Wa1 v1.1 Analysis

Wa1 v1.1 is the first algorithm that we have tested that has measured massive success. It has, however, also logged our greatest losses. I will be using Pyfolio to analyze several backtests of Wa1 v1.1, but first - the important bits of code.

Algorithm Summary

Initialization

The securities we used in these backtests of Wa1 v1.1 are (in order): Intel, Comcast, Ford, Nvidia, Apple, Microsoft, IBM and Cisco.

In [ ]:
```
    context.security_list = [sid(3951),sid(1637),sid(2673),sid(19725),
                             sid(24),sid(5061),sid(3766),sid(1900)]
```

Drawdown

The algorithm supposedly had a 50% max drawdown, but that didn't really happen. I need to check if it's a) a code error or b) a misunderstanding of drawdown

In [ ]:
```
    #50% max drawdown
    context.max_drawdown = .5
    context.day_counter = 0
```

Variables

I am using 10 and 30 day moving averages, as well as some custom daily data inspired by another Quantopian user.

In [ ]:
```
        #10 day moving average
        past10 = data.history(security, 'price', 10, '1d')
        mean10 = past10.mean()

        #30 day moving average
        past30 = data.history(security, 'price', 30, '1d')
        mean30 = past30.mean()

        #Is the asset going up or down in the last three days?
        trend10p = past10[0]>=past10[1]>=past10[2]>=past10[3]
        trend10n = past10[0]<=past10[1]<=past10[2]<=past10[3]
```

Trading Logic

Below is the trading logic of the algorithm

In [ ]:
```
        #If we hold the security
        if security in context.portfolio.positions.keys():
            if mean10 < mean30*0.95 and trend10p:
                order_target_percent(security, 0)
            #8% stop loss
            elif context.portfolio.positions[security].cost_basis*0.92 >=data.current(security, 'price'):
                order_target_percent(security, 0)

        #If we don't hold the security
        elif mean10>mean30*1.05 and trend10n:
            #avoid security if it is falling in the long term
            if past30[0]<=past30[5]<=past30[10]<=past30[15]:
                    continue
            elif security not in context.portfolio.positions.keys():
                    # The heuristic below is to prevent investing too much in one security.
                    p = data.current(security, 'price')
                    toInvest = (context.portfolio.cash) * (context.max_drawdown**0.75)
                    numShares = max(0,np.round(toInvest/p))
                    order(security, numShares)
```

Backtest Data

At the core of pyfolio, we have *tear sheets* that summarize information about a backtest. Each tear sheet returns a number of plots, as well as other information, about a given topic. There are five main ones:

- Cumulative returns tear sheet
- Shock event returns tear sheet
- Positional tear sheet
- Transactional tear sheet
- Bayesian tear sheet

2005-2014

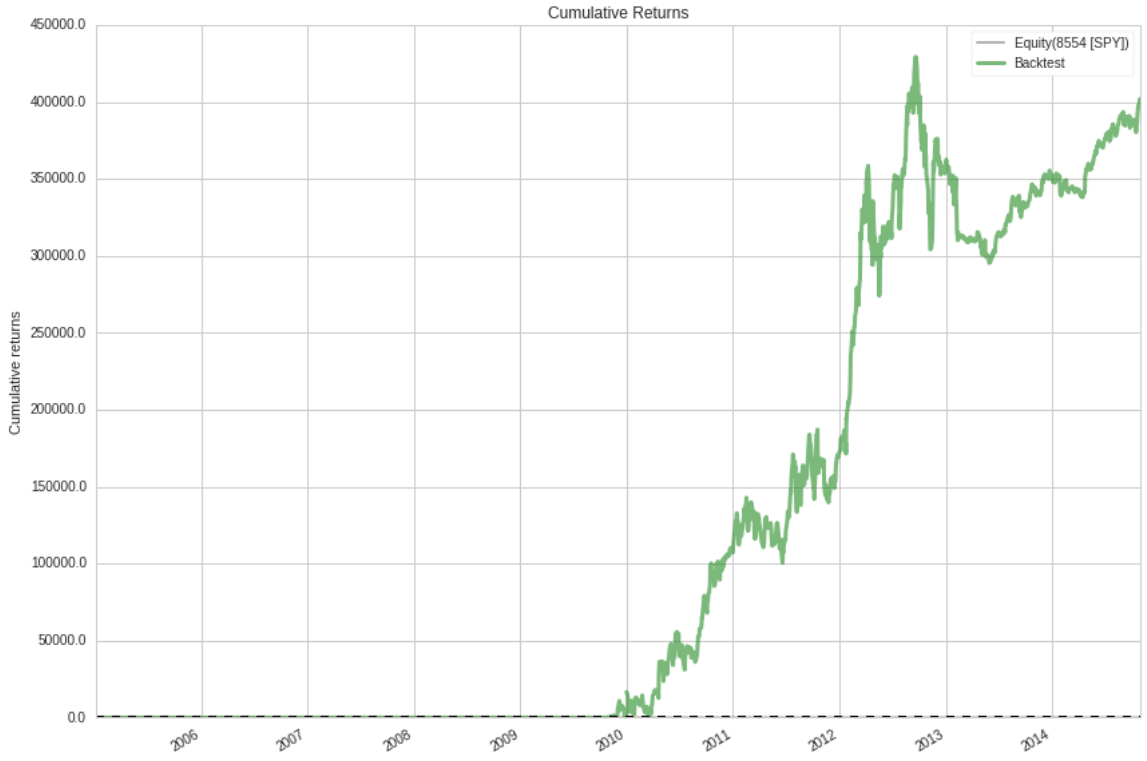
In [1]:
```
# Get backtest object
bt = get_backtest('581e610b7ace62108b526be9')

# Create all tear sheets
bt.create_full_tear_sheet()
```

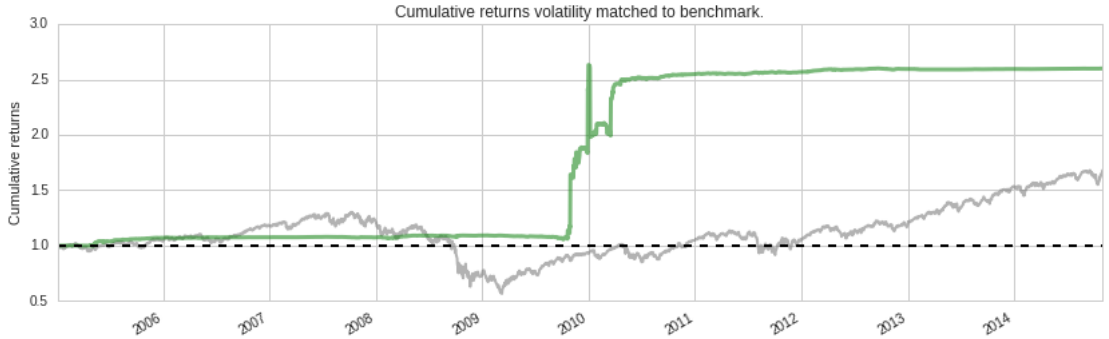
```
100% Time: 0:00:18|###########################################################|
Entire data start date: 2005-01-04
Entire data end date: 2014-10-31


Backtest Months: 117
```

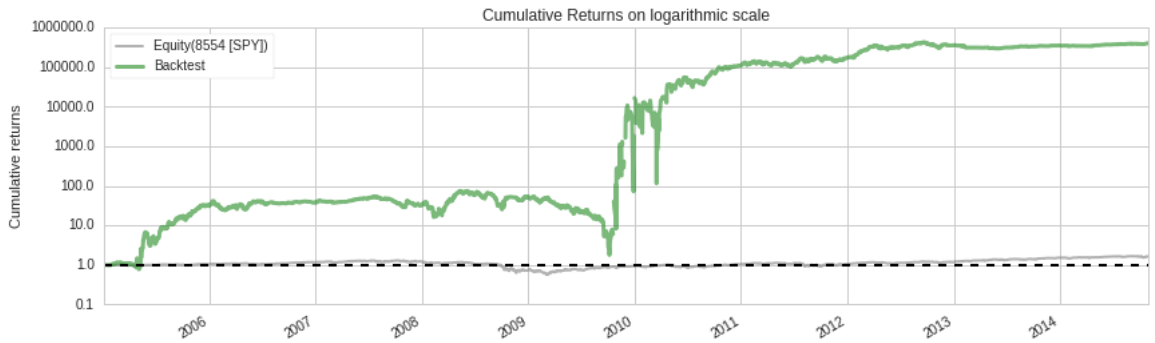
Performance statistics	Backtest
annual_return	2.72
annual_volatility	15.58
sharpe_ratio	0.57
calmar_ratio	2.74
stability_of_timeseries	nan
max_drawdown	-0.99
omega_ratio	2.09
sortino_ratio	1.44
skew	18.44
kurtosis	651.60
tail_ratio	1.10
common_sense_ratio	4.08
information_ratio	0.04
alpha	9.11
beta	-2.78

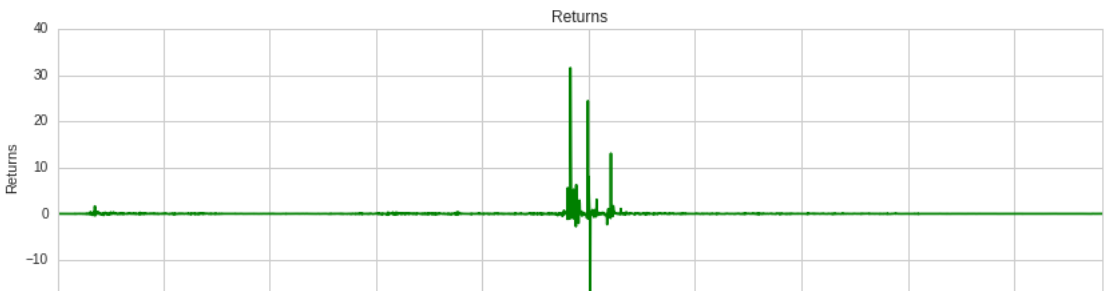
Worst Drawdown Periods	net drawdown in %	peak date	valley date	recovery date	duration
0	97.60	2008-05-13	2009-10-06	NaT	NaN
1	69.81	2007-07-26	2008-02-11	2008-04-21	193
2	55.00	2005-05-26	2005-06-10	2005-07-15	37
3	47.86	2005-04-28	2005-05-04	2005-05-11	10
4	42.56	2006-01-13	2006-02-23	2007-01-10	259

```
[-1.927 -2.314]
```

