\_CTA1\_0.05 | 23.15% | 20.48% | 1.13 | 51.81% | 50.66% | 26.75% | 1.39% | 607 | 229 |

**表格 6 IC阈值策略表现**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| SL\_CTA\_original\_0 | 17.79% | 18.92% | 0.940 | 52.32% | 51.81% | 20.12% | 2.22% | 559 | 332 |
| SL\_CTA\_original\_0.005 | 18.87% | 18.77% | 1.005 | 51.86% | 51.23% | 18.20% | 2.04% | 537 | 326 |
| SL\_CTA\_original\_0.01 | 19.40% | 18.66% | 1.039 | 52.53% | 51.27% | 15.07% | 1.91% | 513 | 314 |
| SL\_CTA\_original\_0.03 | 19.43% | 18.80% | 1.033 | 52.91% | 51.92% | 10.68% | 1.76% | 428 | 287 |
| SL\_CTA\_original\_0.05 | 19.98% | 17.86% | 1.119 | 55.46% | 55.70% | 7.45% | 1.39% | 338 | 237 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| SL\_CTA1\_0 | 20.00% | 18.04% | 1.11 | 52.46% | 52.05% | 22.63% | 1.71% | 628 | 292 |
| SL\_CTA1\_0.005 | 20.95% | 17.55% | 1.19 | 51.92% | 50.90% | 18.02% | 1.55% | 623 | 279 |
| SL\_CTA1\_0.01 | 21.85% | 17.44% | 1.25 | 52.49% | 52.33% | 15.74% | 1.37% | 622 | 258 |
| SL\_CTA1\_0.03 | 23.29% | 17.80% | 1.31 | 53.17% | 52.86% | 10.08% | 1.04% | 614 | 210 |
| SL\_CTA1\_0.05 | 29.50% | 15.19% | 1.94 | 55.87% | 58.54% | 6.24% | 0.61% | 595 | 164 |

信号判断阈值的添加在三个合约上的影响有所不同，IF合约当阈值为0.01时收益表现最好，IH合约的年化收益随阈值上升而下降，IC年化收益随阈值上升而上升。实盘时可以通过数据挖掘寻找近期合适的信号阈值。

### 测试：持有当季合约

考虑到当季合约的成交比较活跃，测试持有当季合约的策略效果。IF合约表现较好，年化收益及收益波动比接近CTA\_Mod\_1水平，且最大回撤仅约为原始策略的一半。换仓次数及总手续费率也显著低于原始策略。但IC、IH持有当季合约的策略效果并不好。(测试过程未加止损)

表格 7 IF合约策略表现对比

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **策略** | **年化收益** | **年化波动** | **收益波动比** | **最大回撤** | **总交易天数** | **换仓次数** | **日度胜率** | **总手续费率** |
| CTA\_original | 25.02% | 19.18% | 1.30 | 16.23% | 571 | 353 | 52.75% | 1.85% |
| **持有当季合约** | **31.64%** | **16.48%** | **1.91** | **8.71%** | **691** | **292** | **52.31%** | **1.16%** |
| CTA\_Mod\_1 | **32.31%** | 16.60% | **1.95** | 13.12% | 691 | 314 | **54.48%** | 1.21% |
| CTA\_Mod\_2 | 27.13% | 17.51% | 1.55 | 14.97% | 623 | 300 | 52.90% | 1.43% |
| MA60  （Benchmark） | -9.46% | 21.62% | -0.44 | 40.25% | 642 | 208 | 52.6% | 4.17% |

表格 8 IH合约策略表现对比

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **策略** | **年化收益** | **年化波动** | **收益波动比** | **最大回撤** | **总交易天数** | **换仓次数** | **日度胜率** | **总手续费率** |
| CTA\_original | 28.63% | 17.57% | **1.63** | 19.97% | 574 | 377 | **54.48%** | 1.78% |
| **持有当季合约** | **24.33%** | **20.39%** | **1.19** | **20.28%** | **691** | **326** | **51.88%** | **1.89%** |
| CTA\_Mod\_1 | **29.47%** | 18.65% | 1.58 | 22.06% | 691 | 339 | 52.17% | 1.55% |
| CTA\_Mod\_2 | 26.5% | **18.06%** | 1.47 | **19.28%** | 623 | **321** | 52.17% | **1.67%** |
| MA60  （Benchmark） | -12.17% | 23% | -0.54 | 49.04% | 642 | 205 | 52.46% | 3.4% |

