ABU 量化系统 简介（版本 0.1）

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- **weixin = 'aaaabbbuu'**

第三部分 基础交易

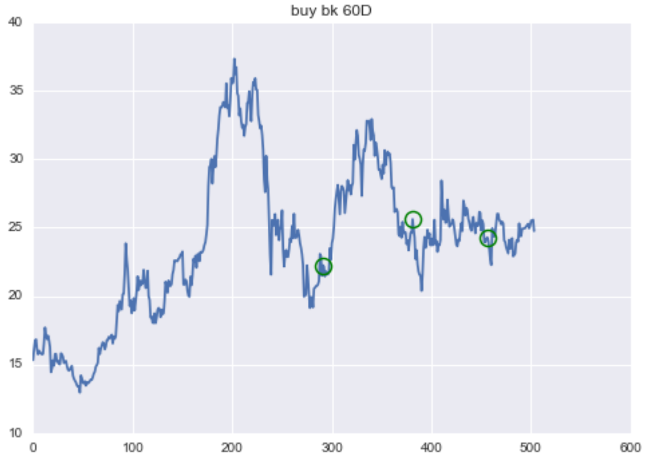
```python import ZEnv import ZLog import ZCommonUtil %matplotlib inline

from Capital import CapitalClass from BuyGoldenFactor import BuyGoldenFactorClass from BuyBkFactor import BuyBkFactorClass from SellBkFactor import SellBkFactorClass import SymbolPd from AlphaBSellMv import AlphaBSellMvEstimator import Metrics ```

完全手工拼接整合系统交易，不建议实际这样做，只做理解运行

两种驱动方式：

```
优先使用**事件驱动**：先计算出会发生事件的日期，之后通过事件集合驱动，加
计算每个买入事件后针对这个时间开始的时间后一些特殊事件，如pre atr，close
atr， 因子独立的止盈止损等独立事件execute_his_order通过设置的各种参数
计算出触发事件的事件集合，买入事件全部集中在init_buy_factor中fit于trade order
中，sell的两个事件之后要重构到统一接口中，fit_order负责将事件于时间连上，或
表述为在时间上打孔，拼接最后的结果pandas数据集及可视化工作

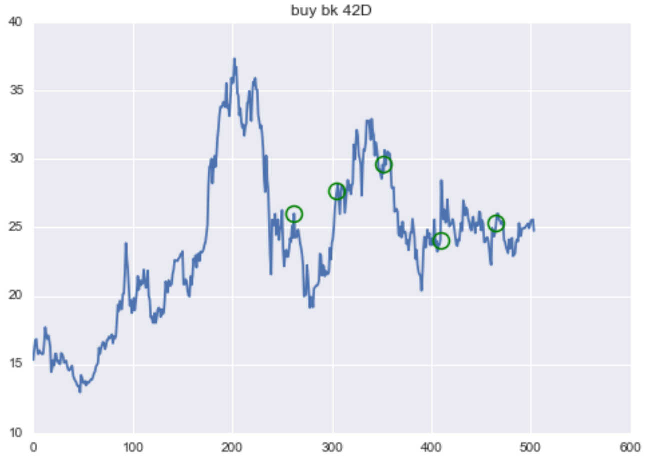
辅助使用**时间驱动**：回测周期内，月周日任务，现在只有开启周任务计算动态
计算止损止盈基础值DynamicWeight.clac_dynamic_stop_loss
~~~

```python def base_trade_sample(buy_factors, sell_factors): target_symbol = 'usNOAH' target_count = SymbolPd.K_N_GET_DAY_YEAR
~~~

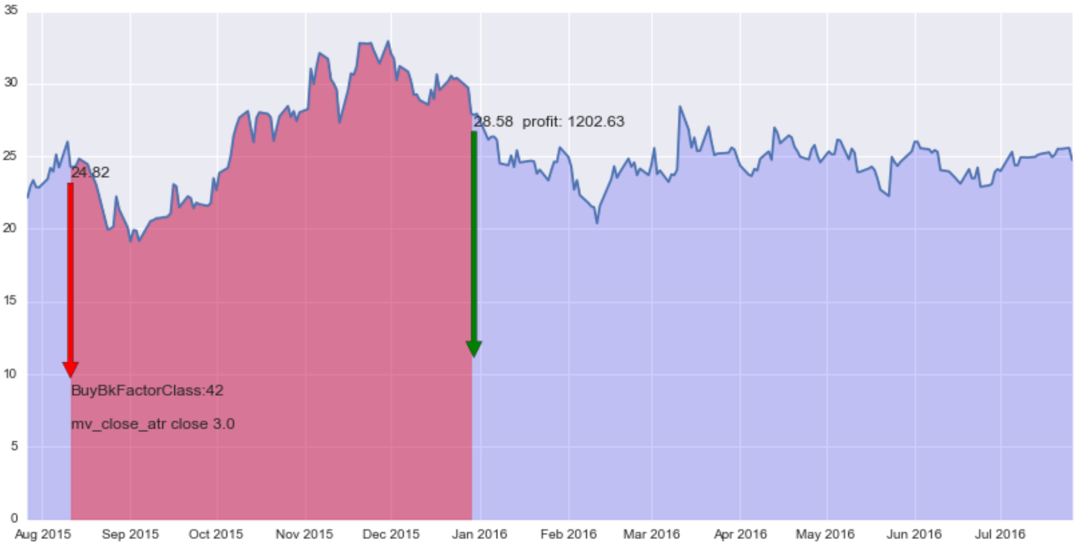
```
"""
    初始化资金
"""
cap = CapitalClass(100000)


"""
     n_folds=2, 请求
     两份target_count
     cap中有含大盘的df, make做数据对齐
"""
kl_pd = SymbolPd.make_kfold_pd(target_symbol, target_count, cap=cap, n_folds=2)
kl_pd.name = target_symbol


"""
    选择使用的基础模型
"""
ap_mv = AlphaBSellMvEstimator()

"""
    2倍动态时间加权atr 止损
    如果用固态设置stop_loss且
    不要设置stop_loss_base_n
"""
ap_mv.stop_loss_base_n = 2.0

"""
    3倍动态时间加权atr 止盈
"""
ap_mv.stop_win_base_n = 3.0

"""
    3倍 相对最大收益损失昨日atr 止损
"""
ap_mv.mv_close_atr = 3.0

"""
    1.5倍 单日最大跌幅atr 止损
"""
ap_mv.mv_pre_atr = 1.5

orders, orders_pd = ap_mv.init_buy_factor(kl_pd, cap, buy_factors)
ap_mv.init_sell_factor(orders_pd, kl_pd, sell_factors)
ap_mv.execute_his_order(orders)
test_pd = kl_pd[-target_count:]
test_pd.name = target_symbol
ap_mv.fit_order(orders, orders_pd, cap, test_pd, kl_pd, None, True)
```

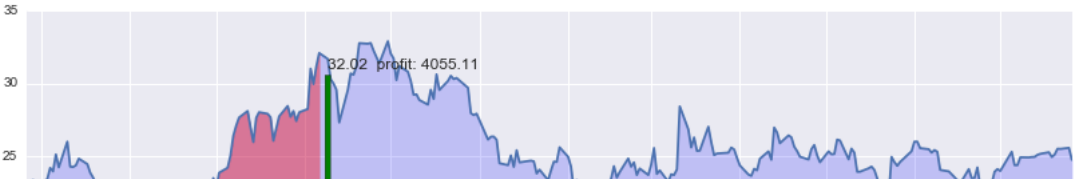
~~~
```python
"""
    设置60, 42日突破买入因子
    []无卖出因子, 所以所有卖出只能靠alpha本身
"""
base_trade_sample([{'XD': 60, 'class': BuyBkFactorClass, 'draw': True} ,
                   {'XD': 42, 'class': BuyBkFactorClass, 'draw': True}], [])
~~~

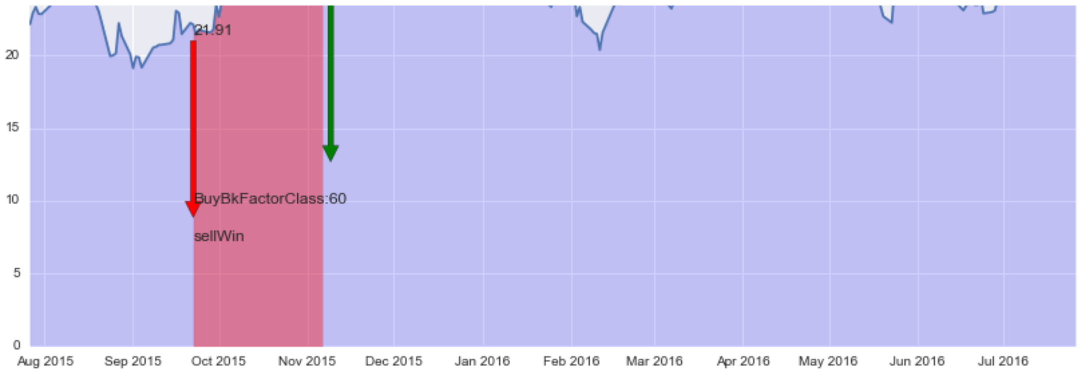
```
****************************************************************************************************************
set(['usNOAH'])
simple profit: [ 1240.8825]
mean win profit 1842.36
mean loss profit -1816.565
win rate 0.6%
```

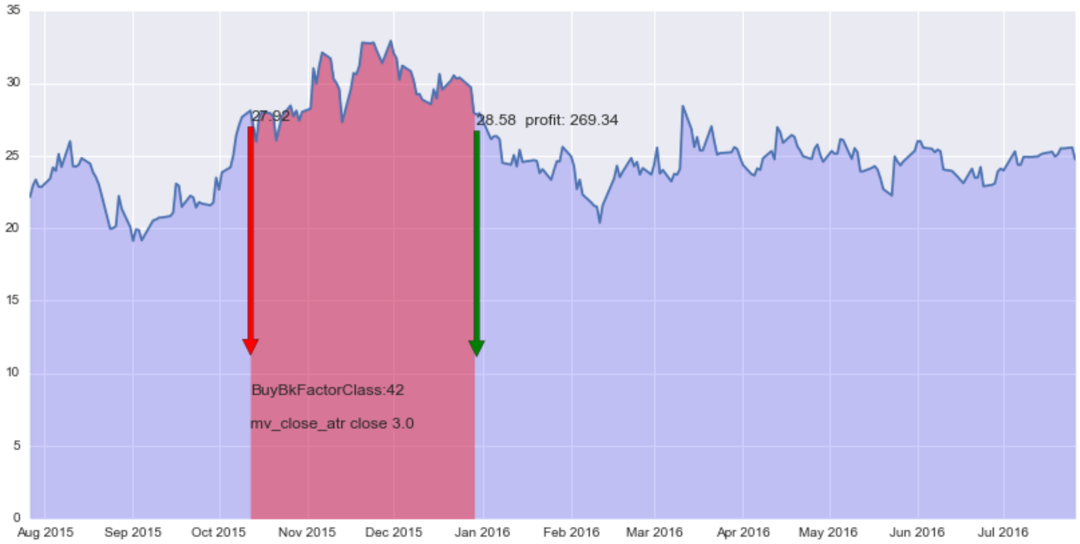

buy bk 60D
40
35
30
25
20
15
10
0
100
200
300
400
500
600

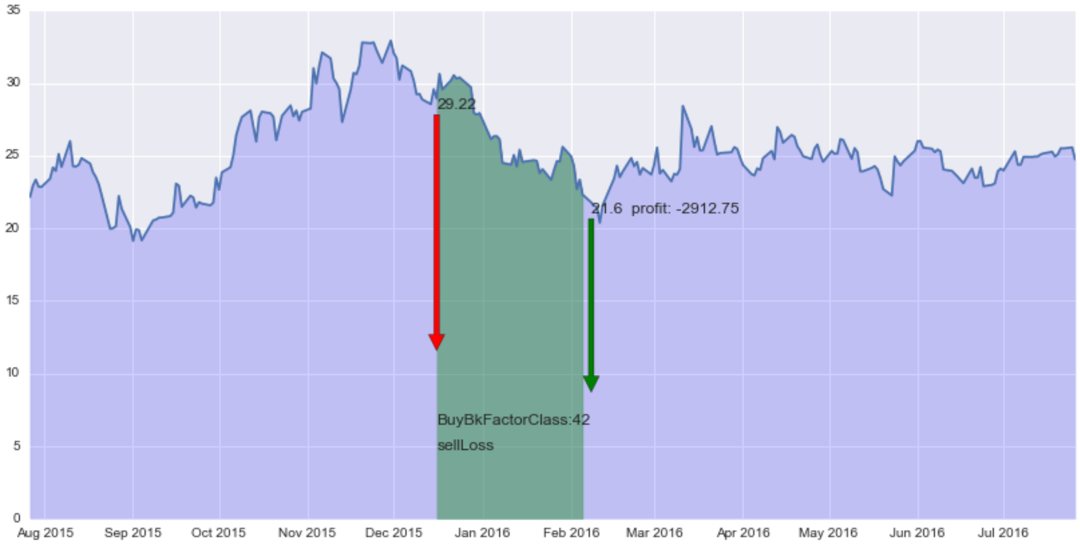

buy bk 42D
40
35
30
25
20
15
10
0
100
200
300
400
500
600

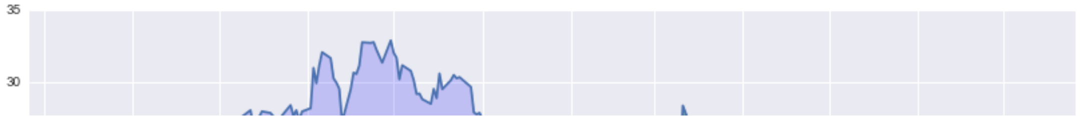

35
30
25
20
15
10
5
0
24.82
28.58 profit: 1202.63
BuyBkFactorClass:42
mv_close_atr close 3.0
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