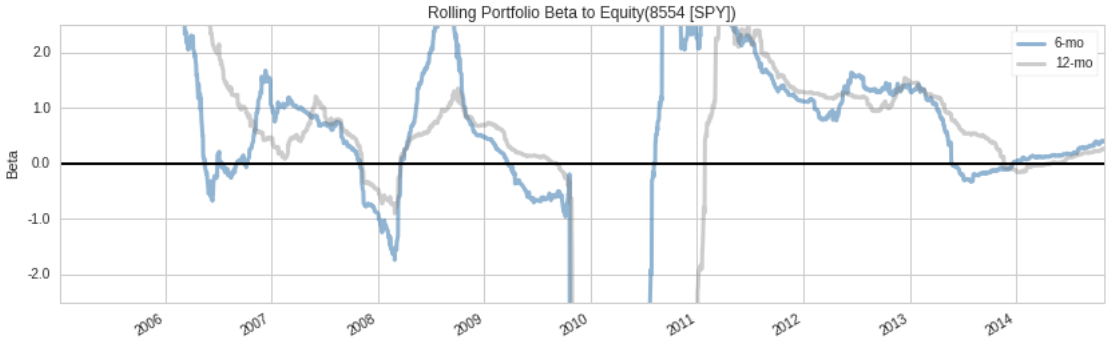

Cumulative Returns
Equity(8554 [SPY])
Backtest
Cumulative returns
450000.0
400000.0
350000.0
300000.0
250000.0
200000.0
150000.0
100000.0
50000.0
0.0
2006
2007
2008
2009
2010
2011
2012
2013
2014

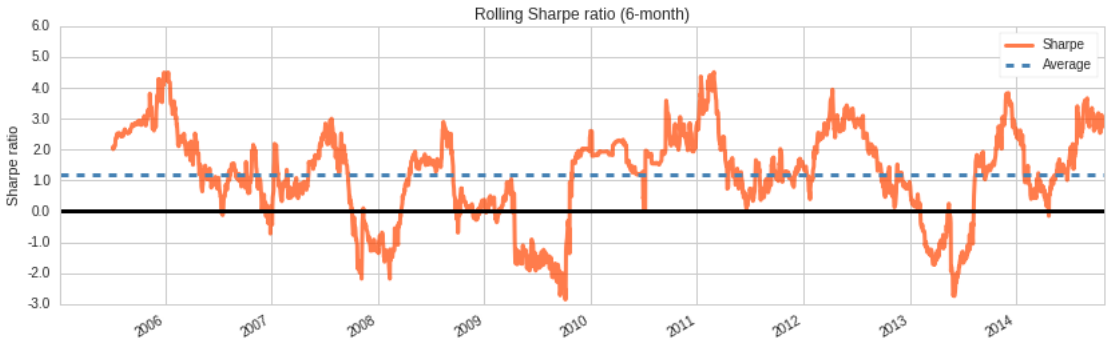

Cumulative returns volatility matched to benchmark.
Cumulative returns
3.0
2.5
2.0
1.5
1.0
0.5
2006
2007
2008
2009
2010
2011
2012
2013
2014

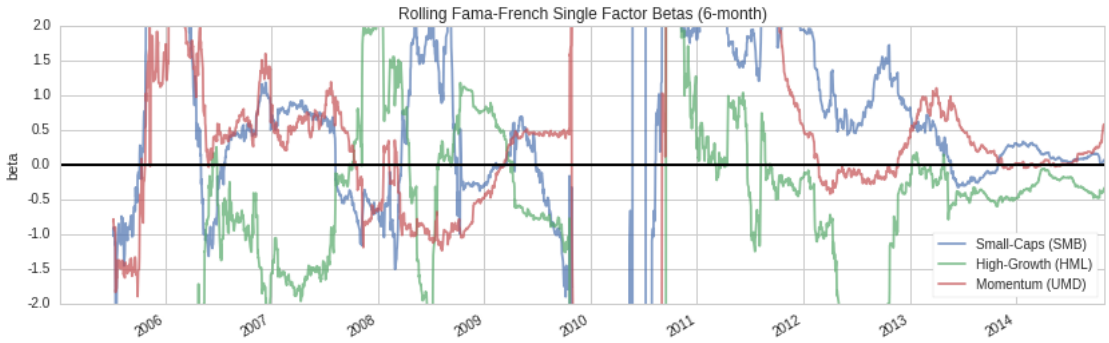

Cumulative Returns on logarithmic scale
Equity(8554 [SPY])
Backtest
Cumulative returns
1000000.0
100000.0
10000.0
1000.0
100.0
10.0
1.0
0.1
2006
2007
2008
2009
2010
2011
2012
2013
2014

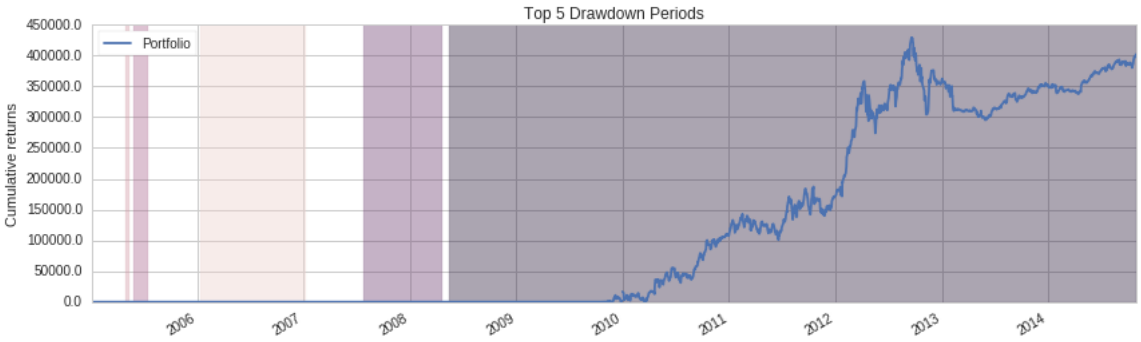

Returns
Returns
40
30
20
10
0
−10

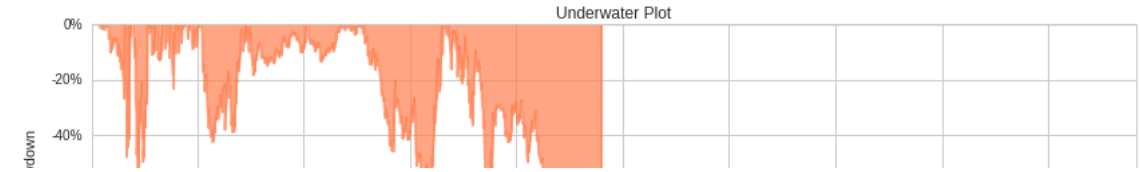

-20
2006
2007
2008
2009
2010
2011
2012
2013
2014

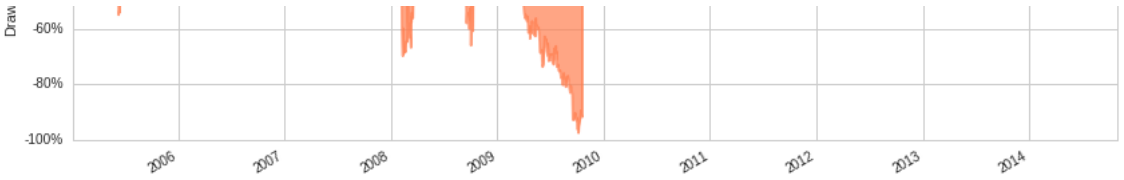

Rolling Portfolio Beta to Equity(8554 [SPY])
Beta
6-mo
12-mo
2.0
1.0
0.0
-1.0
-2.0
2006
2007
2008
2009
2010
2011
2012
2013
2014

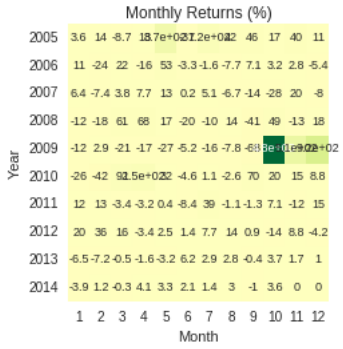

Rolling Sharpe ratio (6-month)
Sharpe ratio
Sharpe
Average
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
2006
2007
2008
2009
2010
2011
2012
2013
2014

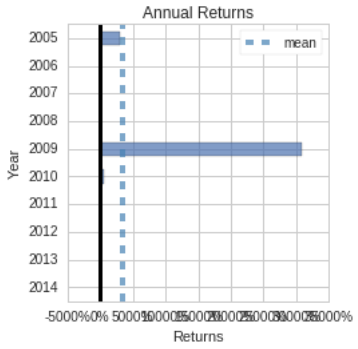

Rolling Fama-French Single Factor Betas (6-month)
beta
Small-Caps (SMB)
High-Growth (HML)
Momentum (UMD)
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
2006
2007
2008
2009
2010
2011
2012
2013
2014

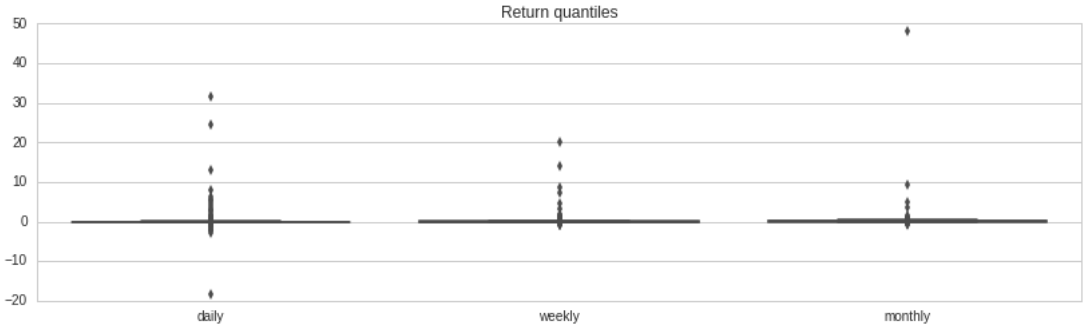

Top 5 Drawdown Periods
Cumulative returns
Portfolio
450000.0
400000.0
350000.0
300000.0
250000.0
200000.0
150000.0
100000.0
50000.0
0.0
2006
2007
2008
2009
2010
2011
2012
2013
2014