表格 9 IC合约策略对比

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **策略** | **年化收益** | **年化波动** | **收益波动比** | **最大回撤** | **总交易天数** | **换仓次数** | **日度胜率** | **总手续费率** |
| CTA\_original | 17.59% | **16.67%** | 1.05 | 20.12% | 566 | 344 | 52.02% | 2.32% |
| **持有当季合约** | **16.64%** | **20.38%** | **0.81** | **59.19%** | **691** | **315** | **50.29%** | **2.29%** |
| CTA\_Mod\_1 | 23.35% | 17.76% | 1.36 | **15.22%** | 691 | **305** | **52.60%** | **1.49%** |
| CTA\_Mod\_2 | **26.5%** | 18.06% | **1.47** | 19.28% | 623 | 321 | 52.17% | 1.67% |
| MA60  （Benchmark） | -2.18% | 20.83% | -0.10 | 25.03% | 642 | 209 | 51.45% | 16.32% |

### ­回测结果综合展示与对比

由以上测试可知，总体来看添加止损的CTA\_1策略（持有当月合约）效果最好。

表格 10 IF 添加止损及信号判断阈值

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| noSL\_CTA1\_0 | 28.08% | 18.23% | 1.540 | 54.26% | 57.62% | 14.64% | 1.38% | 633 | 302 |
| noSL\_CTA1\_0.005 | 28.14% | 17.87% | 1.575 | 54.13% | 57.63% | 15.36% | 1.35% | 629 | 295 |
| noSL\_CTA1\_0.01 | 30.75% | 17.13% | 1.796 | 55.08% | 59.15% | 12.55% | 1.16% | 629 | 284 |
| noSL\_CTA1\_0.03 | 24.89% | 19.90% | 1.251 | 53.30% | 55.97% | 14.49% | 1.30% | 620 | 243 |
| noSL\_CTA1\_0.05 | 21.51% | 24.38% | 0.882 | 52.46% | 55.44% | 28.80% | 1.22% | 609 | 193 |
| SL\_CTA1\_0 | 28.26% | 18.77% | 1.506 | 54.62% | 57.84% | 15.38% | 1.39% | 627 | 306 |
| SL\_CTA1\_0.005 | 28.32% | 18.40% | 1.540 | 54.49% | 57.86% | 16.10% | 1.35% | 623 | 299 |
| SL\_CTA1\_0.01 | 31.33% | 17.33% | 1.808 | 55.36% | 59.23% | 13.29% | 1.15% | 624 | 287 |
| SL\_CTA1\_0.03 | 25.60% | 20.31% | 1.261 | 53.75% | 56.28% | 15.23% | 1.27% | 613 | 247 |
| SL\_CTA1\_0.05 | 21.20% | 24.17% | 0.877 | 52.49% | 54.87% | 27.02% | 1.26% | 601 | 195 |
| noSL\_CTA\_original\_0 | 24.66% | 19.34% | 1.275 | 53.15% | 57.40% | 15.16% | 1.77% | 571 | 331 |
| noSL\_CTA\_original\_0.005 | 26.53% | 17.82% | 1.489 | 53.54% | 57.93% | 13.27% | 1.61% | 550 | 328 |
| noSL\_CTA\_original\_0.01 | 27.49% | 17.16% | 1.602 | 54.15% | 58.39% | 13.33% | 1.51% | 529 | 322 |
| noSL\_CTA\_original\_0.03 | 22.26% | 19.55% | 1.138 | 54.02% | 56.86% | 19.85% | 1.86% | 447 | 306 |
| noSL\_CTA\_original\_0.05 | 14.91% | 21.42% | 0.696 | 53.78% | 55.64% | 15.98% | 2.55% | 356 | 266 |
| SL\_CTA\_original\_0 | 25.87% | 20.72% | 1.249 | 53.91% | 57.69% | 25.44% | 1.71% | 561 | 338 |
| SL\_CTA\_original\_0.005 | 27.79% | 20.17% | 1.378 | 54.14% | 58.38% | 24.10% | 1.55% | 542 | 334 |
| SL\_CTA\_original\_0.01 | 28.51% | 19.62% | 1.453 | 54.49% | 58.72% | 22.60% | 1.47% | 522 | 327 |
| SL\_CTA\_original\_0.03 | 23.31% | 20.76% | 1.123 | 54.16% | 56.77% | 21.57% | 1.79% | 444 | 310 |
| SL\_CTA\_original\_0.05 | 15.86% | 22.92% | 0.692 | 53.65% | 55.39% | 21.99% | 2.41% | 355 | 269 |