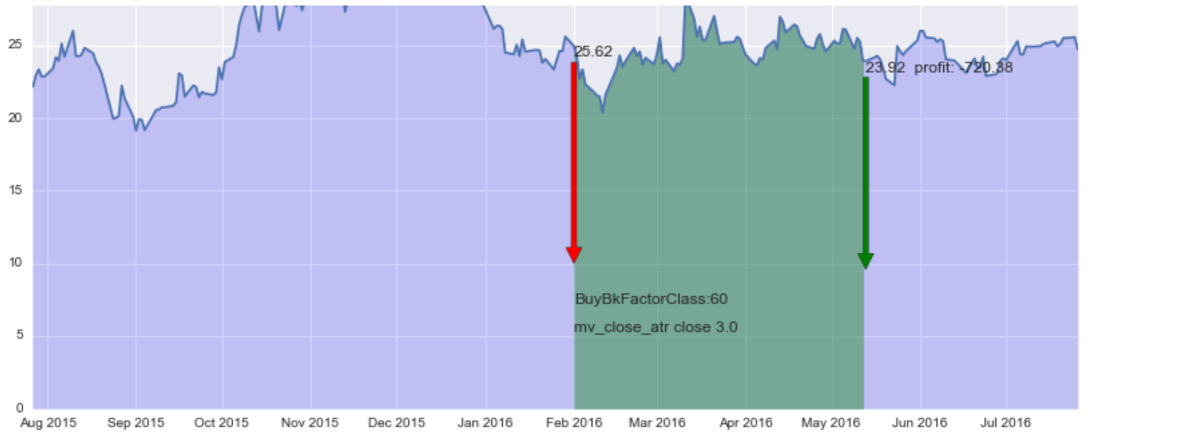

35
30
25
32.02 profit: 4055.11

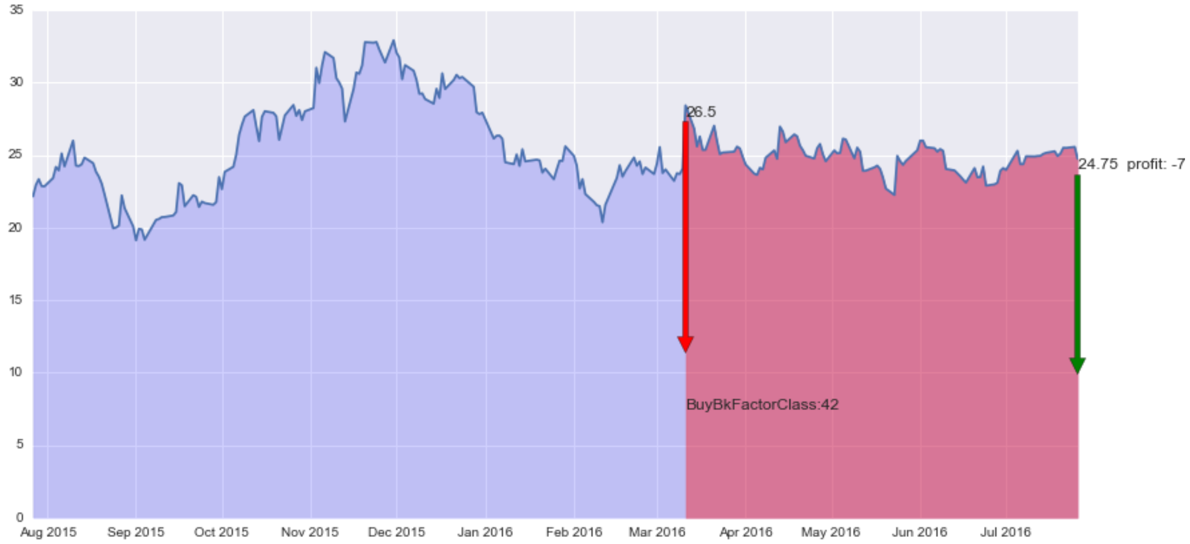

21.91
BuyBkFactorClass:60
sellWin
20
15
10
5
0
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

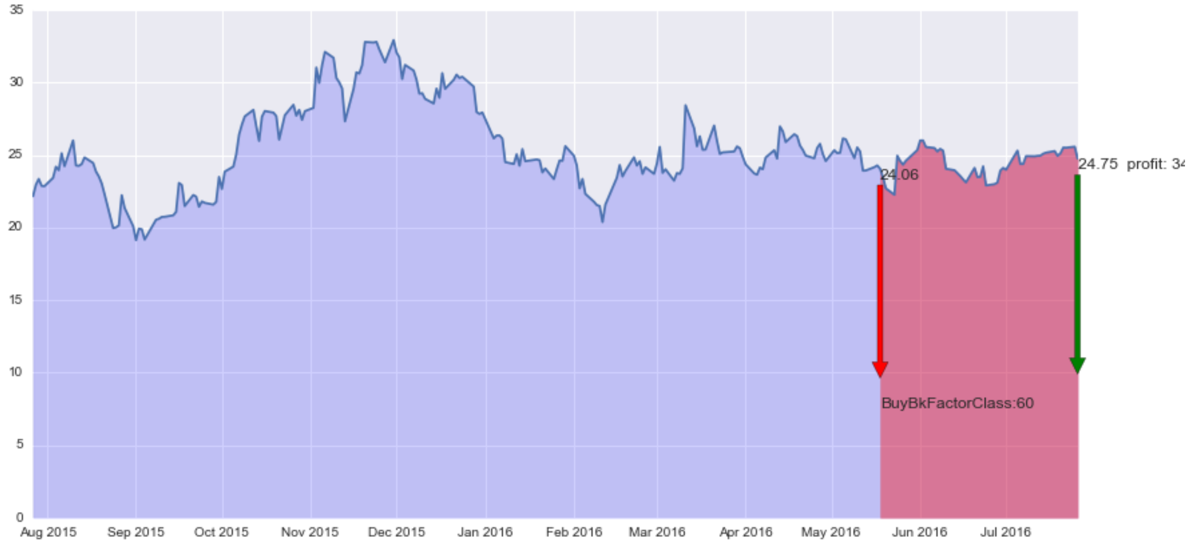

35
30
25
20
15
10
5
0
27.92
28.58 profit: 269.34
BuyBkFactorClass:42
mv_close_atr close 3.0
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


35
30
25
20
15
10
5
0
29.22
21.6 profit: -2912.75
BuyBkFactorClass:42
sellLoss
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

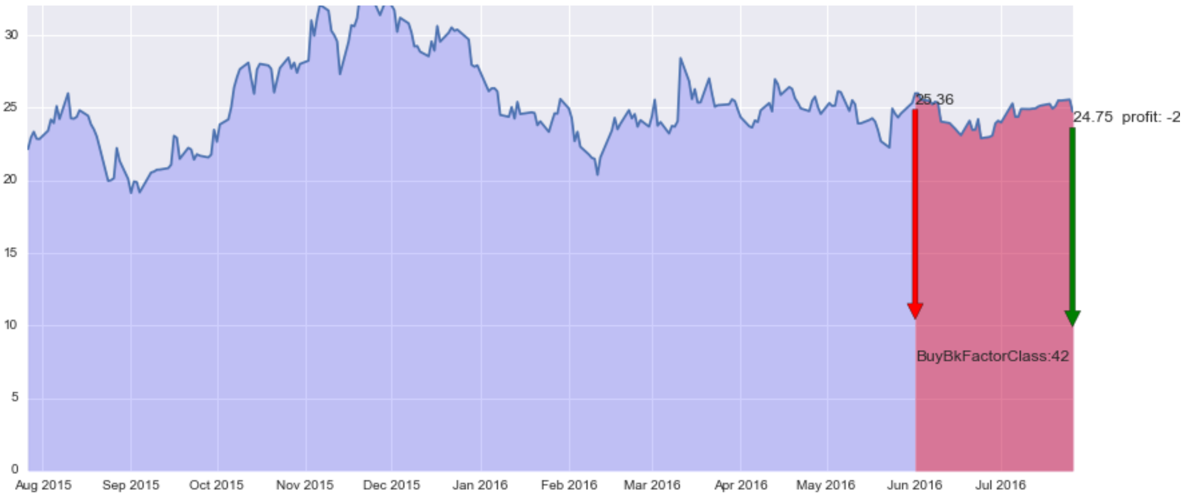

35
30

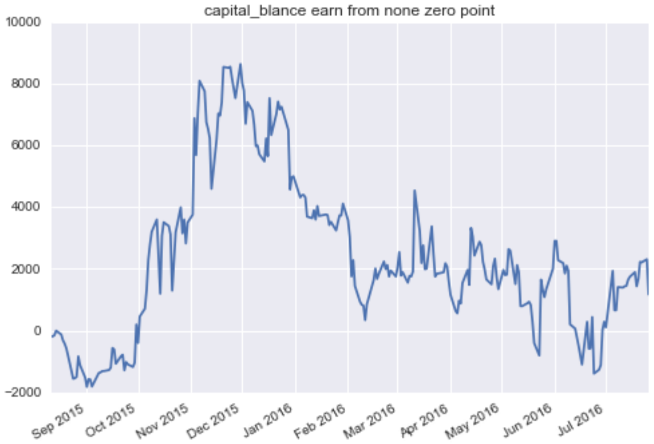

25.62
23.92 profit: -720.88
BuyBkFactorClass:60
mv_close_atr close 3.0
0
5
10
15
20
25
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

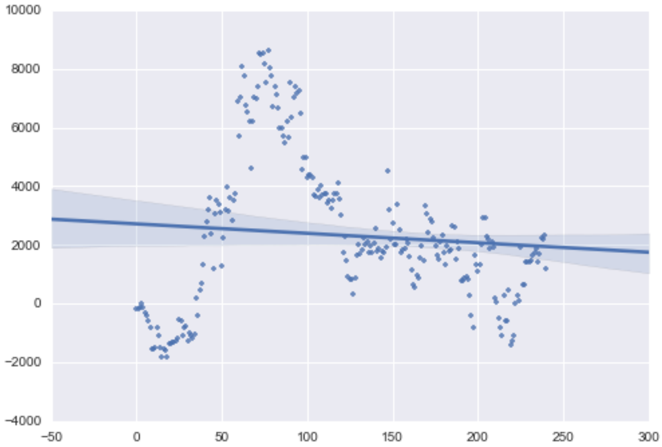

26.5
24.75 profit: -7
BuyBkFactorClass:42
0
5
10
15
20
25
30
35
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

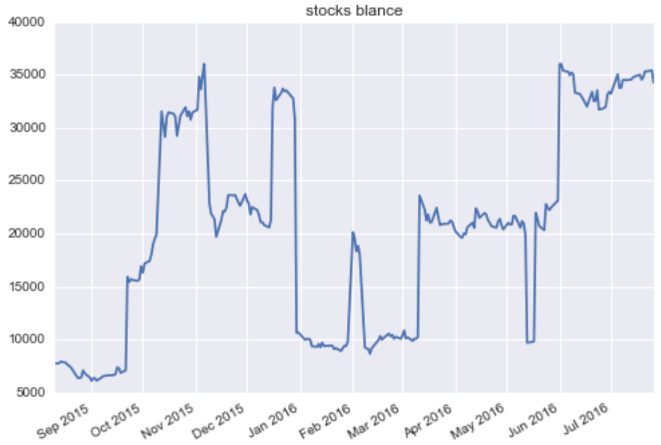

24.06
24.75 profit: 34
BuyBkFactorClass:60
0
5
10
15
20
25
30
35
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