Underwater Plot
0%
-20%
-40%
2006
2007
2008
2009
2010
2011
2012
2013
2014



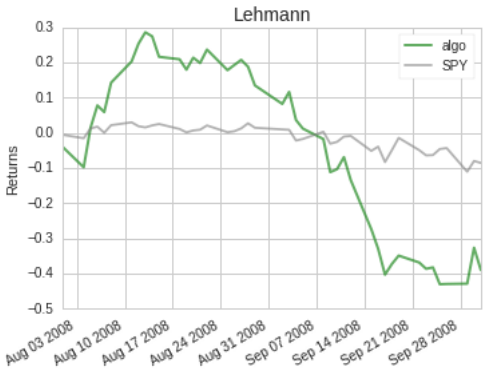


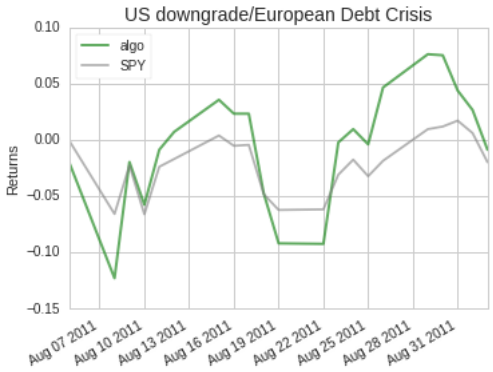


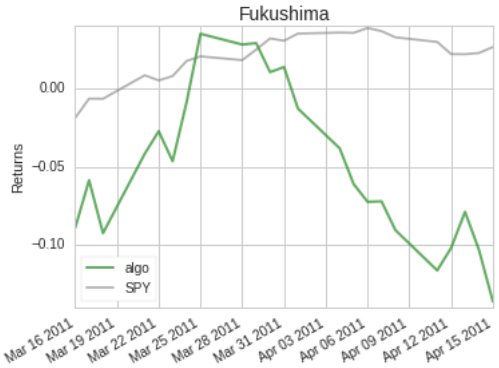


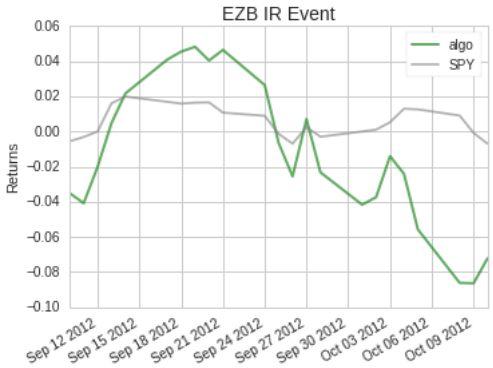

```
/usr/local/lib/python2.7/dist-packages/numpy/lib/function_base.py:3834: RuntimeWarning: Invalid value encountered in percenti
le
  RuntimeWarning)
```

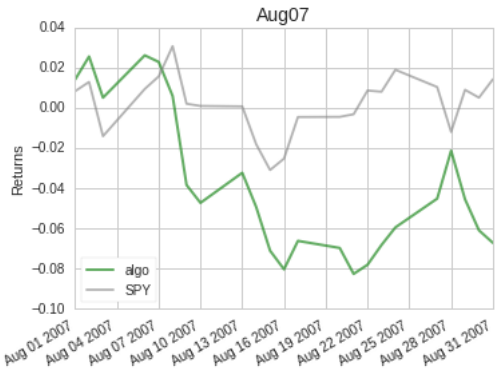
Stress Events	mean	min	max
Lehmann	-0.95%	-16.15%	17.92%
US downgrade/European Debt Crisis	0.08%	-10.39%	11.78%
Fukushima	-0.58%	-8.93%	5.61%
EZB IR Event	-0.30%	-3.51%	3.34%
Aug07	-0.29%	-4.40%	2.50%
Mar08	3.43%	-13.63%	33.57%
Sept08	-2.54%	-16.15%	17.92%
2009Q1	-0.16%	-11.00%	9.16%
2009Q2	-0.99%	-12.95%	9.71%
Flash Crash	1.14%	-20.61%	38.23%
Apr14	0.20%	-0.72%	3.05%
Oct14	0.16%	-0.79%	1.41%
Low Volatility Bull Market	0.92%	-41.39%	164.44%
GFC Crash	0.15%	-24.21%	36.12%
Recovery	8.55%	-1846.17%	3159.98%
New Normal	0.03%	-4.61%	3.77%

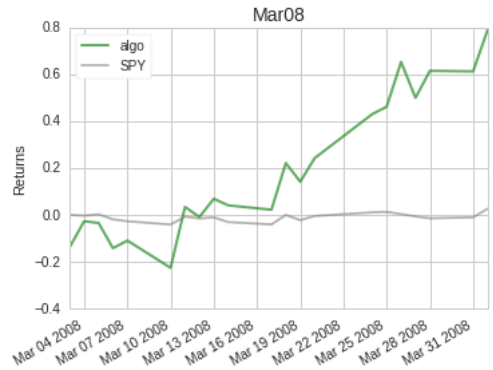

Lehmann
algo
SPY
Returns
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
−0.5
Aug 03 2008
Aug 10 2008
Aug 17 2008
Aug 24 2008
Aug 31 2008
Sep 07 2008
Sep 14 2008
Sep 21 2008
Sep 28 2008

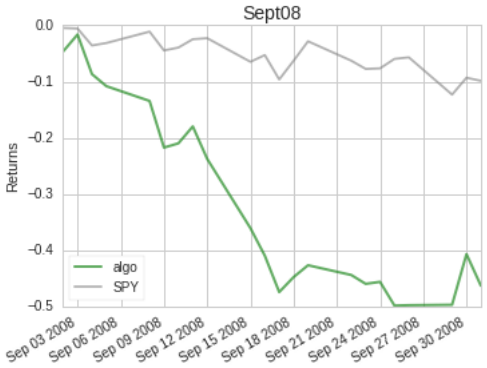

US downgrade/European Debt Crisis
algo
SPY
Returns
0.10
0.05
0.00
−0.05
−0.10
−0.15
Aug 07 2011
Aug 10 2011
Aug 13 2011
Aug 16 2011
Aug 19 2011
Aug 22 2011
Aug 25 2011
Aug 28 2011
Aug 31 2011


Fukushima
algo
SPY
Returns
0.00
−0.05
−0.10
Mar 16 2011
Mar 19 2011
Mar 22 2011
Mar 25 2011
Mar 28 2011
Mar 31 2011
Apr 03 2011
Apr 06 2011
Apr 09 2011
Apr 12 2011
Apr 15 2011

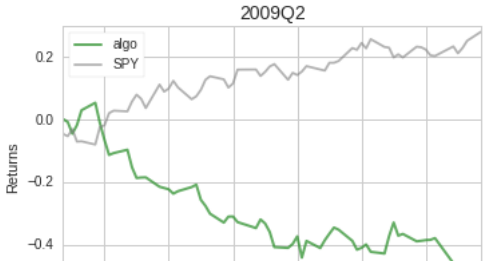

EZB IR Event
algo
SPY
Returns
0.06
0.04
0.02
0.00
−0.02
−0.04
−0.06
−0.08
−0.10
Sep 12 2012
Sep 15 2012
Sep 18 2012
Sep 21 2012
Sep 24 2012
Sep 27 2012
Sep 30 2012
Oct 03 2012
Oct 06 2012
Oct 09 2012

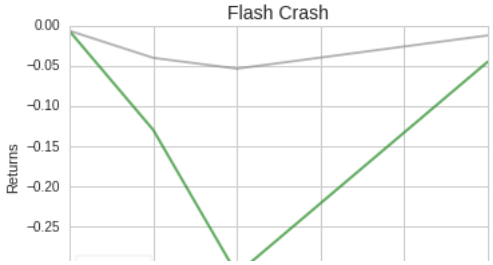

Aug07
algo
SPY
Returns
0.04
0.02
0.00
−0.02
−0.04
−0.06
−0.08
−0.10
Aug 01 2007
Aug 04 2007
Aug 07 2007
Aug 10 2007
Aug 13 2007
Aug 16 2007
Aug 19 2007
Aug 22 2007
Aug 25 2007
Aug 28 2007
Aug 31 2007

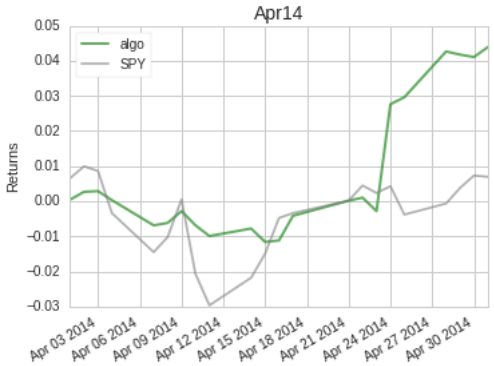

Mar08
algo
SPY
Returns
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
Mar 04 2008
Mar 07 2008
Mar 10 2008
Mar 13 2008
Mar 16 2008
Mar 19 2008
Mar 22 2008
Mar 25 2008
Mar 28 2008
Mar 31 2008

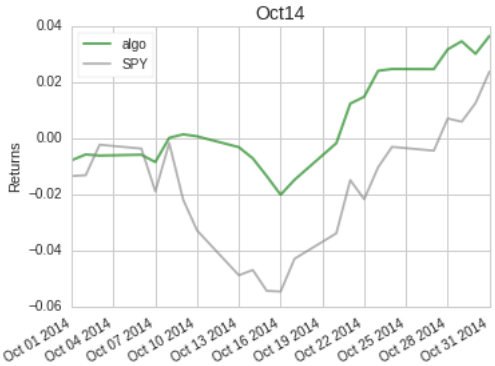

Sept08
algo
SPY
Returns
0.0
−0.1
−0.2
−0.3
−0.4
−0.5
Sep 03 2008
Sep 06 2008
Sep 09 2008
Sep 12 2008
Sep 15 2008
Sep 18 2008
Sep 21 2008
Sep 24 2008
Sep 27 2008
Sep 30 2008