表格 11 IC添加止损及信号判断阈值

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| noSL\_CTA1\_0 | 20.36% | 17.68% | 1.152 | 52.22% | 52.23% | 21.06% | 1.67% | 631 | 291 |
| noSL\_CTA1\_0.005 | 21.31% | 17.21% | 1.238 | 51.67% | 51.08% | 16.48% | 1.51% | 626 | 278 |
| noSL\_CTA1\_0.01 | 22.20% | 17.11% | 1.297 | 52.24% | 52.53% | 14.24% | 1.34% | 625 | 257 |
| noSL\_CTA1\_0.03 | 23.60% | 17.58% | 1.343 | 52.66% | 53.11% | 9.12% | 1.02% | 620 | 209 |
| noSL\_CTA1\_0.05 | 30.13% | 14.94% | 2.016 | 55.46% | 58.64% | 5.48% | 0.58% | 603 | 162 |
| SL\_CTA1\_0 | 20.00% | 18.04% | 1.109 | 52.46% | 52.05% | 22.63% | 1.71% | 628 | 292 |
| SL\_CTA1\_0.005 | 20.95% | 17.55% | 1.194 | 51.92% | 50.90% | 18.02% | 1.55% | 623 | 279 |
| SL\_CTA1\_0.01 | 21.85% | 17.44% | 1.253 | 52.49% | 52.33% | 15.74% | 1.37% | 622 | 258 |
| SL\_CTA1\_0.03 | 23.29% | 17.80% | 1.309 | 53.17% | 52.86% | 10.08% | 1.04% | 614 | 210 |
| SL\_CTA1\_0.05 | 29.50% | 15.19% | 1.942 | 55.87% | 58.54% | 6.24% | 0.61% | 595 | 164 |
| noSL\_CTA\_original\_0 | 17.24% | 18.50% | 0.932 | 51.68% | 51.37% | 20.48% | 2.27% | 566 | 329 |
| noSL\_CTA\_original\_0.005 | 18.46% | 18.28% | 1.010 | 51.29% | 50.77% | 18.15% | 2.07% | 543 | 323 |
| noSL\_CTA\_original\_0.01 | 18.99% | 18.16% | 1.045 | 51.92% | 50.80% | 15.01% | 1.94% | 519 | 311 |
| noSL\_CTA\_original\_0.03 | 18.76% | 18.50% | 1.014 | 52.42% | 51.58% | 11.24% | 1.81% | 432 | 285 |
| noSL\_CTA\_original\_0.05 | 19.79% | 17.95% | 1.102 | 55.13% | 55.70% | 8.01% | 1.41% | 340 | 237 |
| SL\_CTA\_original\_0 | 17.79% | 18.92% | 0.940 | 52.32% | 51.81% | 20.12% | 2.22% | 559 | 332 |
| SL\_CTA\_original\_0.005 | 18.87% | 18.77% | 1.005 | 51.86% | 51.23% | 18.20% | 2.04% | 537 | 326 |
| SL\_CTA\_original\_0.01 | 19.40% | 18.66% | 1.039 | 52.53% | 51.27% | 15.07% | 1.91% | 513 | 314 |
| SL\_CTA\_original\_0.03 | 19.43% | 18.80% | 1.033 | 52.91% | 51.92% | 10.68% | 1.76% | 428 | 287 |
| SL\_CTA\_original\_0.05 | 19.98% | 17.86% | 1.119 | 55.46% | 55.70% | 7.45% | 1.39% | 338 | 237 |