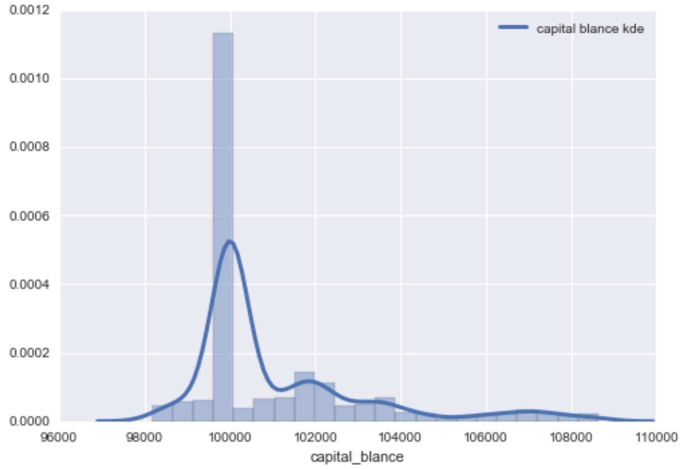
35


25.36
24.75 profit: -2
BuyBkFactorClass:42
0
5
10
15
20
25
30
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


capital_blance earn from none zero point
10000
8000
6000
4000
2000
0
-2000
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


10000
8000
6000
4000
2000
0
-2000
-4000
-50
0
50
100
150
200
250
300

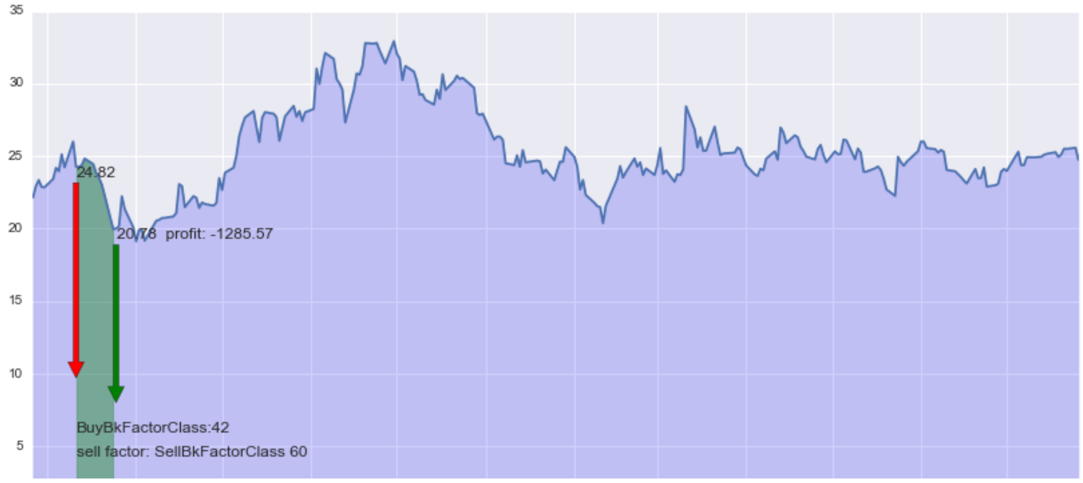


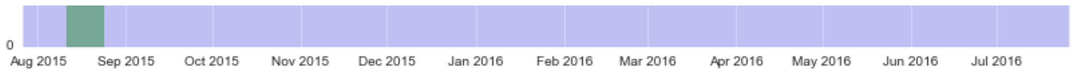


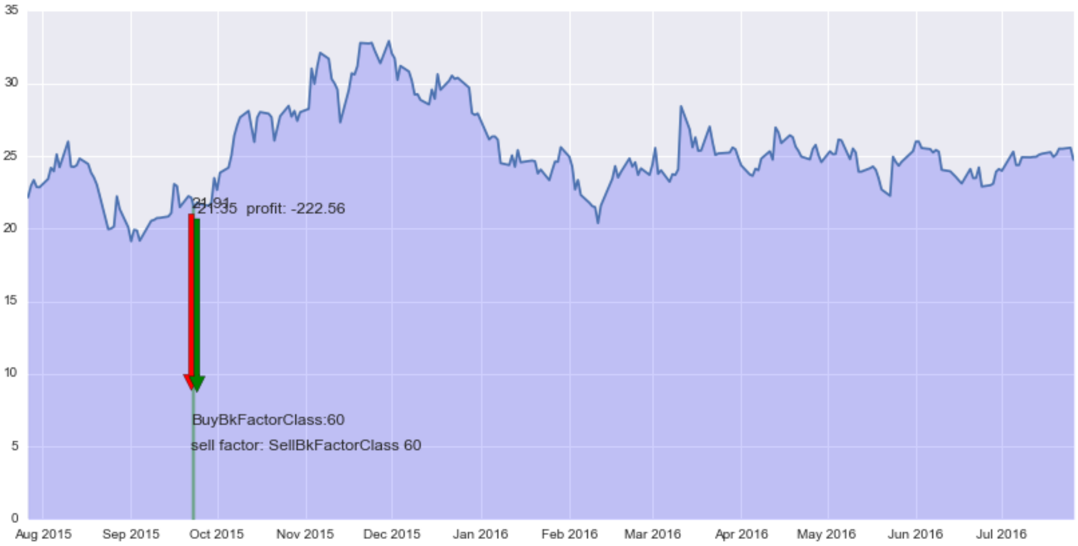
模型空转最佳结果应该是n个测试集下结果不大跌, 随个股走势进步平稳行进，加入真实有能力的因子才是真实情况

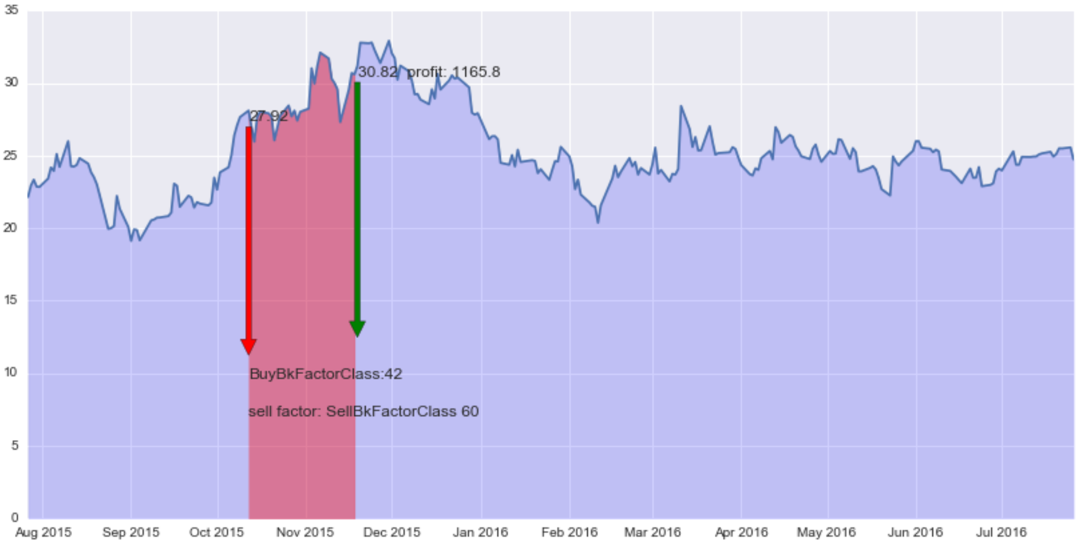
`python """ 设置60，42日突破买入因子 60，120卖出因子 """ base_trade_sample([{'XD': 60, 'class': BuyBkFactorClass, 'draw': False} , {'XD': 42, 'class': BuyBkFactorClass, 'draw': False}], [{'XD': 60, 'class': SellBkFactorClass, 'draw': False}, {'XD': 120, 'class': SellBkFactorClass, 'draw': False}])`

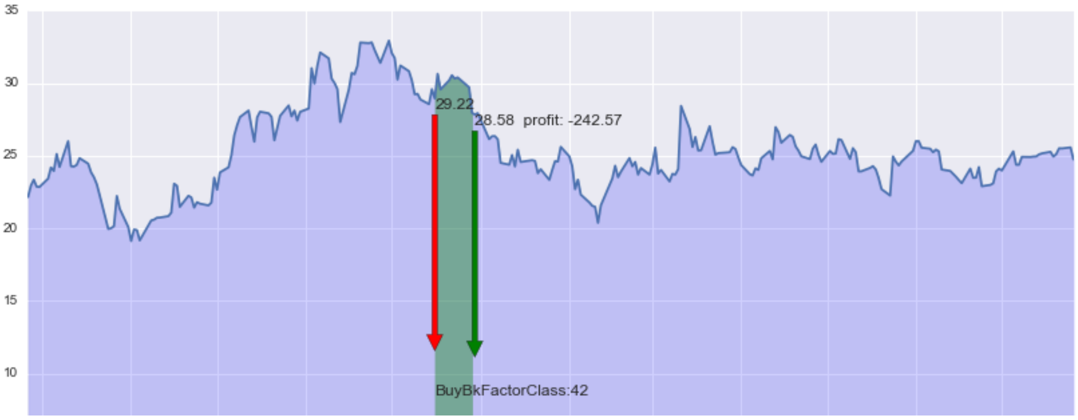
```
*************************************************************************************************************
set(['usNOAH'])
simple profit: -2614.1
mean win profit 1165.8
mean loss profit -539.987142857
win rate 0.125%
```

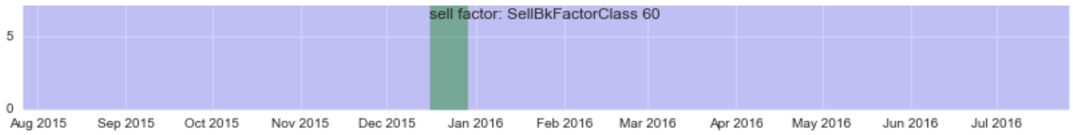


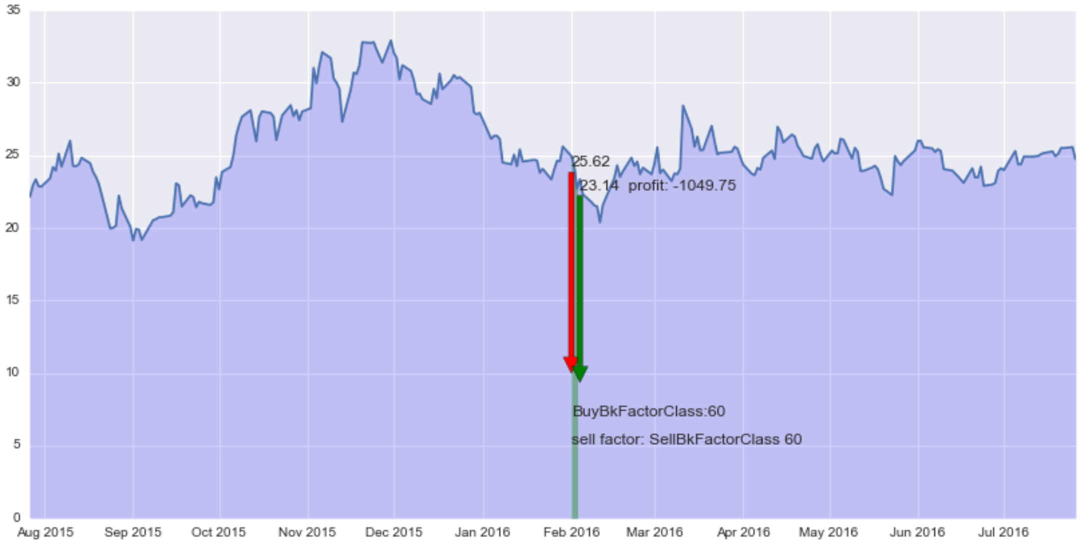

0
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

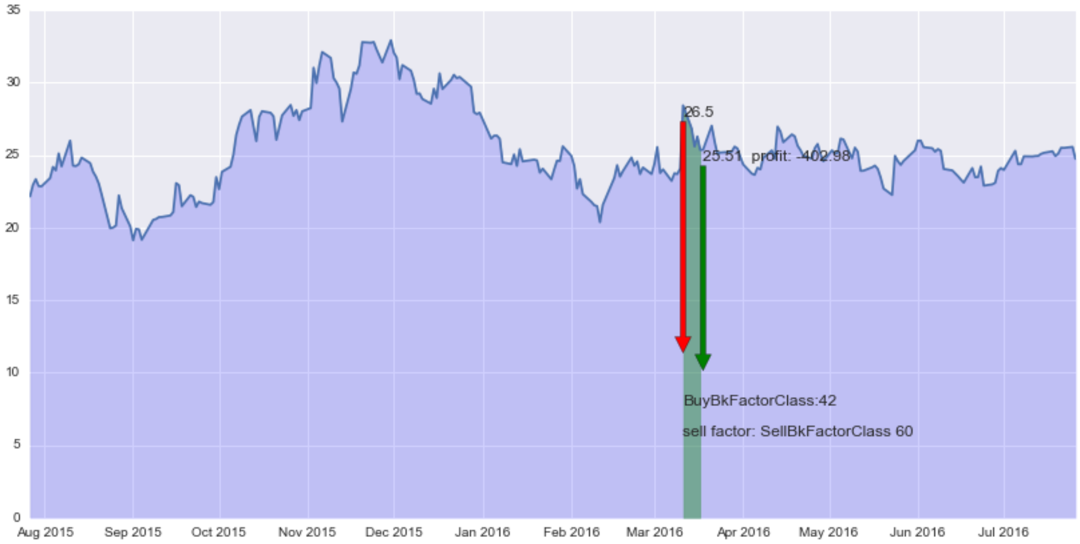

35
30
25
20
15
10
5
0
21.91
21.35 profit: -222.56
BuyBkFactorClass:60
sell factor: SellBkFactorClass 60
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