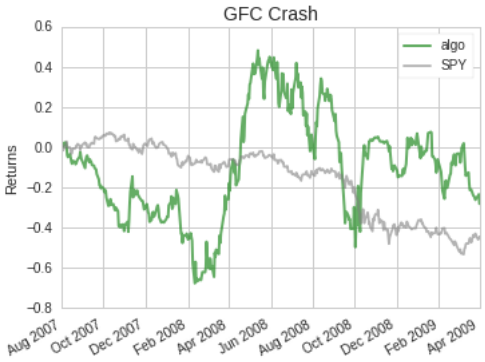

2009Q1
algo
SPY
Returns
0.05
0.00
−0.05
−0.10
−0.15
−0.20
−0.25
−0.30
−0.35
Jan 02 2009
Jan 09 2009
Jan 16 2009
Jan 23 2009
Jan 30 2009
Feb 06 2009
Feb 13 2009
Feb 20 2009
Feb 27 2009

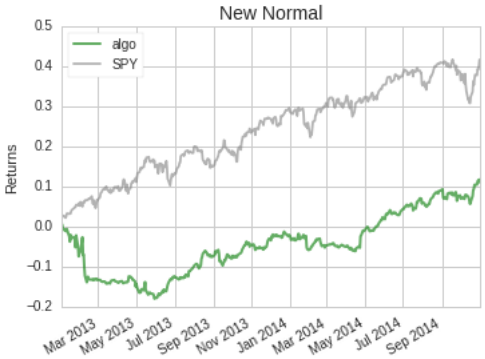

2009Q2
algo
SPY
Returns
0.2
0.0
−0.2
−0.4


Flash Crash
Returns
0.00
−0.05
−0.10
−0.15
−0.20
−0.25







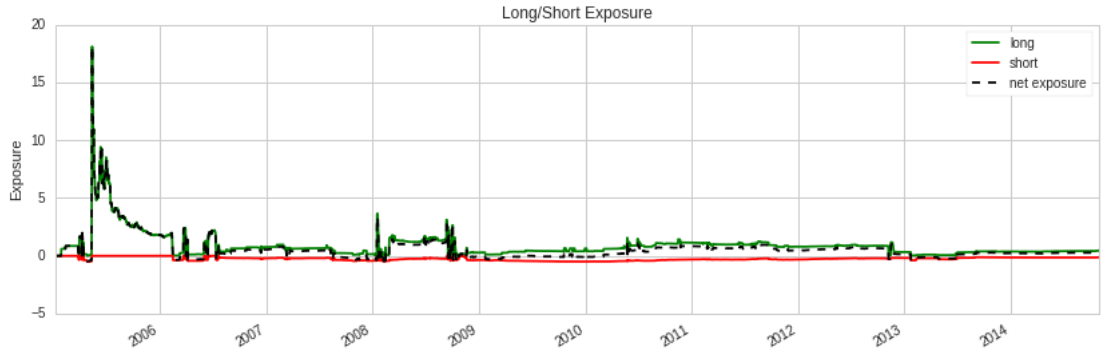


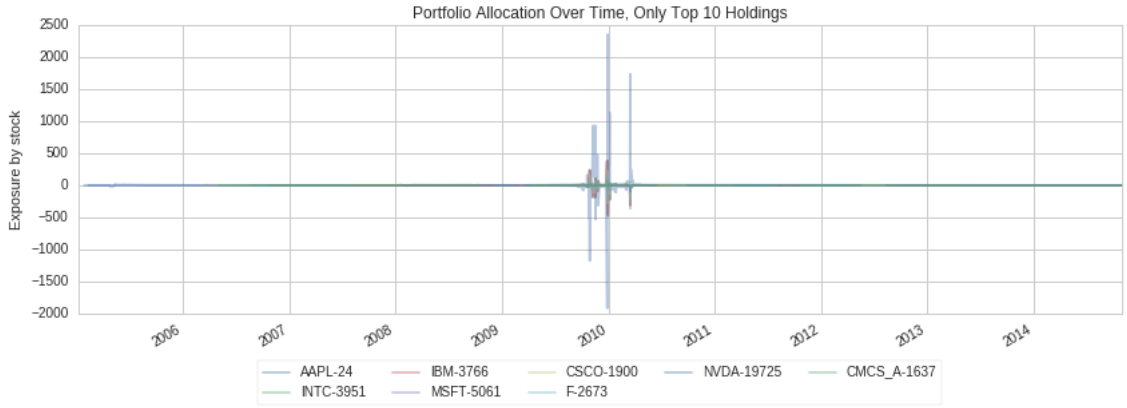
Top 10 long positions of all time	max
AAPL-24	235048.77%
INTC-3951	38846.25%
IBM-3766	38049.16%
MSFT-5061	37758.26%
CSCO-1900	22855.25%
F-2673	17971.89%
CMCS_A-1637	6983.02%
NVDA-19725	1195.98%

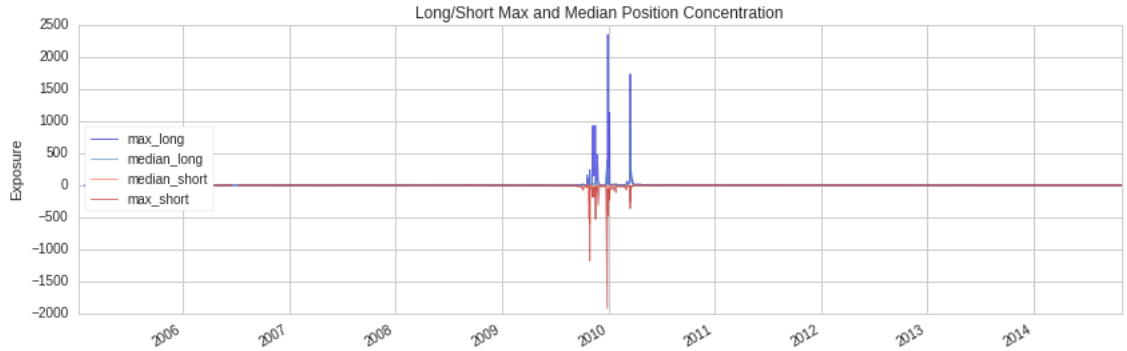
Top 10 short positions of all time	max
AAPL-24	-191816.62%
INTC-3951	-48278.96%
IBM-3766	-46657.32%
MSFT-5061	-45879.21%
CSCO-1900	-28058.63%
F-2673	-21525.06%
NVDA-19725	-9519.33%
CMCS_A-1637	-5704.57%

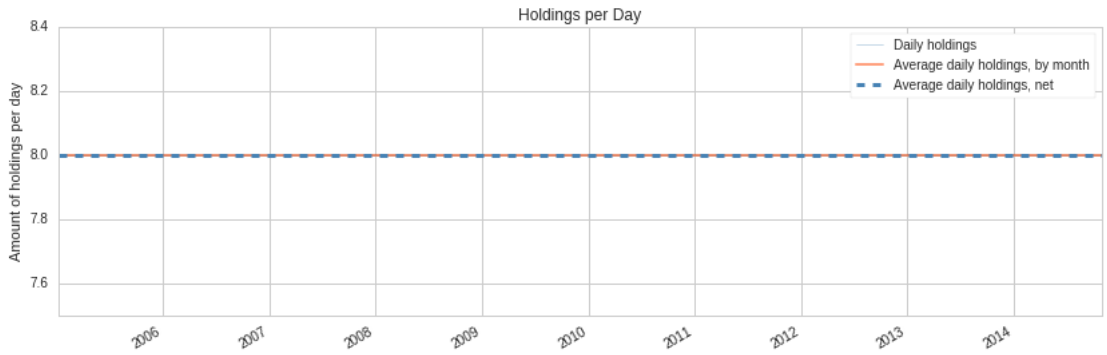
Top 10 positions of all time	max
AAPL-24	235048.77%
INTC-3951	48278.96%
IBM-3766	46657.32%
MSFT-5061	45879.21%
CSCO-1900	28058.63%
F-2673	21525.06%
NVDA-19725	9519.33%
CMCS_A-1637	6983.02%

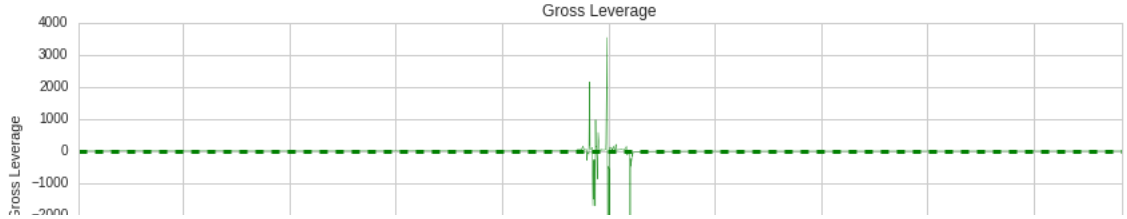
All positions ever held	max
AAPL-24	235048.77%
INTC-3951	48278.96%
IBM-3766	46657.32%
MSFT-5061	45879.21%
CSCO-1900	28058.63%
F-2673	21525.06%
NVDA-19725	9519.33%
CMCS_A-1637	6983.02%

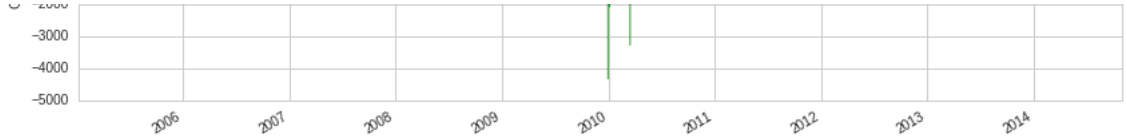

Long/Short Exposure
long
short
net exposure
Exposure
20
15
10
5
0
−5
2006
2007
2008
2009
2010
2011
2012
2013
2014