表格 12 IH添加止损及信号判断阈值

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **是否止损\_CTA策略\_阈值** | **年化收益** | **年化波动** | **收益波动比** | **日度胜率** | **交易胜率** | **最大回撤** | **总费率** | **总交易天数** | **总换仓次数** |
| noSL\_CTA1\_0 | 28.04% | 18.89% | 1.48 | 52.50% | 53.82% | 19.97% | 1.59% | 639 | 327 |
| noSL\_CTA1\_0.005 | 25.99% | 19.35% | 1.34 | 51.10% | 53.02% | 21.26% | 1.68% | 637 | 315 |
| noSL\_CTA1\_0.01 | 24.37% | 19.04% | 1.28 | 51.81% | 52.82% | 18.80% | 1.73% | 636 | 301 |
| noSL\_CTA1\_0.03 | 22.65% | 18.78% | 1.21 | 51.45% | 51.76% | 13.22% | 1.59% | 621 | 255 |
| noSL\_CTA1\_0.05 | 23.80% | 19.99% | 1.19 | 52.19% | 50.88% | 25.35% | 1.33% | 616 | 226 |
| SL\_CTA1\_0 | 28.00% | 19.40% | 1.44 | 52.76% | 53.80% | 22.21% | 1.60% | 634 | 329 |
| SL\_CTA1\_0.005 | 26.00% | 19.82% | 1.31 | 51.34% | 53.00% | 23.50% | 1.69% | 632 | 317 |
| SL\_CTA1\_0.01 | 24.09% | 19.71% | 1.22 | 52.14% | 52.96% | 21.04% | 1.77% | 630 | 304 |
| SL\_CTA1\_0.03 | 23.16% | 19.13% | 1.21 | 51.79% | 51.94% | 15.45% | 1.57% | 613 | 258 |
| SL\_CTA1\_0.05 | 23.15% | 20.48% | 1.13 | 51.81% | 50.66% | 26.75% | 1.39% | 607 | 229 |
| noSL\_CTA\_original\_0 | 28.23% | 19.48% | 1.45 | 53.22% | 54.62% | 20.12% | 1.72% | 574 | 357 |
| noSL\_CTA\_original\_0.005 | 27.17% | 19.68% | 1.38 | 52.84% | 54.26% | 21.13% | 1.77% | 544 | 352 |
| noSL\_CTA\_original\_0.01 | 26.00% | 19.07% | 1.36 | 52.99% | 54.62% | 18.15% | 1.84% | 518 | 346 |
| noSL\_CTA\_original\_0.03 | 22.08% | 20.17% | 1.09 | 52.18% | 53.82% | 14.75% | 2.02% | 434 | 314 |
| noSL\_CTA\_original\_0.05 | 20.35% | 19.99% | 1.02 | 51.73% | 54.05% | 17.48% | 2.10% | 374 | 296 |
| SL\_CTA\_original\_0 | 28.99% | 20.92% | 1.39 | 54.40% | 54.55% | 25.35% | 1.69% | 567 | 363 |
| SL\_CTA\_original\_0.005 | 25.81% | 21.73% | 1.19 | 53.25% | 54.04% | 26.35% | 1.92% | 538 | 359 |
| SL\_CTA\_original\_0.01 | 24.69% | 21.06% | 1.17 | 53.50% | 54.26% | 23.10% | 1.99% | 513 | 352 |
| SL\_CTA\_original\_0.03 | 20.30% | 22.56% | 0.90 | 53.24% | 53.13% | 19.71% | 2.27% | 431 | 320 |
| SL\_CTA\_original\_0.05 | 17.24% | 22.16% | 0.78 | 51.34% | 53.33% | 22.48% | 2.57% | 373 | 300 |