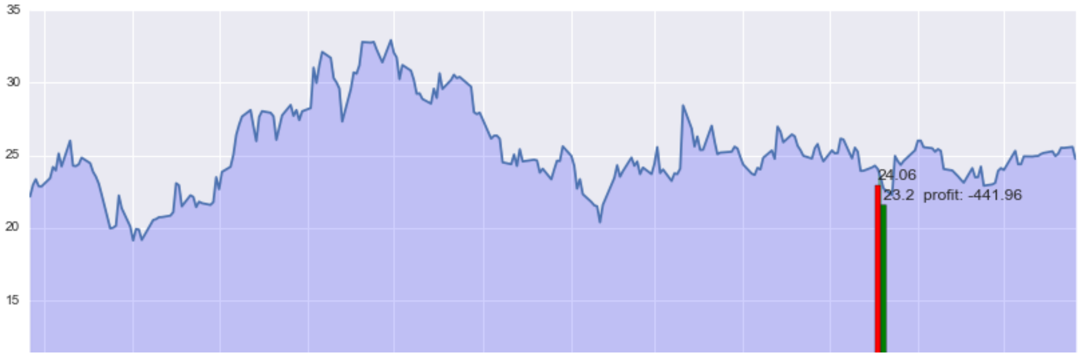

35
30
25
20
15
10
5
0
27.92
30.82 profit: 1165.8
BuyBkFactorClass:42
sell factor: SellBkFactorClass 60
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016

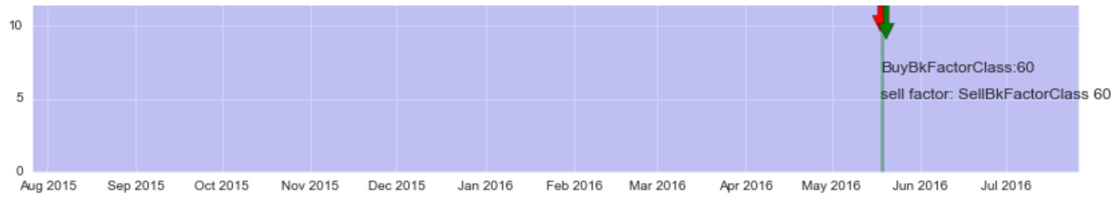

35
30
25
20
15
10
29.22
28.58 profit: -242.57
BuyBkFactorClass:42

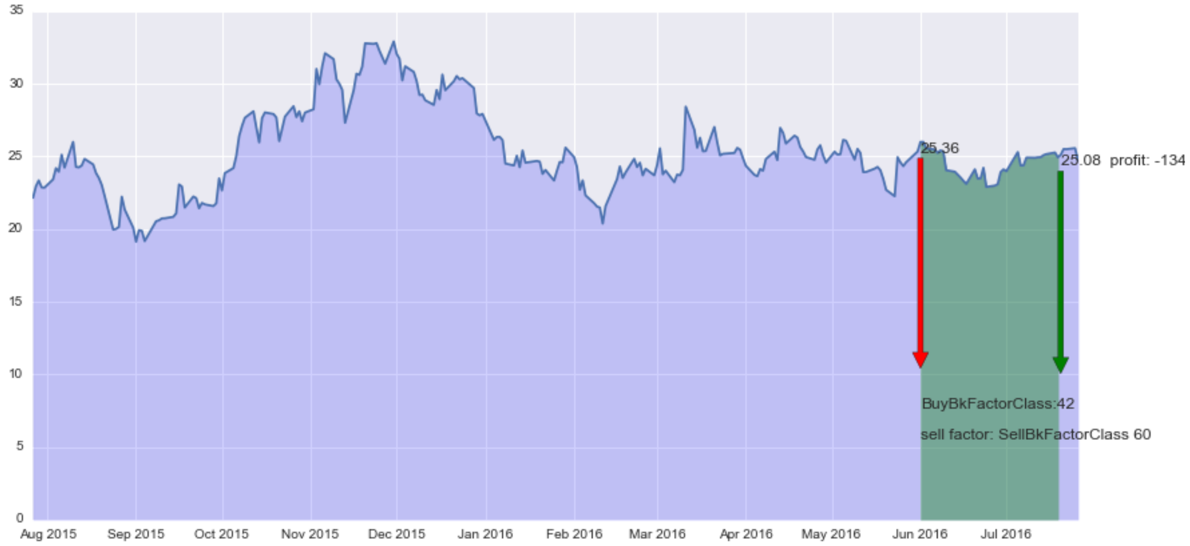

sell factor: SellBkFactorClass 60
5
0
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


35
30
25
20
15
10
5
0
25.62
23.14 profit: -1049.75
BuyBkFactorClass:60
sell factor: SellBkFactorClass 60
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


35
30
25
20
15
10
5
0
26.5
25.51 profit: -402.98
BuyBkFactorClass:42
sell factor: SellBkFactorClass 60
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


35
30
25
20
15
24.06
23.2 profit: -441.96


10
5
0
BuyBkFactorClass:60
sell factor: SellBkFactorClass 60
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


35
30
25
20
15
10
5
0
25.36
25.08 profit: -134
BuyBkFactorClass:42
sell factor: SellBkFactorClass 60
Aug 2015
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Dec 2015
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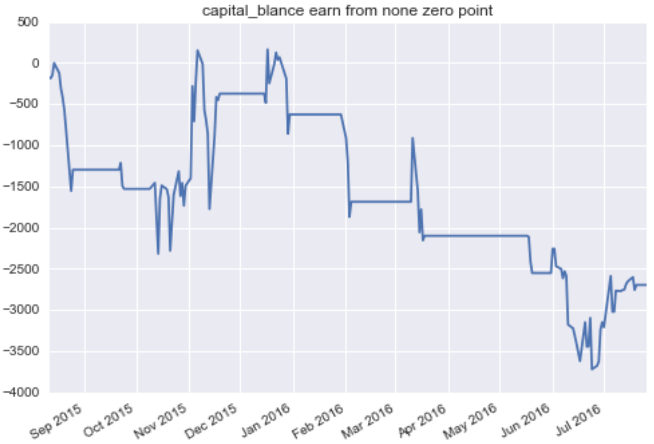
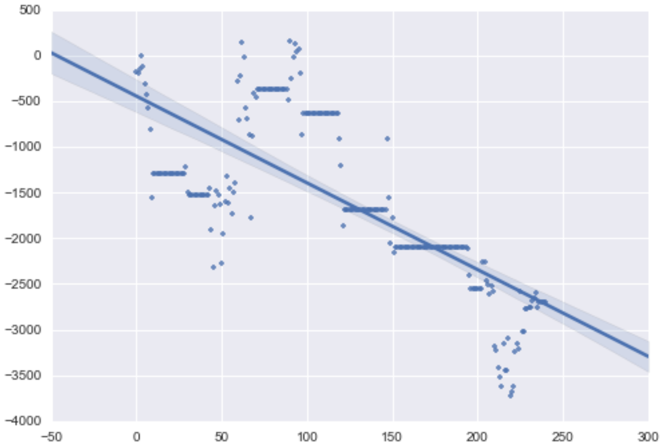
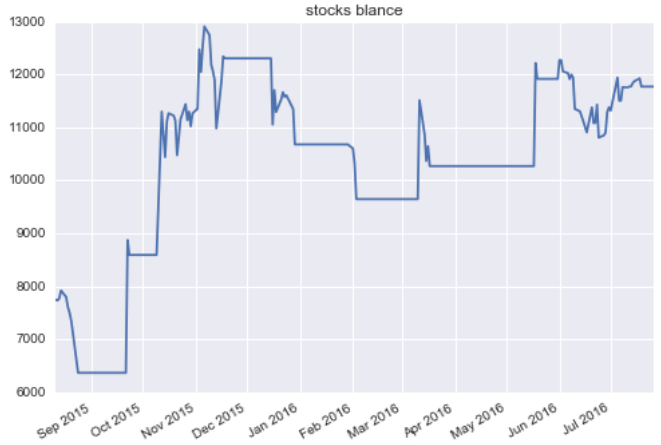
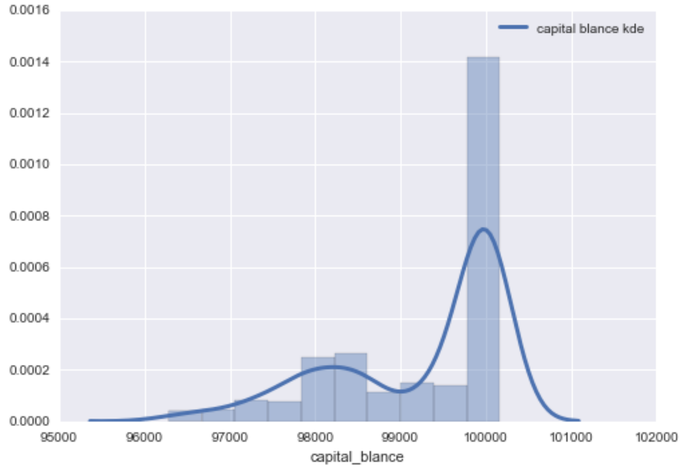
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


capital_blance earn from none zero point
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
-50
0
50
100
150
200
250
300

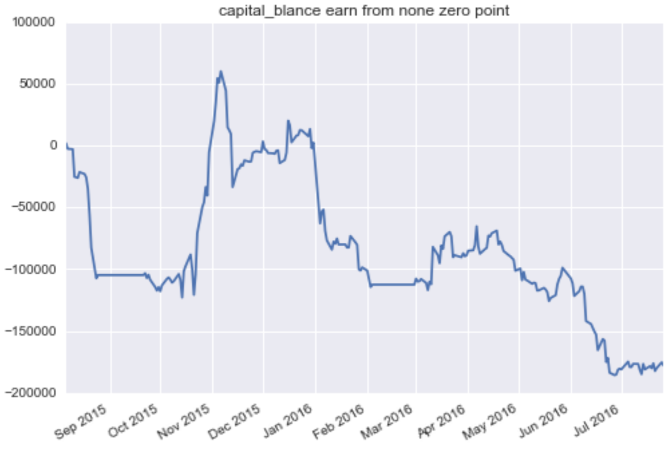




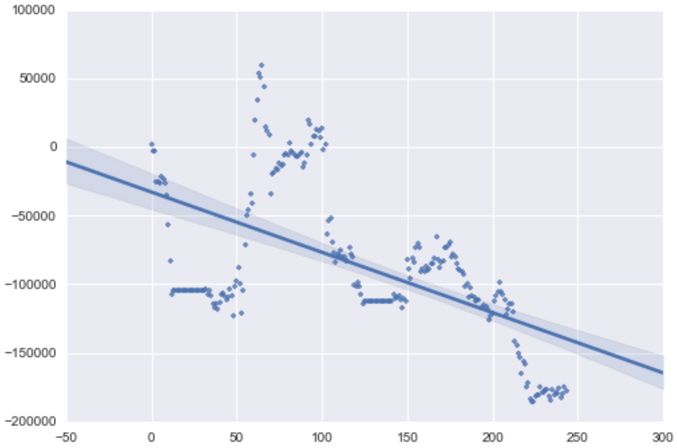
更一般使用do_symbols_with_same_factors | do_symbols_with_diff_factors