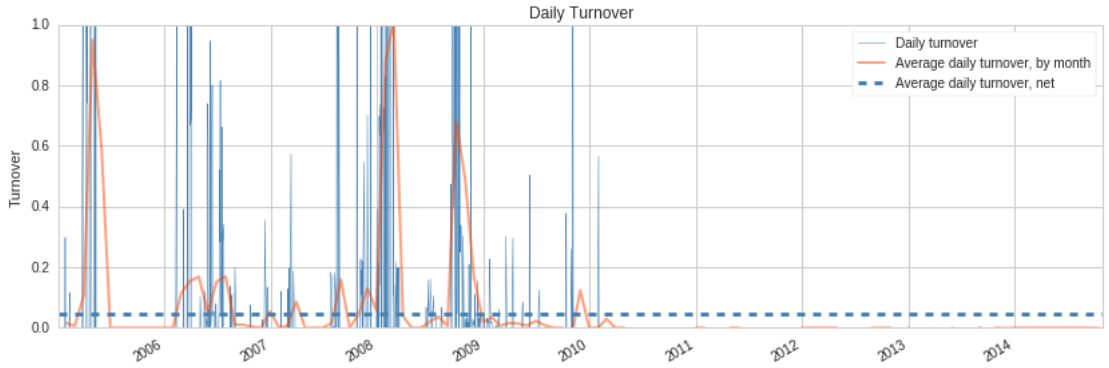

Portfolio Allocation Over Time, Only Top 10 Holdings
Exposure by stock
2500
2000
1500
1000
500
0
−500
−1000
−1500
−2000
2006
2007
2008
2009
2010
2011
2012
2013
2014
AAPL-24
IBM-3766
CSCO-1900
NVDA-19725
CMCS_A-1637
INTC-3951
MSFT-5061
F-2673

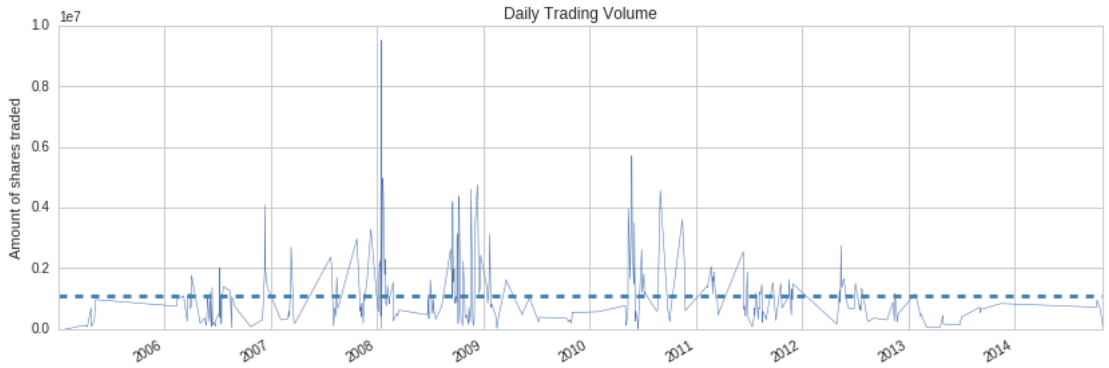

Long/Short Max and Median Position Concentration
Exposure
max_long
median_long
median_short
max_short
2500
2000
1500
1000
500
0
−500
−1000
−1500
−2000
2006
2007
2008
2009
2010
2011
2012
2013
2014

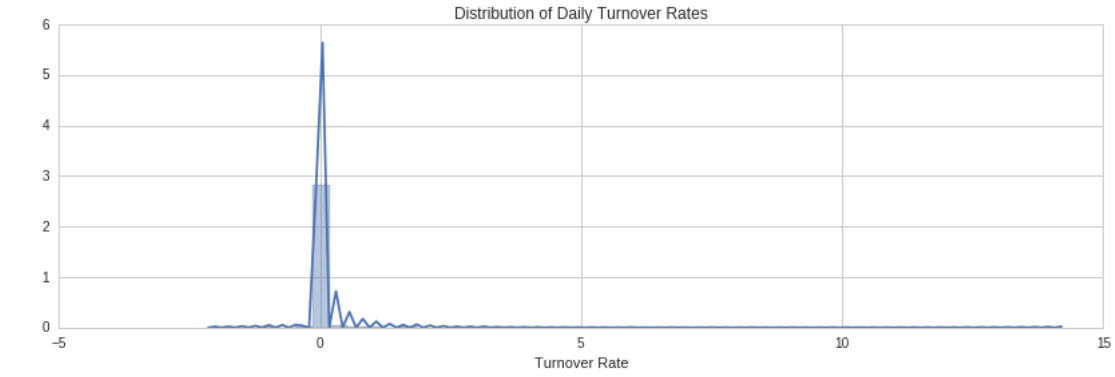

Holdings per Day
Amount of holdings per day
Daily holdings
Average daily holdings, by month
Average daily holdings, net
8.4
8.2
8.0
7.8
7.6
2006
2007
2008
2009
2010
2011
2012
2013
2014


Gross Leverage
4000
3000
2000
1000
0
−1000
2006
2007
2008
2009
2010
2011
2012
2013
2014


−3000
−4000
−5000
2006
2007
2008
2009
2010
2011
2012
2013
2014


Daily Turnover
Daily turnover
Average daily turnover, by month
Average daily turnover, net
Turnover
1.0
0.8
0.6
0.4
0.2
0.0
2006
2007
2008
2009
2010
2011
2012
2013
2014


Daily Trading Volume
1e7
Amount of shares traded
1.0
0.8
0.6
0.4
0.2
0.0
2006
2007
2008
2009
2010
2011
2012
2013
2014


Distribution of Daily Turnover Rates
6
5
4
3
2
1
0
−5
0
5
10
15
Turnover Rate

2005-2006

In [2]:
```
# Get backtest object
bt = get_backtest('581cca58736fa910735756de')

# Create all tear sheets
bt.create_full_tear_sheet()
```

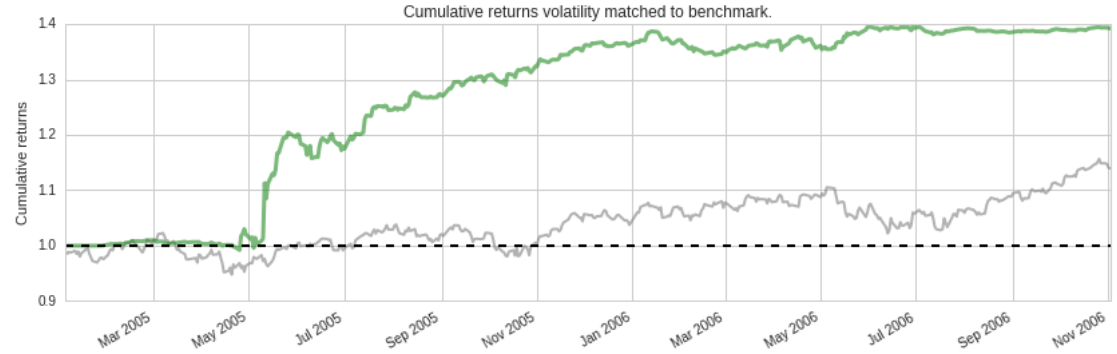
```
100% Time: 0:00:02|###########################################################|
Entire data start date: 2005-01-04
Entire data end date: 2006-11-02


Backtest Months: 22
```

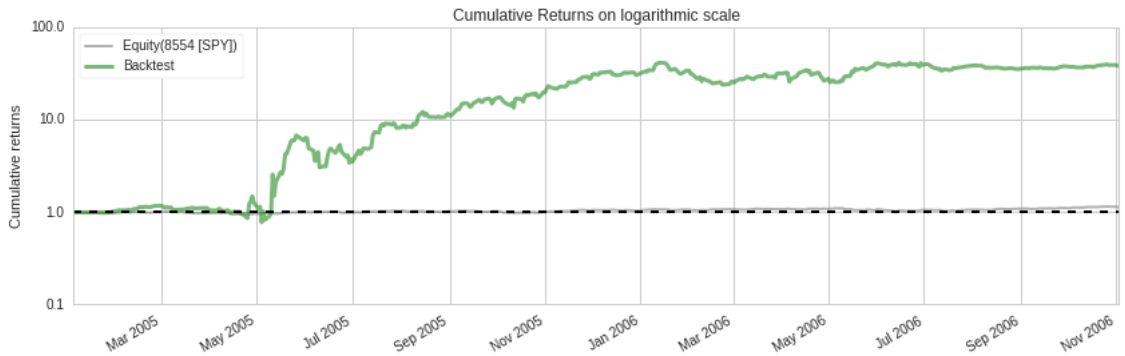
Performance statistics	Backtest
annual_return	6.31
annual_volatility	1.72
sharpe_ratio	1.80
calmar_ratio	11.48
stability_of_timeseries	0.80
max_drawdown	-0.55
omega_ratio	1.72
sortino_ratio	4.33
skew	7.73
kurtosis	111.77
tail_ratio	1.33
common_sense_ratio	9.72
information_ratio	0.11
alpha	2.94
beta	1.97

Worst Drawdown Periods	net drawdown in %	peak date	valley date	recovery date	duration
0	55.00	2005-05-26	2005-06-10	2005-07-15	37
1	47.86	2005-04-28	2005-05-04	2005-05-11	10
2	42.56	2006-01-13	2006-02-23	NaT	NaN
3	41.39	2005-05-11	2005-05-12	2005-05-16	4
4	26.76	2005-02-28	2005-04-25	2005-04-26	42

```
[-0.205 -0.424]
```