1. **交易标的更换：300ETF**

根据IF发出的信号交易300ETF，单边手续费0.0001。仓位控制分为仅持有一手或收益再投资（累计净值）。策略无止损。回测期间为20180801-20200729。

标的为SH510300、收益再投资、信号阈值为0.01时年化收益最高位28.42，收益波动比最高位1.38。最大回撤为6.65%。



1. **交易时间更换**

尝试将信号发出时间提前到每日盘中（14:30,14:50）并将换仓时间调整为信号产生后一分钟。策略效果收益减半，波动无明显变化。推测原因为每日尾盘的交易数据为关键数据，14：30-15：00内为T0交易者临近收盘的补仓时间，因此交易数据蕴含着重要的市场观点信息。

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 年化收益 | 年化波动 | 收益波动比 | 日度胜率 | 交易胜率 | 最大回撤 | 总费率 | 总交易天数 | 总换仓  次数 |
| CTA1\_noSL\_open | 41.39% | 19.61% | 2.110564758 | 55.98% | 58.13% | 8.45% | 1.01% | 442 | 203 |
| CTA1\_noSL\_1430 | 18.26% | 23.38% | 0.780913979 | 46.41% | 56.72% | 26.90% | 2.52% | 458 | 201 |
| CTA1\_noSL\_1450 | 24.24% | 21.99% | 1.102513242 | 47.52% | 58.82% | 21.86% | 1.72% | 462 | 187 |
|  |  |  |  |  |  |  |  |  |  |
| CTA\_300ETF\_One\_open | 24.16% | 20.08% | 1.203222392 | 51.09% | 54.35% | 6.12% | 4.21% | 183 | 111 |
| CTA\_300ETF\_One\_1430 | 13.68% | 21.64% | 0.632235539 | 15.59% | 50.00% | 12.52% | 7.54% | 185 | 113 |
| CTA\_300ETF\_FullPos\_1450 | 18.19% | 20.45% | 0.889400388 | 8.65% | 49.46% | 11.11% | 5.78% | 184 | 112 |
|  |  |  |  |  |  |  |  |  |  |
| CTA\_300ETF\_FullPos\_open | 28.42% | 20.59% | 1.379882434 | 51.09% | 54.89% | 6.65% | 4.09% | 183 | 111 |
| CTA\_300ETF\_FullPos\_1430 | 14.66% | 19.55% | 0.750037679 | 15.68% | 47.85% | 11.90% | 6.94% | 184 | 112 |
| CTA\_300ETF\_One\_1450 | 16.95% | 22.03% | 0.769650235 | 8.60% | 55.38% | 10.67% | 6.12% | 185 | 113 |

**附录：策略代码说明**

代码注释请参见**CTA\_original.py**

params:全局变量，记录策略参数

#回测主体函数

for day in params.trading\_days.index[1:]:

run\_daily(day, df\_signal, df\_PV, df\_olhc) #每天运行run\_daily

#\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*#

def run\_daily(day, df\_signal, df\_PV, df\_olhc): # 每日调用

global params

signal\_exist\_flag = run\_before\_open(day, df\_signal, df\_PV) #确定当日交易信号及交易合约

open\_run(day, signal\_exist\_flag, df\_PV, df\_olhc) #开盘运行，根据信号交易

# stop\_loss(day, df\_olhc) #选择是否添加止损

update\_portfolio\_before\_close(day, df\_olhc) # 收盘 计算当日净值

1. 参考：东吴证券 《高频价量相关性拥抱CTA系列研究（一）—— CPV因子期货版》 [↑](#footnote-ref-1)
2. <http://www.cffex.com.cn/zjssf/20190508/23701.html> 中金所收费一览表 [↑](#footnote-ref-2)