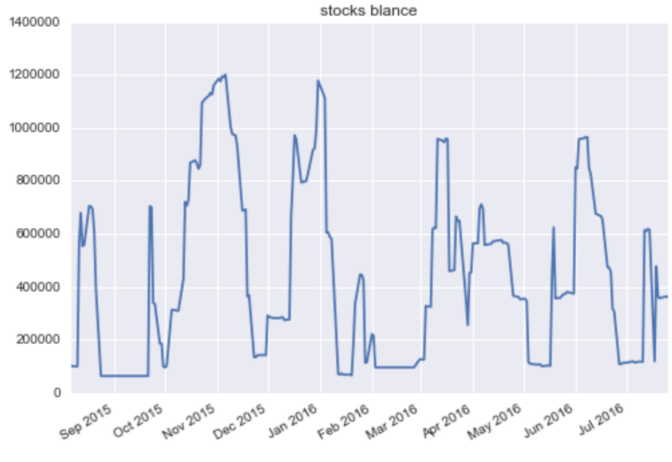
do_symbols_with_same_factors:单个或者多个股票，n个因子，每个股票上承载一样的因子

```python parameters = { 'stop_win_base_n' : 3.0, 'stop_loss_base_n' : 2.0, 'mv_close_atr': 3.0, 'mv_pre_atr' : 1.5, }

buy_factors = [{'XD': 60, 'class': BuyBkFactorClass, 'draw': True}, {'XD': 42, 'class': BuyBkFactorClass, 'draw': True}]

sell_factors = [{'XD': 60, 'class': SellBkFactorClass, 'draw': True}, {'XD': 120, 'class': SellBkFactorClass, 'draw': True}]

target_symbols = ['usNOAH', 'usSFUN', 'usBIDU', 'usAAPL', 'usGOOG', 'usTSLA', 'usWUBA', 'usVIPS'] ```

1. 对于不同参数相同的因子其实认为是不同的因子
2. 'has duplicated will remove' 针对不同因子产生的重复买单现在策略是只保留一个
3. 'Can't excute order for cash not enought' 只针对初始设置的资金交易，没有涉及资金放大等问题

`python cap = CapitalClass(1000000) results, orders_pd, action_pd, all_fit_symbols = AlphaBSellMvEstimator.do_symbols_with_same_factors(target_symbols, buy_factors, sell_factors, parameters, cap, scoring=Metrics.K_RMULT, show=False)`

```
usWUBA : date:20150930 has duplicated will remove
usWUBA: date : 20160601 : Can't excute order for cash not enought
usVIPS: date : 20151104 : Can't excute order for cash not enought
usVIPS: date : 20160601 : Can't excute order for cash not enought
```

`python import MetricsManger from MetricsManger import metrics_rsc from FactorMetrics import METRICSTYPE`

**关于模型度量metrics 更多查看模型度量部分**

`python rsc = metrics_rsc(*(cap, results, orders_pd, action_pd, all_fit_symbols)) MetricsManger.make_metrics_from_rsc(rsc, METRICSTYPE.SYSMBOL_R_SCORES.value)`
```

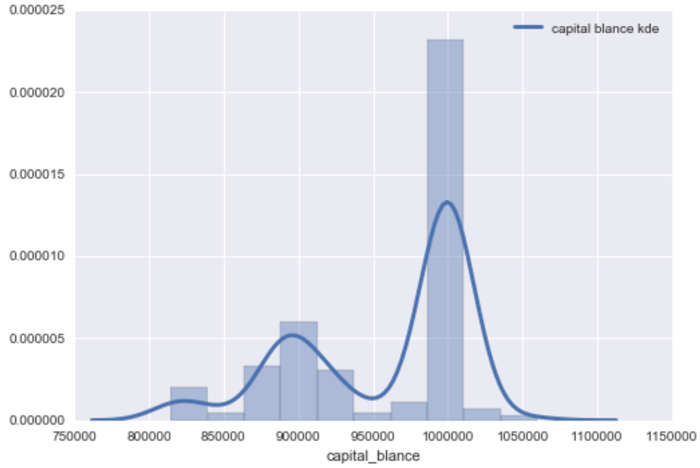


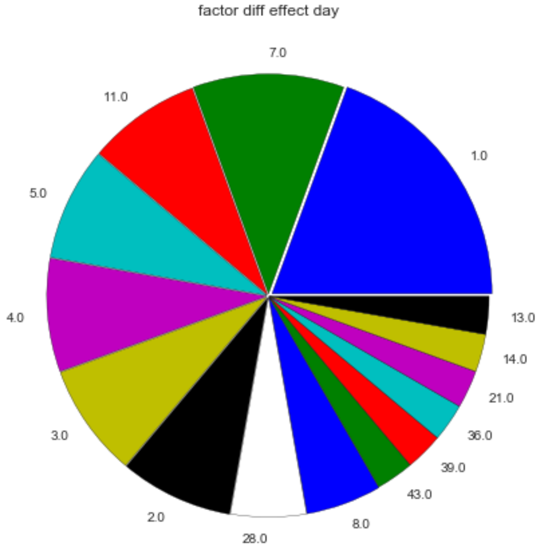
capital_blance earn from none zero point



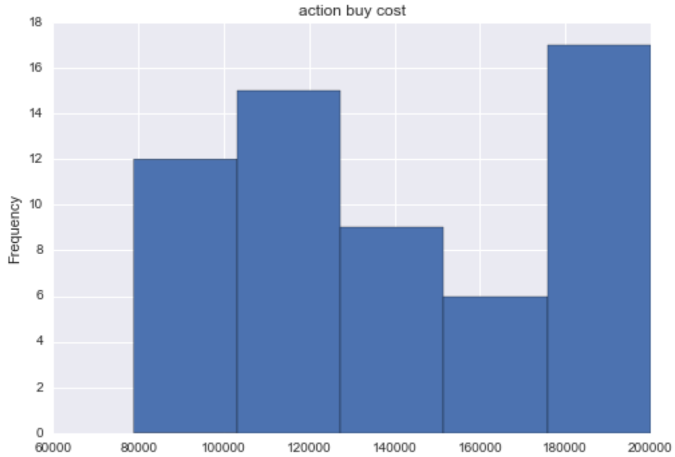


stocks blance

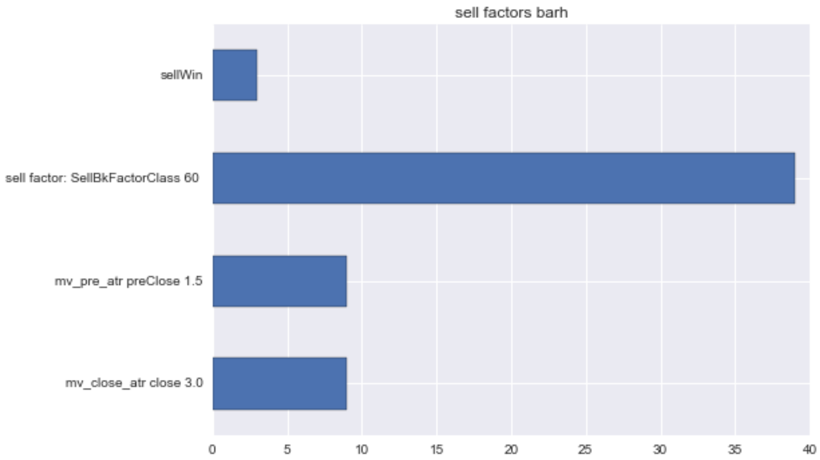




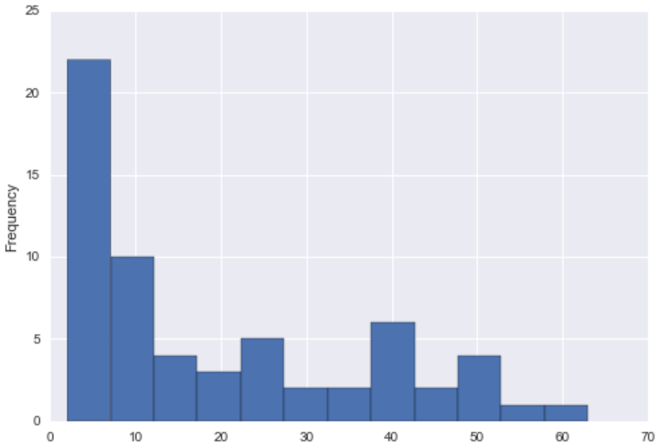
```
effect mean day: 9.66666666667
```



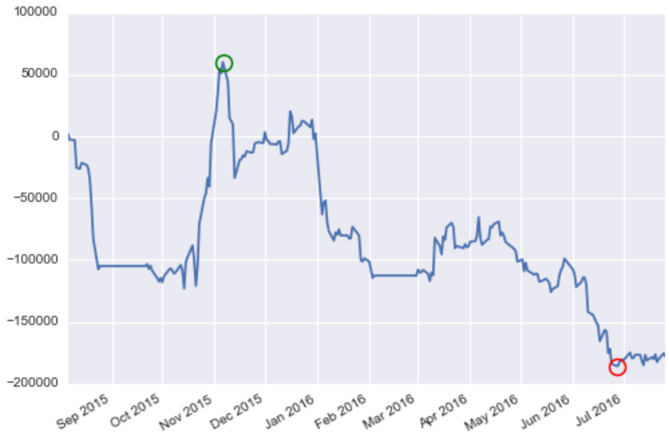
```
cost info:
moments_tuple(mean=141419.3043813559, std=41737.8507986827, skewness=0.2113344387800186, kurtosis=1.5882221206753873)
```



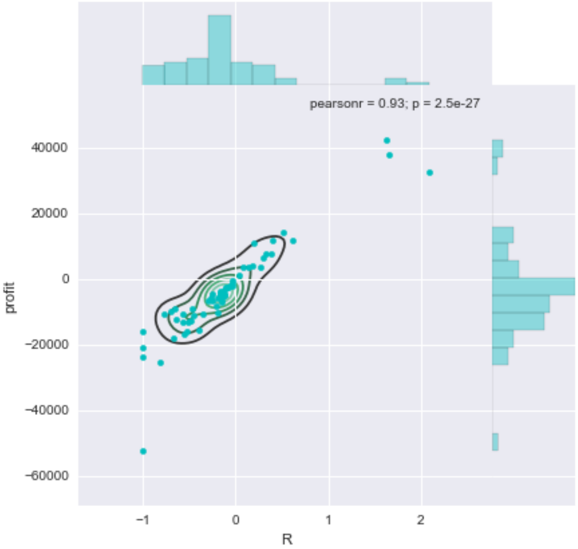
```
mv_close_atr close 3.0                9.0
mv_pre_atr preClose 1.5               9.0
sell factor: SellBkFactorClass 60    39.0
sellWin                               3.0
dtype: float64
```