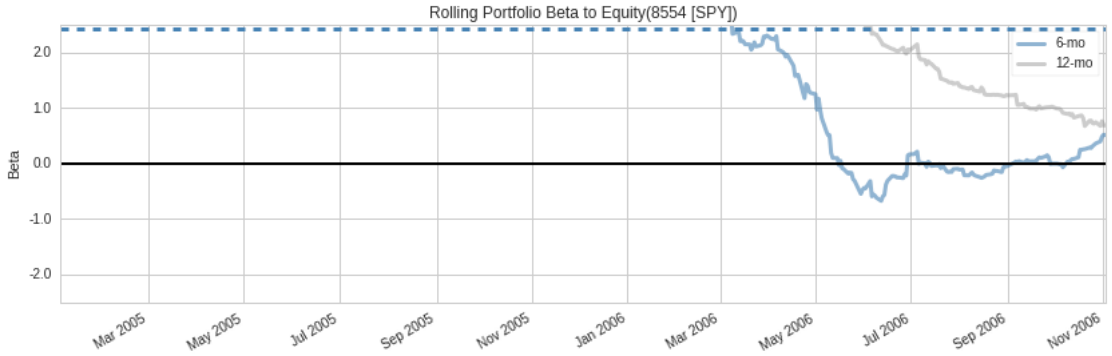

Cumulative Returns
Equity(8554 [SPY])
Backtest
Cumulative returns
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

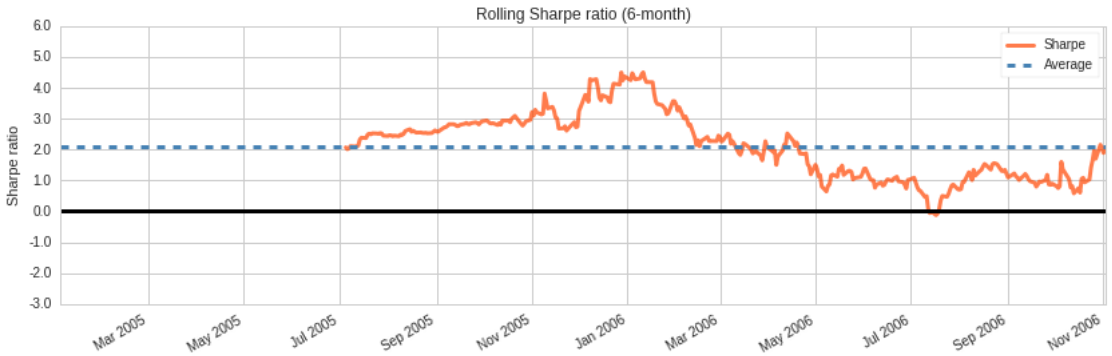

Cumulative returns volatility matched to benchmark.
Cumulative returns
1.4
1.3
1.2
1.1
1.0
0.9
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

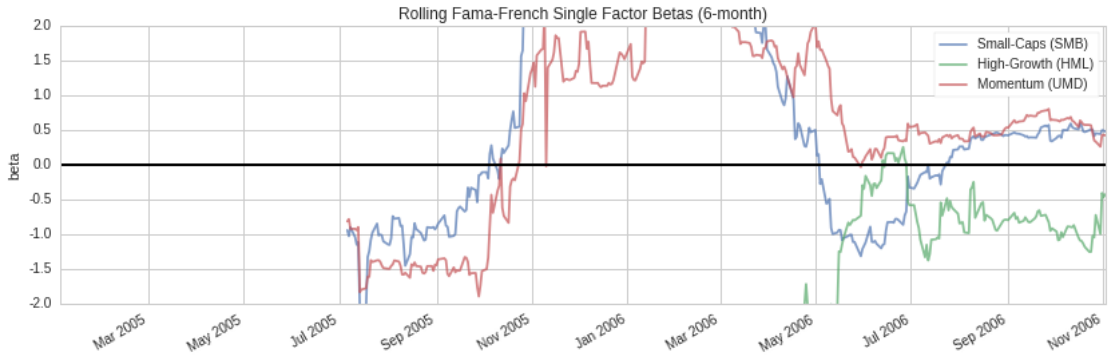

Cumulative Returns on logarithmic scale
Equity(8554 [SPY])
Backtest
Cumulative returns
100.0
10.0
1.0
0.1
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

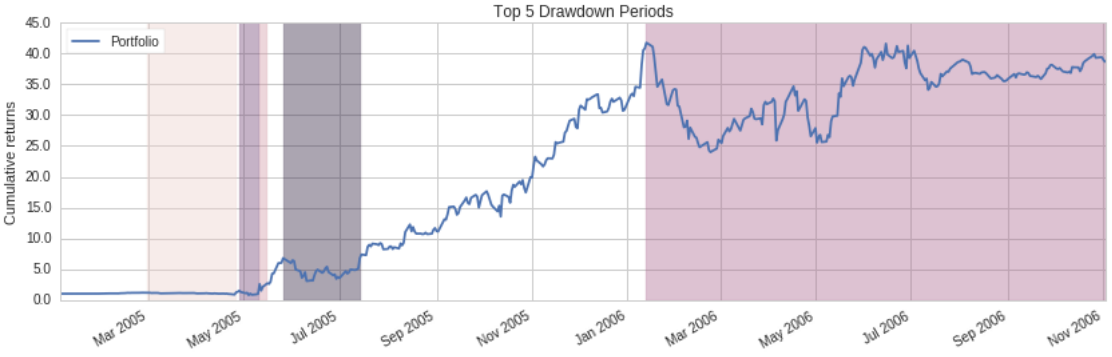

Returns
Returns
2.0
1.5
1.0
0.5
0.0

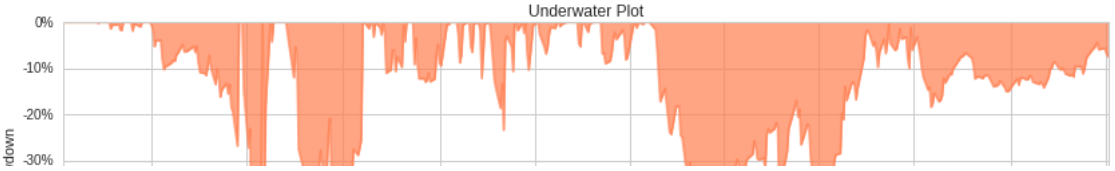

-0.5
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

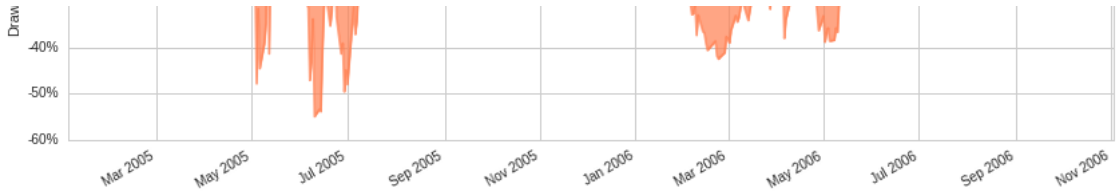

Rolling Portfolio Beta to Equity(8554 [SPY])
6-mo
12-mo
Beta
2.0
1.0
0.0
-1.0
-2.0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

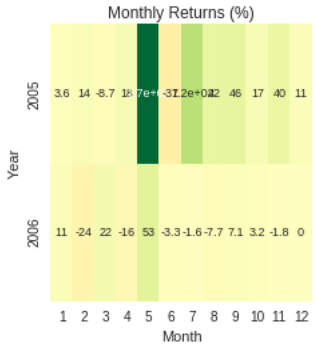

Rolling Sharpe ratio (6-month)
Sharpe
Average
Sharpe ratio
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

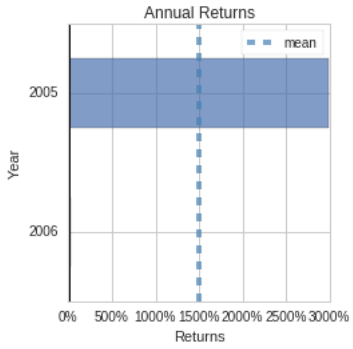

Rolling Fama-French Single Factor Betas (6-month)
Small-Caps (SMB)
High-Growth (HML)
Momentum (UMD)
beta
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

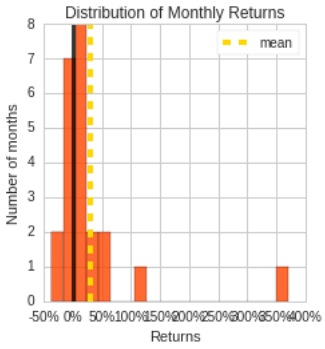

Top 5 Drawdown Periods
Portfolio
Cumulative returns
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