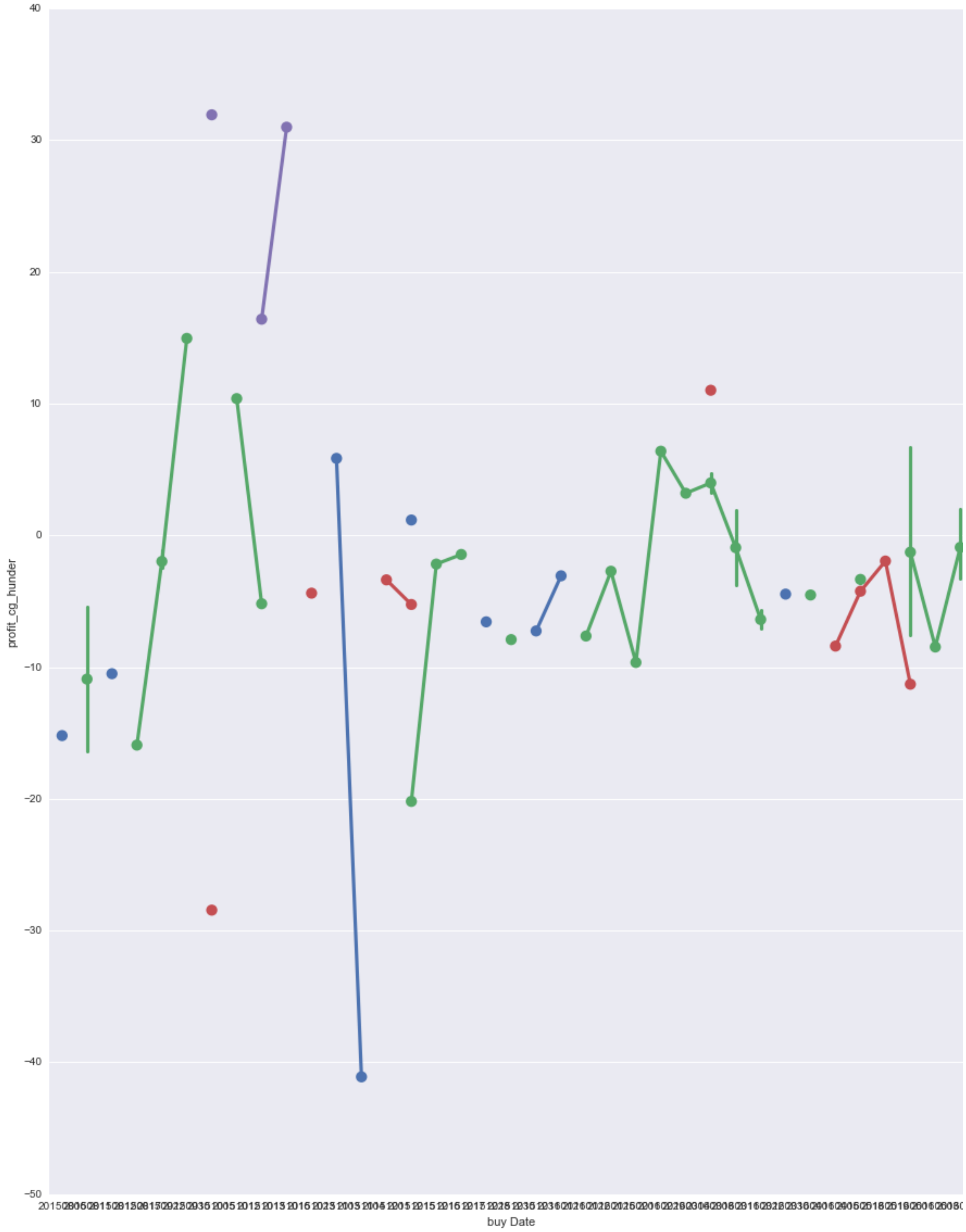
```
keep days mean: 19.9838709677
keep days median: 12.0
```



```
max down rate: 0.231752640954
{(Timestamp('2015-11-06 00:00:00'), Timestamp('2016-06-27 00:00:00')): 245665.42499999981}
```



```
factor effect symbol rate: 1.0
factor gen order rate: 7.375

R win rate: 0.125
result win rate: 0.241935483871
R return: -0.986705489494
P return: -0.0305778467302
C return: -0.177819671
C PB:      -439.848172076

order win mean: 13357.8066667 cg: 10.3229561511
order win max: 42292.59 cg: 31.9318642693

Win Top 5
2015-10-05    31.931864
2015-10-16    30.993183
2015-10-13    16.416186
2015-09-30    14.960630
2016-03-08    11.022700
Name: profit_cg_hunder, dtype: float64

order loss mean: -9672.954 cg: -7.51803161438
order loss max: -52102.54 cg: -41.0991733868

2015-11-04   -41.099173
2015-10-05   -28.442535
2015-12-15   -20.188346
2015-08-11   -16.466431
2015-08-11   -16.240177
Name: profit_cg_hunder, dtype: float64
```



```
top 10 win profit_cg mean: 14.3339301147
top 10 loss profit_cg  mean: -18.5019760052
```

do_symbols_with_diff_factors: m个股票，n * m个因子，每个股票上承载自己独有的因子组合

```python cap = CapitalClass(100000)

target_symbols = ['usSFUN', 'usNOAH']
```

parameters_sfun = { 'stop_win_base_n' : 3.0, 'stop_loss_base_n' : 2.0, 'mv_close_atr': 3.0, 'mv_pre_atr' : 1.5, } buyFactors_sfun = [{'XD': 60, 'class': BuyBkFactorClass, 'draw': True}, {'XD': 42, 'class': BuyBkFactorClass, 'draw': True}] sellFactors_sfun = [{'XD': 60, 'class': SellBkFactorClass, 'draw': True}, {'XD': 120, 'class': SellBkFactorClass, 'draw': True}]

parameters_noah = { 'stop_win_base_n' : 2.0, 'stop_loss_base_n' : 1.0, 'mv_close_atr': 3.0, 'mv_pre_atr' : 1.5, } buyFactors_noah = [{'XD': 21, 'class': BuyBkFactorClass, 'draw': True}] sellFactors_noah = [{'XD': 42, 'class': SellBkFactorClass, 'draw': True}]

factor_dict = dict() factor_dict['usSFUN'] = {'parameters':parameters_sfun, 'buyFactors':buyFactors_sfun, 'sellFactors':sellFactors_sfun} factor_dict['usNOAH'] = {'parameters':parameters_noah, 'buyFactors':buyFactors_noah, 'sellFactors':sellFactors_noah}

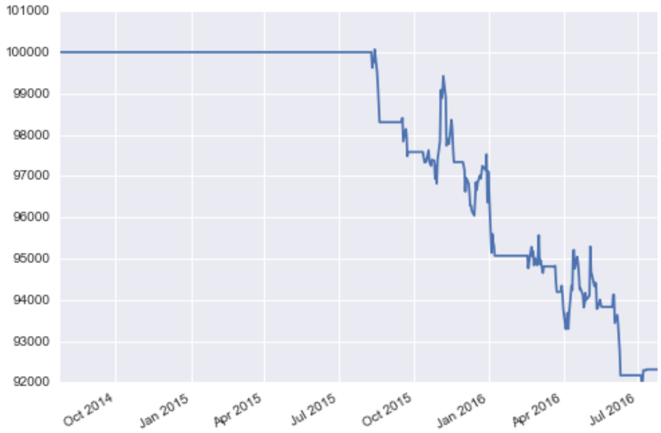
results, orders_pd, action_pd, all_fit_symbols = AlphaBSellMvEstimator.do_symbols_with_diff_factors(target_symbols, factor_dict, cap, scoring=Metrics.K_RMULT, show=False) ```

`python orders_pd.tail()`

	buy Date	buy Price	buy Cnt	buyFactor	Sell Date	Sell Price	Sell Type	Symbol	MaxLoss	ExtraInfo	key	
2016-03-30	20160330	25.0750	392	BuyBkFactorClass:21	20160421	25.4150	win	usNOAH	21.49	None	422	13
2016-04-01	20160401	5.8625	1818	BuyBkFactorClass:60	20160518	5.5975	loss	usSFUN	3.56	None	424	-4
2016-06-01	20160601	25.3650	472	BuyBkFactorClass:21	20160613	24.0650	loss	usNOAH	21.78	None	466	-6
2016-06-03	20160603	5.3150	2276	BuyBkFactorClass:42	20160609	4.8650	loss	usSFUN	3.01	None	468	-1
2016-07-06	20160706	24.6800	538	BuyBkFactorClass:21	20160712	24.9650	win	usNOAH	21.09	None	489	15

`python cap.capital_pd.capital_blance.plot()`

```
<matplotlib.axes._subplots.AxesSubplot at 0x11f66f110>
```



寻找合适的alpha参数组合

```
初始给定参数约束范围，之后GridHelper等方式生成参数的排列组合序列
```

```python import numpy as np import GridHelper from GridSearch import GridSearchCV

close_atr = np.arange(2.0, 4.0, 0.5) pre_atr = np.arange(1.5, 3.0, 0.5) win = np.arange(2.0, 4.0, 0.5) loss = np.arange(0.5, 1.5, 0.5) parameters = { 'stop_win_base_n' : win, 'stop_loss_base_n' : loss, 'mv_close_atr': close_atr, 'mv_pre_atr' : pre_atr, }

bk_days = [21, 42] sell_bk_factor_grid = { 'class': [SellBkFactorClass], 'XD' : bk_days, 'draw' : [True], } bk_days2 = [60] sell_bk_factor_grid2 = { 'class': [SellBkFactorClass], 'XD' : bk_days2, 'draw' : [True], } sell_factor_prams = GridHelper.gen_factor_grid(GridHelper.K_GEN_FACTOR_PARM_SELL, *[sell_bk_factor_grid, sell_bk_factor_grid2])

buy_bk_factor_grid = { 'class': [BuyBkFactorClass], 'XD' : [60], 'draw' : [True], } buy_bk_factor_grid2 = { 'class': [BuyBkFactorClass], 'XD' : [120], 'draw' : [True], } buy_factor_prams = GridHelper.gen_factor_grid(GridHelper.K_GEN_FACTOR_PARM_BUY, *[buy_bk_factor_grid, buy_bk_factor_grid2])
```

sell_factor_prams, buy_factor_prams, parameters ```

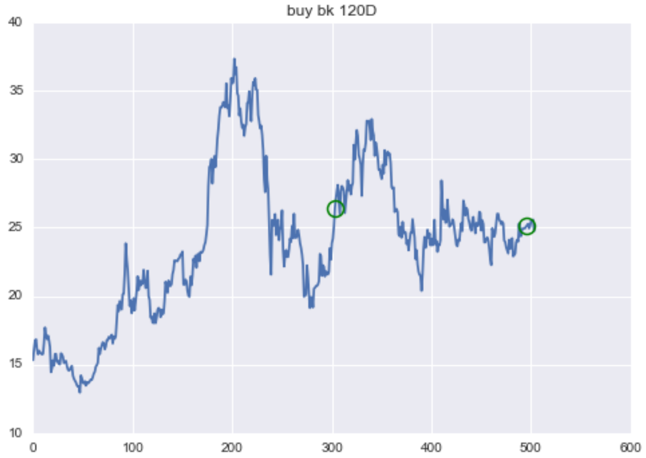
```
([[{'XD': 21, 'class': SellBkFactor.SellBkFactorClass, 'draw': True},
   {'XD': 60, 'class': SellBkFactor.SellBkFactorClass, 'draw': True}],
  [{'XD': 42, 'class': SellBkFactor.SellBkFactorClass, 'draw': True},
   {'XD': 60, 'class': SellBkFactor.SellBkFactorClass, 'draw': True}],
  [{'XD': 21, 'class': SellBkFactor.SellBkFactorClass, 'draw': True}],
  [{'XD': 42, 'class': SellBkFactor.SellBkFactorClass, 'draw': True}],
  [{'XD': 60, 'class': SellBkFactor.SellBkFactorClass, 'draw': True}],
  []],
 [[{'XD': 60, 'class': BuyBkFactor.BuyBkFactorClass, 'draw': True},
   {'XD': 120, 'class': BuyBkFactor.BuyBkFactorClass, 'draw': True}],
  [{'XD': 60, 'class': BuyBkFactor.BuyBkFactorClass, 'draw': True}],
  [{'XD': 120, 'class': BuyBkFactor.BuyBkFactorClass, 'draw': True}]],
 {'mv_close_atr': array([ 2. ,  2.5,  3. ,  3.5]),
  'mv_pre_atr': array([ 1.5,  2. ,  2.5]),
  'stop_loss_base_n': array([ 0.5,  1. ]),
  'stop_win_base_n': array([ 2. ,  2.5,  3. ,  3.5])})
```