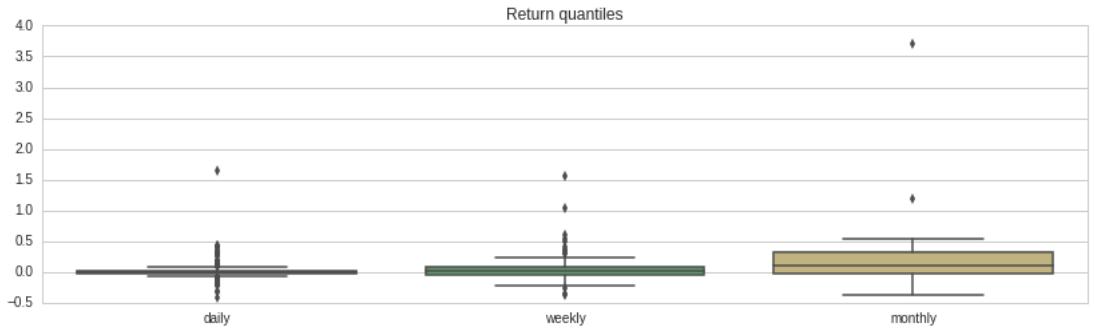

Underwater Plot
0%
-10%
-20%
-30%



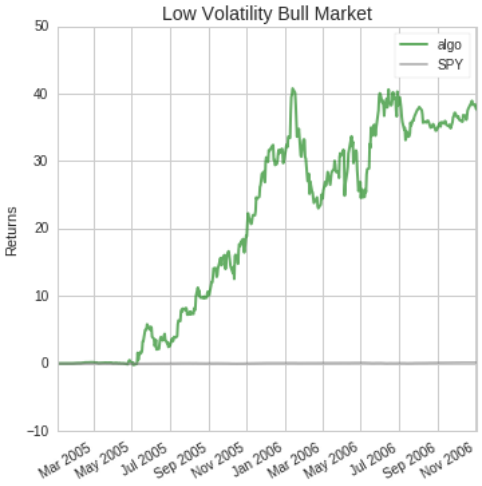








Stress Events	mean	min	max
Low Volatility Bull Market	1.23%	-41.39%	164.44%

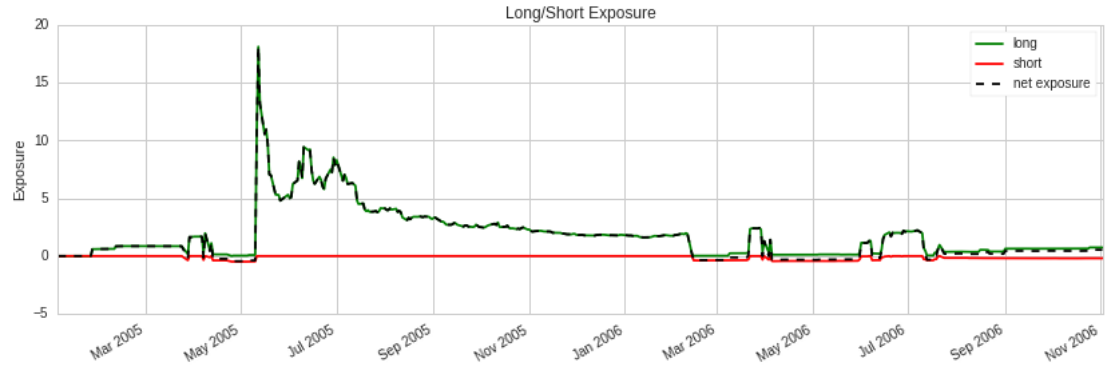


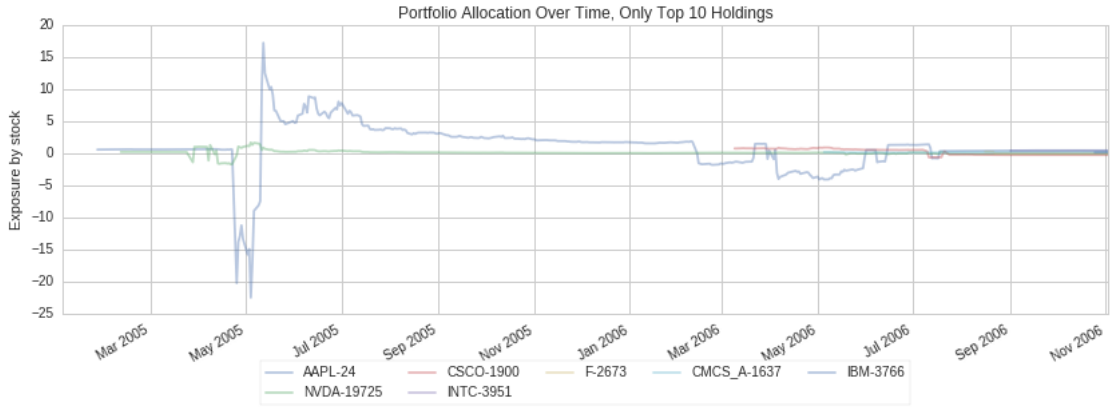
Top 10 long positions of all time	max
AAPL-24	1723.75%
NVDA-19725	169.88%
CSCO-1900	91.77%
INTC-3951	41.84%
F-2673	27.92%
CMCS_A-1637	21.01%
IBM-3766	15.40%

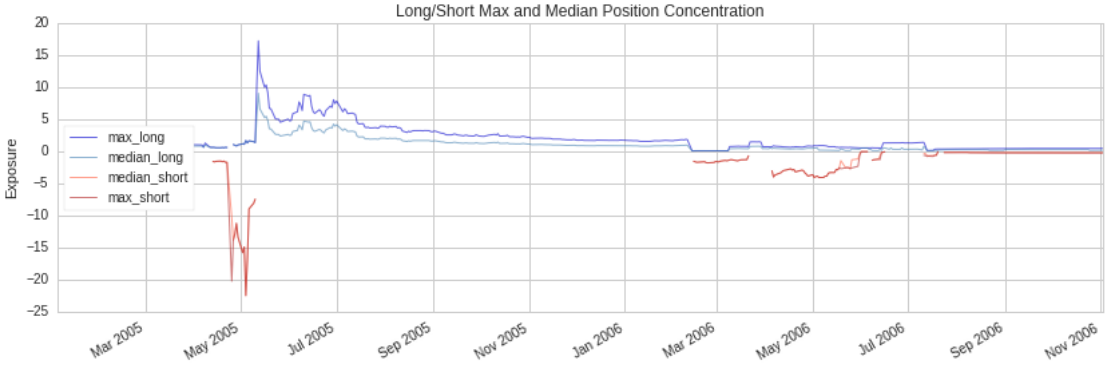
Top 10 short positions of all time	max
AAPL-24	-2247.69%
NVDA-19725	-169.44%
CSCO-1900	-62.83%

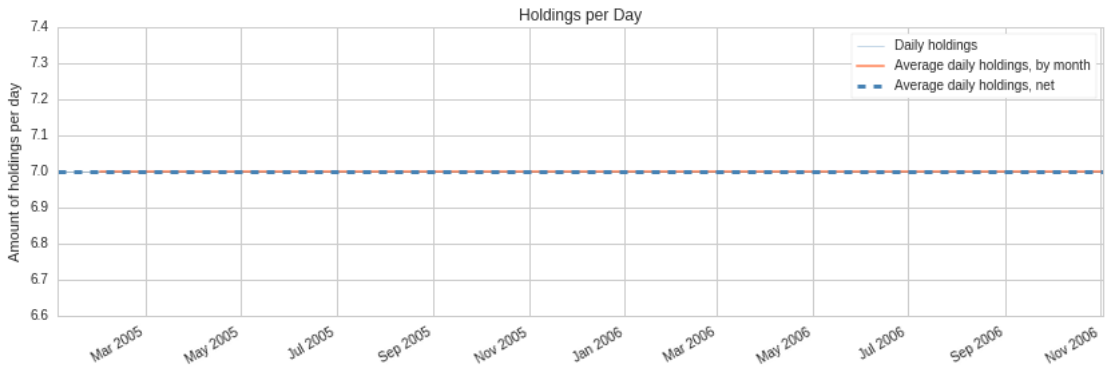
Top 10 positions of all time	max
AAPL-24	2247.69%
NVDA-19725	169.88%
CSCO-1900	91.77%
INTC-3951	41.84%
F-2673	27.92%
CMCS_A-1637	21.01%
IBM-3766	15.40%

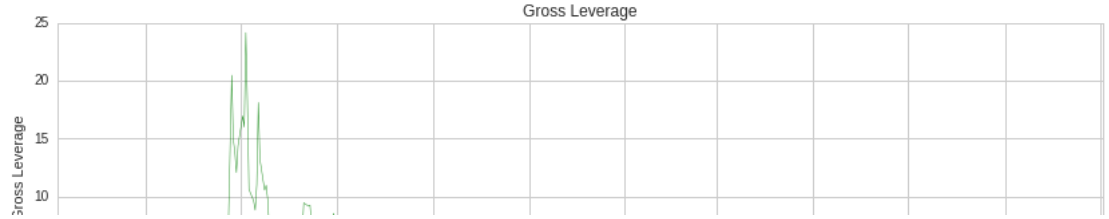
All positions ever held	max
AAPL-24	2247.69%
NVDA-19725	169.88%
CSCO-1900	91.77%
INTC-3951	41.84%
F-2673	27.92%
CMCS_A-1637	21.01%
IBM-3766	15.40%

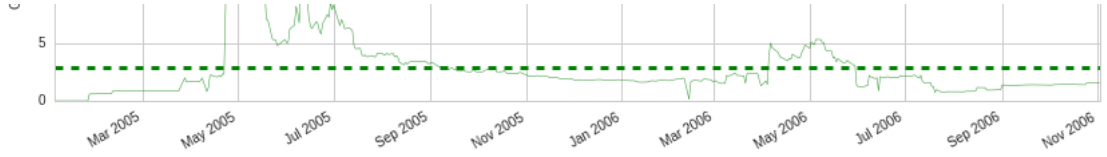

Long/Short Exposure
long
short
net exposure
Exposure
20
15
10
5
0
−5
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

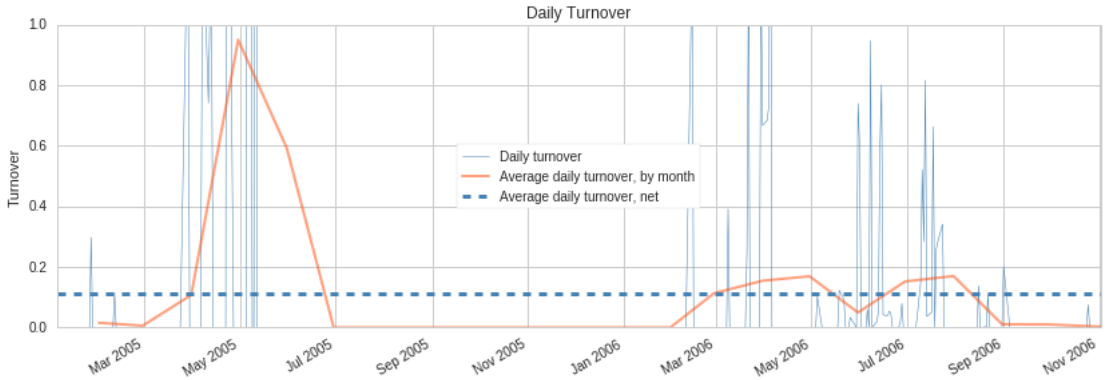

Portfolio Allocation Over Time, Only Top 10 Holdings
Exposure by stock
20
15
10
5
0
−5
−10
−15
−20
−25
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006
AAPL-24
CSCO-1900
F-2673
CMCS_A-1637
IBM-3766
NVDA-19725
INTC-3951


Long/Short Max and Median Position Concentration
Exposure
max_long
median_long
median_short
max_short
20
15
10
5
0
−5
−10
−15
−20
−25
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006