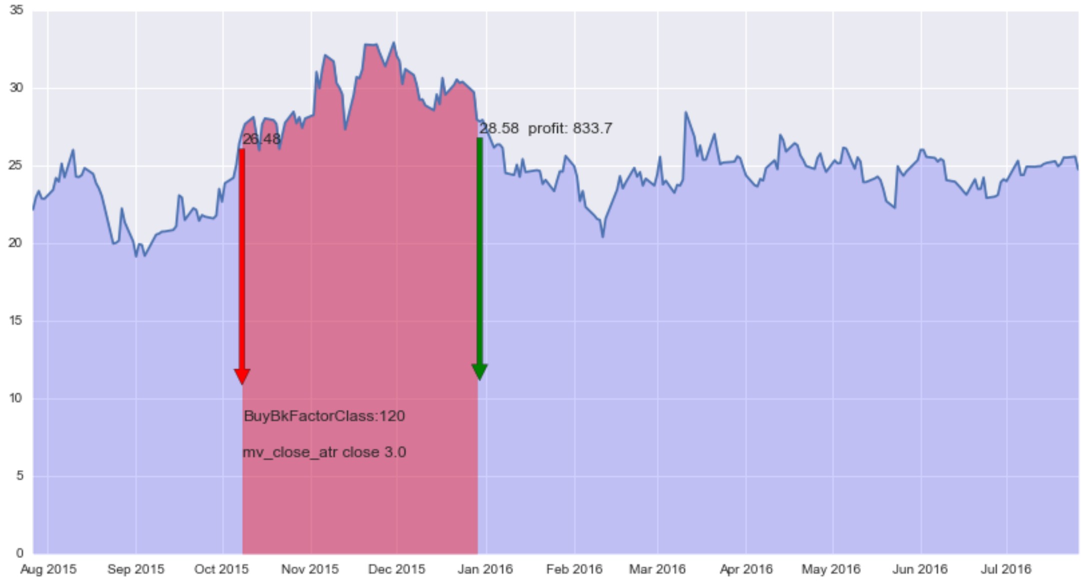
GridSearchCV 最合所有参数及因子的拟合

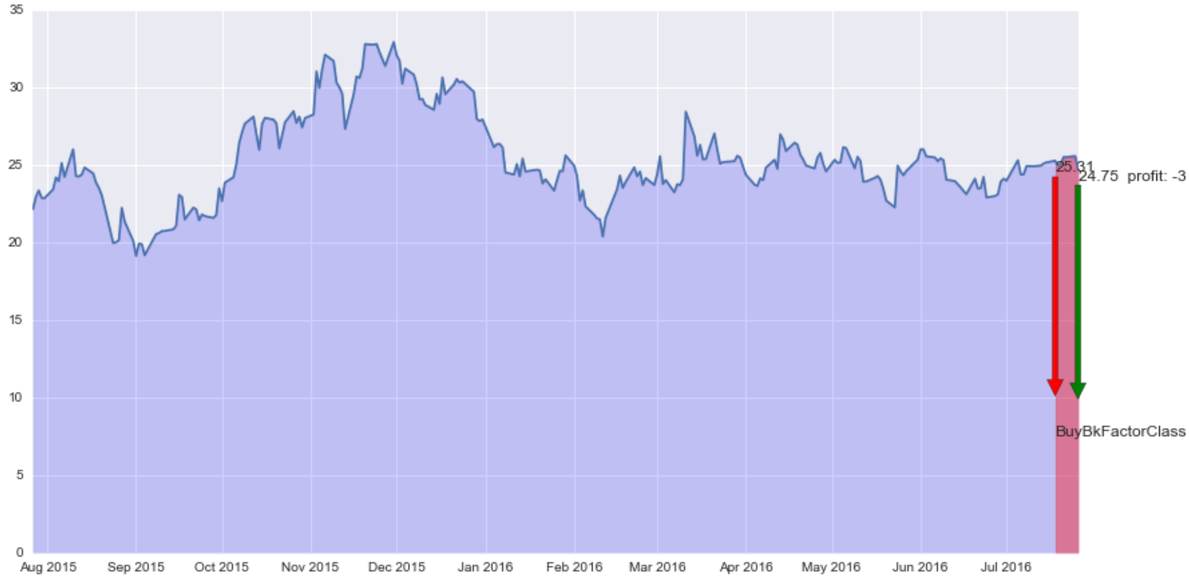
```
scoring：度量输出结果的方式
Metrics.K_QUANT, Metrics.K_RSMM 只可用于grid情况下
横向对比
        K_QUANT：认为最好的模型按照时间 bestQuant = [0.0, 0.25, 0.75, 1.0] 排序
        标准化所有模型结果度量差距
        K_RSMM:  高，收，平均与标准差的关系数
                 主要提取模型的平稳性，独立使用
                 并不能有很好的评价模型
        更多度量详情查看Metrics，Scorer

        scoring_weight：对赋予scoring的各种度量方式分配记分权重
                        Scorer.scaler_standard_min_max：对多个分数在分配权重前标准化分数，类似penalty大分数，
                        避免由于某个分数基础值过大，导致影响的问题
```

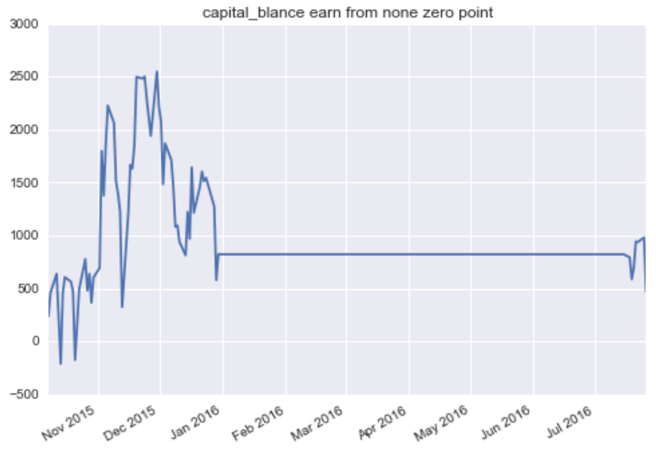
```python

# cap, capklPd, klPd, buyFactorPrams, False

target_symbol = 'usNOAH' target_count = SymbolPd.K_N_GET_DAY_YEAR

cap = CapitalClass(100000) kl_pd = SymbolPd.make_kfold_pd(target_symbol, target_count, cap=cap, n_folds=2) kl_pd.name = target_symbol test_pd = kl_pd[-target_count:] test_pd.name = target_symbol

svr = AlphaBSellMvEstimator() clf = GridSearchCV(svr, parameters, n_jobs=-1, scoring=[Metrics.K_QUANT, Metrics.K_RSMM, Metrics.K_SHARP, Metrics.K_RMULT], scoring_weight=[0.3, 0.2, 0.2, 0.3], sell_factor_prams=sell_factor_prams) clf.fit_with_buy_factor(cap, test_pd, kl_pd, buy_factor_prams, False) ```

```
best is :{'stop_loss_base_n': 0.5, 'mv_pre_atr': 1.5, 'mv_close_atr': 3.0, 'stop_win_base_n': 2.0} sellFactor: [] buyFactor:
[{'draw': True, 'class': <class 'BuyBkFactor.BuyBkFactorClass'>, 'XD': 120}]

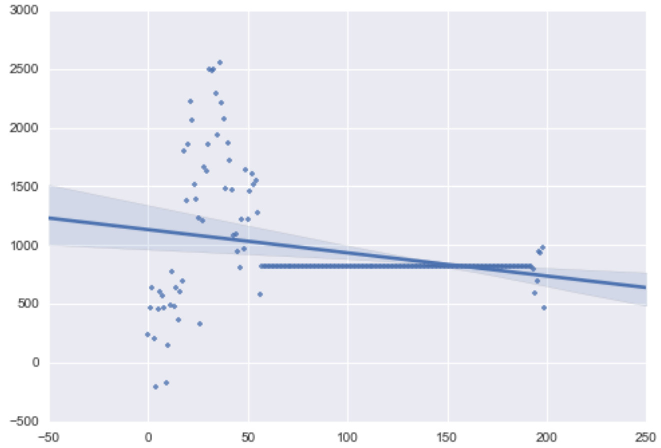
****
set(['usNOAH'])
simple profit: [483.834]
mean win profit 833.7
mean loss profit nan
win rate 1.0%
```
```

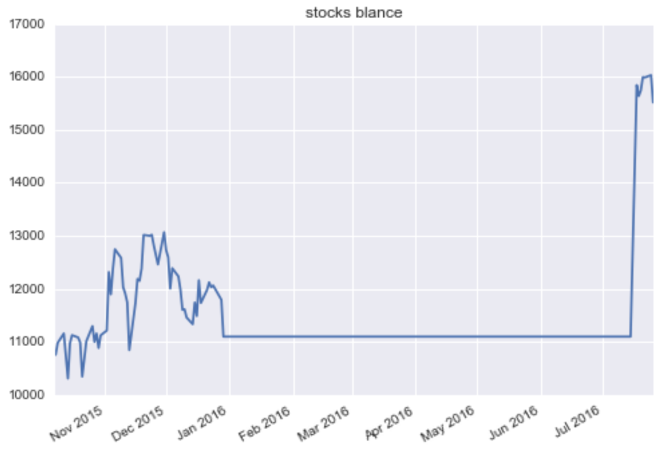

buy bk 120D
40
35
30
25
20
15
10
0
100
200
300
400
500
600

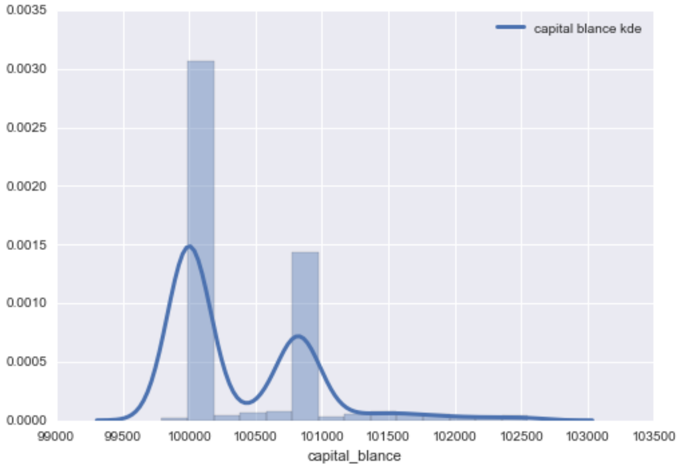

35
30
25
20
15
10
5
0
26.48
28.58 profit: 833.7
BuyBkFactorClass:120
mv_close_atr close 3.0
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


35
30
25
20
15
10
5
0
25.31
24.75 profit: -3
BuyBkFactorClass
Aug 2015
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016


capital_blance earn from none zero point




stocks blance



```
GridSearchCV({'scoring': ['QUANT', 'RSMM', 'SHARP', 'RMULT'], 'sell_factor_prams': None, 'n_jobs': -1, 'standar_sc': True,
'scoring_weight': [0.3, 0.2, 0.2, 0.3], 'estimator': AlphaBSellMvEstimator({'stop_win_base_n': -1, 'mv_pre_atr': 0.0,
'stop_loss': inf, 'stop_loss_base_n': -1, 'stop_win': inf, 'n_jobs': 1, 'weights': 'uniform', 'mv_close_atr': 0.0}),
'pre_dispatch': '2*n_jobs', 'param_grid': {'stop_win_base_n': array([ 2. ,  2.5,  3. ,  3.5]), 'mv_pre_atr': array([ 1.5,  2. ,
2.5]), 'mv_close_atr': array([ 2. ,  2.5,  3. ,  3.5]), 'stop_loss_base_n': array([ 0.5,  1. ])}})
```

```python

# ZCommonUtil.dump_pickle(clf, './data/cache/grid_search_clf_abu')

```
```python
# clf_load = ZCommonUtil.load_pickle('./data/cache/grid_search_clf_abu')
# clf = clf_load
```

最后输出plot的是最优模型参数及因子组合

```
    clf.grid_scores_: 所有组合的分数
    grid_scores[0][0][0] 最终加权分数
```

`python grid_scores = clf.grid_scores_ ZLog.info(grid_scores[0]) grid_scores[0][0][0]`

```
[[3.39223959582824, 4.428993364243846, 4.321218995126834, 4.514481688561519, 0.9880048327247186], {'stop_loss_base_n': 0.5,
'mv_pre_atr': 1.5, 'mv_close_atr': 3.0, 'stop_win_base_n': 2.0}, [], [{'draw': True, 'class': <class
'BuyBkFactor.BuyBkFactorClass'>, 'XD': 120}], [{'quant': 0.96870531019629336}, {'rsmm': -0.096345846764633841},
5.11580595352178, 0]]





3.39223959582824
```

GridHelper.make_grid_score_pd

```
    根据各自参数因子组合生成pandas
    Y_REG 最终分数
    Y_LOG_MEDIAN: grid_pd['Y_REG'].median()
    Y_LOG_618: stats.scoreatpercentile(grid_pd['Y_REG'], 61.8)
```

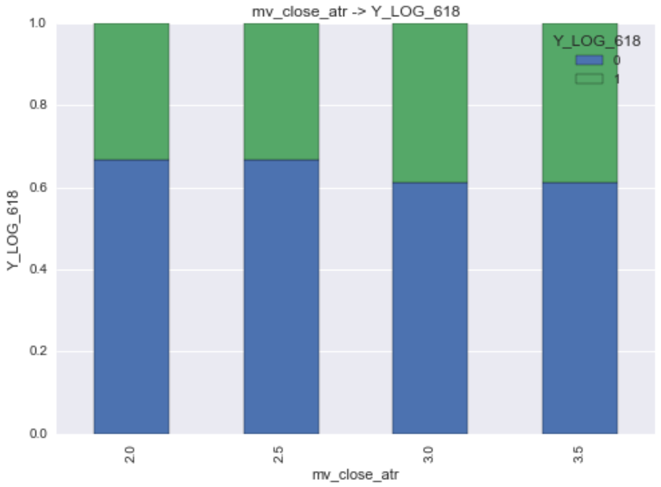
`python import pandas as pd pd.options.display.max_rows = 12 grid_pd = GridHelper.make_grid_score_pd(grid_scores)`

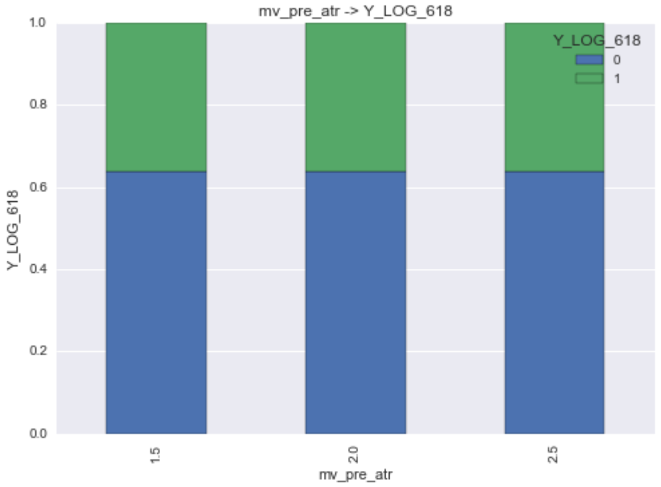
`python grid_pd`

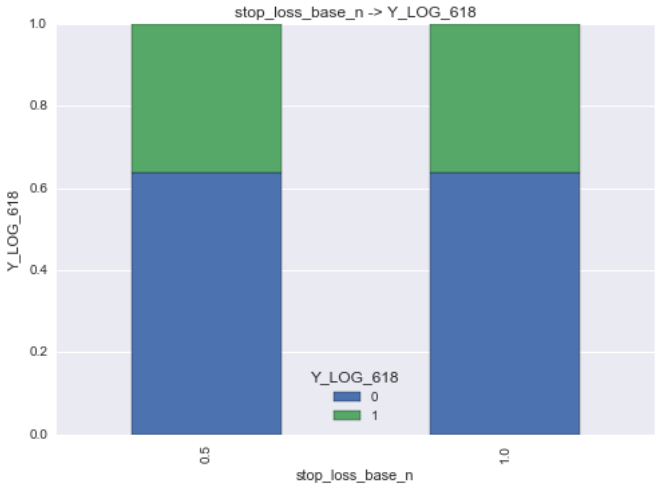
可视化综合评定参数的设定和因子的选择

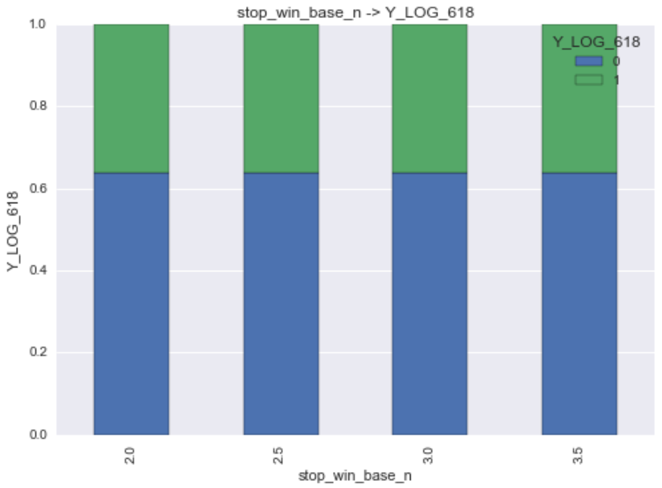
```
如下可看出：mv_close_atr设置应该小于2.5
          pre_atr 1.5-2.5对模型几乎没产生影响等
```

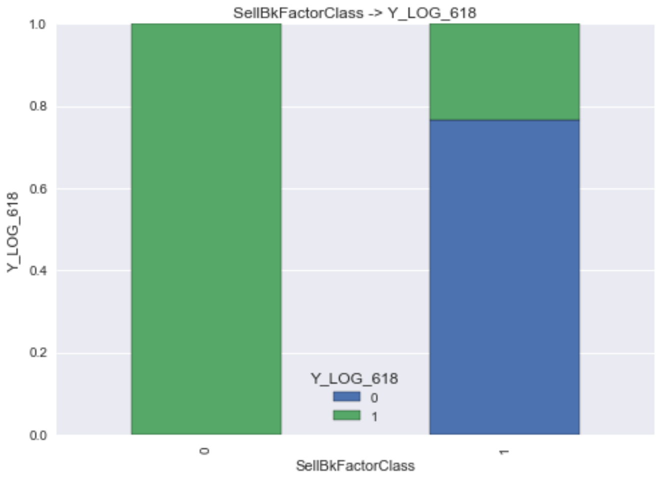
`python GridHelper.score_pd_plot(grid_pd, 'Y_LOG_618')`

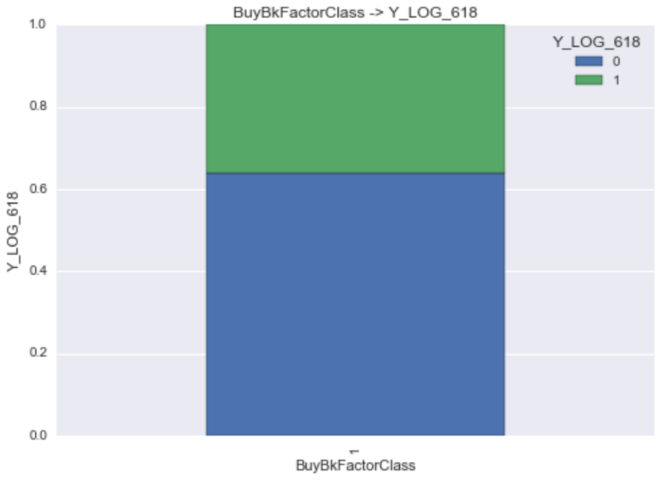


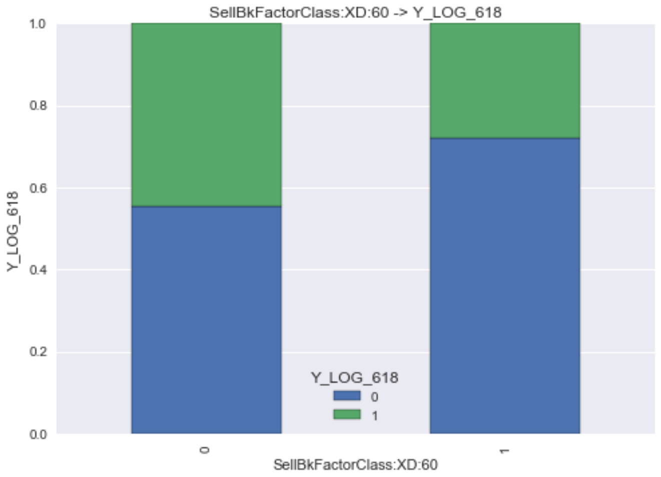


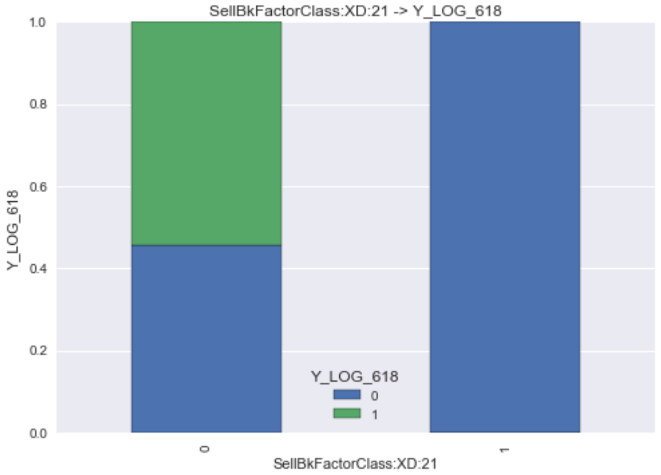


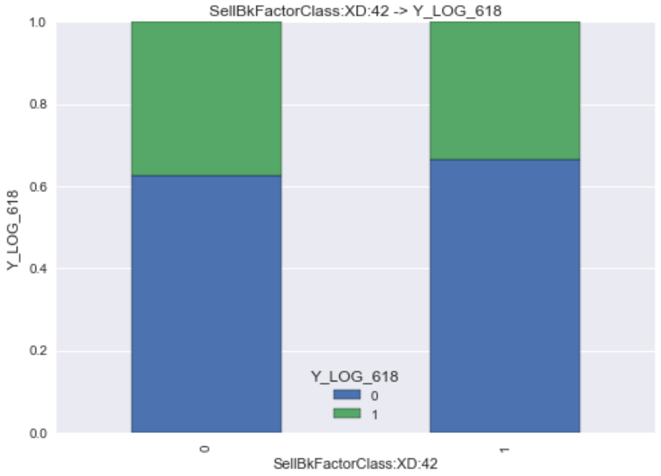

stop_win_base_n -> Y_LOG_618
Y_LOG_618
0
1
1.0
0.8
0.6
0.4
0.2
0.0
Y_LOG_618
2.0
2.5
3.0
3.5
stop_win_base_n

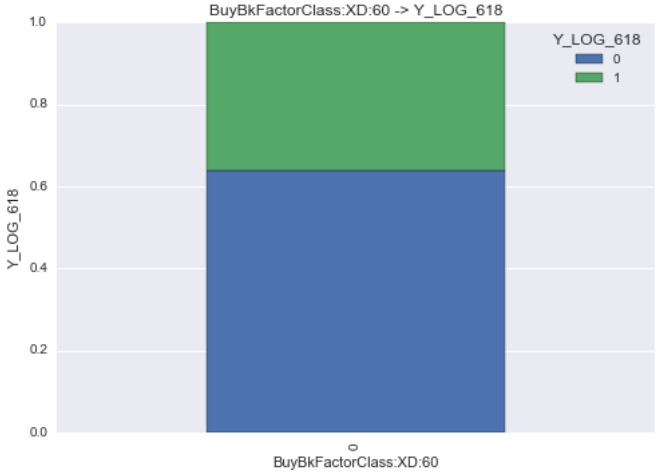

SellBkFactorClass -> Y_LOG_618
Y_LOG_618
0
1
1.0
0.8
0.6
0.4
0.2
0.0
Y_LOG_618
0
1
SellBkFactorClass

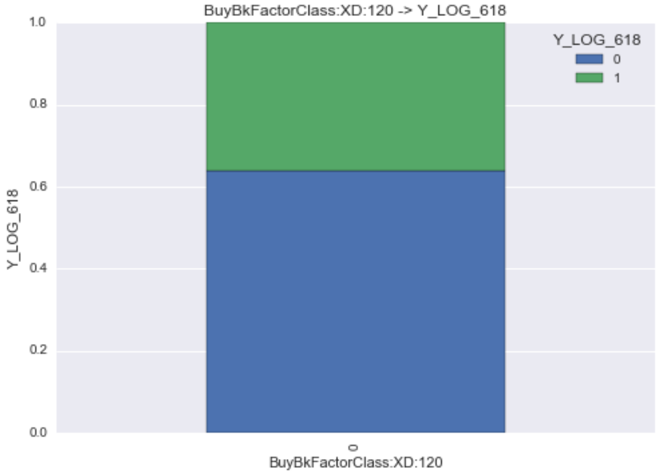

BuyBkFactorClass -> Y_LOG_618
Y_LOG_618
0
1
1.0
0.8
0.6
0.4
0.2
0.0
Y_LOG_618
1
BuyBkFactorClass


SellBkFactorClass:XD:60 -> Y_LOG_618
1.0
0.8
0.6
0.4
0.2
0.0
Y_LOG_618
Y_LOG_618
0
1
0
1
SellBkFactorClass:XD:60


SellBkFactorClass:XD:21 -> Y_LOG_618
1.0
0.8
0.6
0.4
0.2
0.0
Y_LOG_618
Y_LOG_618
0
1
0
1
SellBkFactorClass:XD:21


SellBkFactorClass:XD:42 -> Y_LOG_618
1.0
0.8
0.6
0.4
0.2
0.0
Y_LOG_618
Y_LOG_618
0
1
0
1
SellBkFactorClass:XD:42





- AlphaBSellMvEstimator.do_from_done_factor: 可从clf.best_buy_factor_params, *clf.best_sell_factor_params*拿出 进行拟合测试
- AlphaBSellMvEstimator.do_from_grid_scores: 从gird分数中拿出某个查看

交叉测试

```
cv个正相关，cv个负相关，cv个分段相关pd.qcut
组合交叉测试grid输出的最优结果clf.best_buy_factor_params_,
clf.best_sell_factor_params_, clf.best_params_
```

```python
```