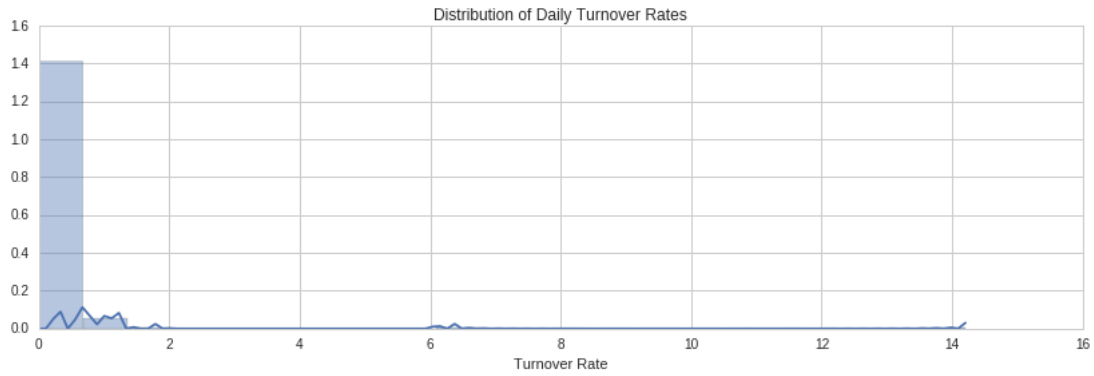

Holdings per Day
Amount of holdings per day
Daily holdings
Average daily holdings, by month
Average daily holdings, net
7.4
7.3
7.2
7.1
7.0
6.9
6.8
6.7
6.6
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006


Gross Leverage
25
20
15
10


5
0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006


Daily Turnover
Turnover
1.0
0.8
0.6
0.4
0.2
0.0
Daily turnover
Average daily turnover, by month
Average daily turnover, net
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006


Daily Trading Volume
Amount of shares traded
2500000
2000000
1500000
1000000
500000
0
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
Jan 2006
Mar 2006
May 2006
Jul 2006
Sep 2006
Nov 2006


Distribution of Daily Turnover Rates
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
Turnover Rate

2016-2016

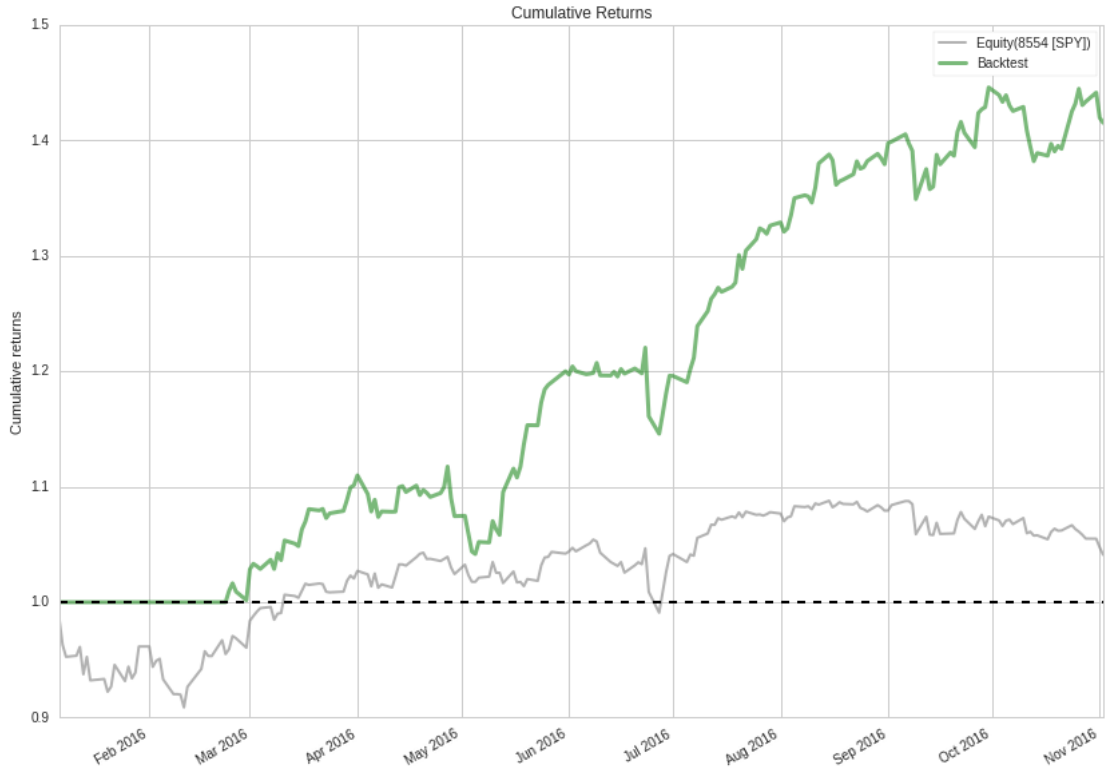
In [3]:
```
# Get backtest object
bt = get_backtest('581c7464a4da41132b55447b')

# Create all tear sheets
bt.create_full_tear_sheet()
```

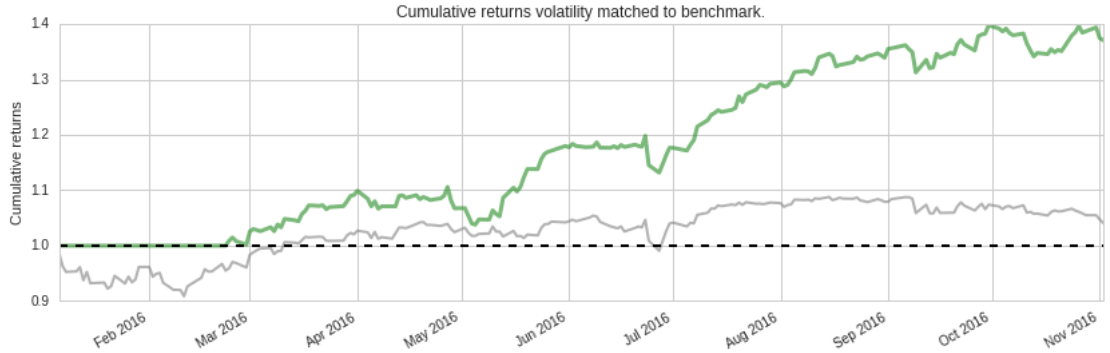
```
100% Time: 0:00:00|###########################################################|
Entire data start date: 2016-01-04
Entire data end date: 2016-11-02


Backtest Months: 10
```

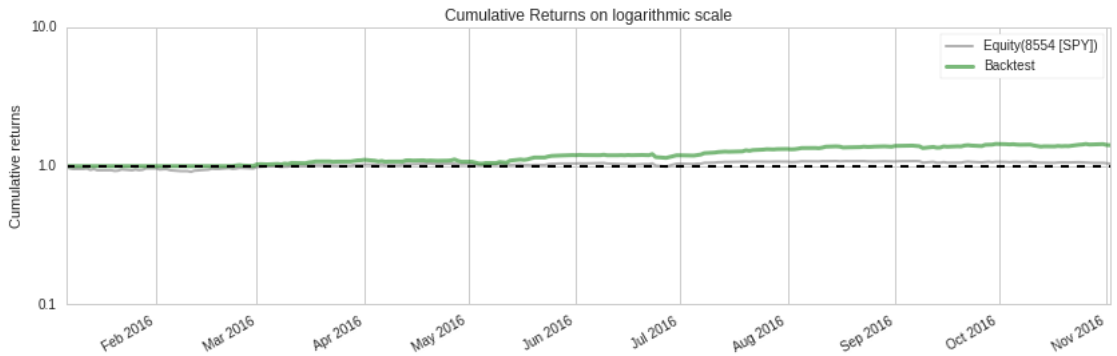
Performance statistics	Backtest
annual_return	0.51
annual_volatility	0.15
sharpe_ratio	2.83
calmar_ratio	7.54
stability_of_timeseries	0.95
max_drawdown	-0.07
omega_ratio	1.70
sortino_ratio	4.48
skew	-0.46
kurtosis	4.27
tail_ratio	1.32
common_sense_ratio	1.99
information_ratio	0.18
alpha	0.39
beta	0.64

Worst Drawdown Periods	net drawdown in %	peak date	valley date	recovery date	duration
0	6.78	2016-04-27	2016-05-05	2016-05-19	17
1	6.11	2016-06-23	2016-06-27	2016-07-08	12
2	4.42	2016-09-30	2016-10-13	NaT	NaN
3	3.99	2016-09-06	2016-09-09	2016-09-21	12
4	3.25	2016-04-01	2016-04-07	2016-04-27	19

```
[-0.017 -0.033]
```

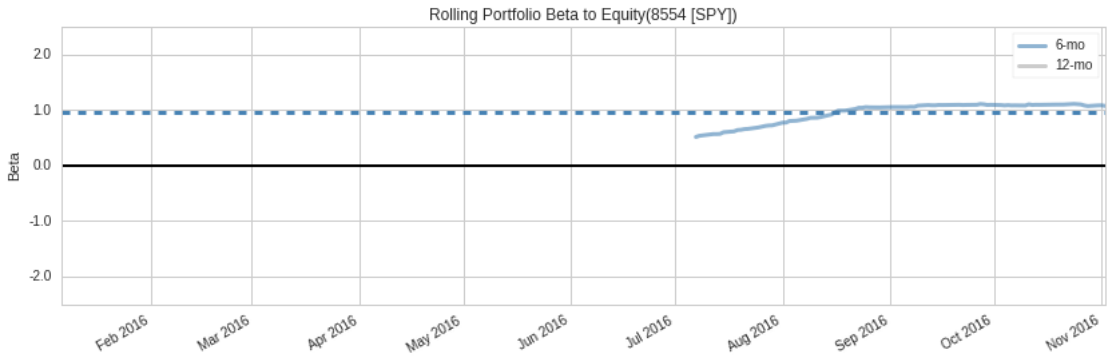

Cumulative Returns
Equity(8554 [SPY])
Backtest
Cumulative returns
1.5
1.4
1.3
1.2
1.1
1.0
0.9
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

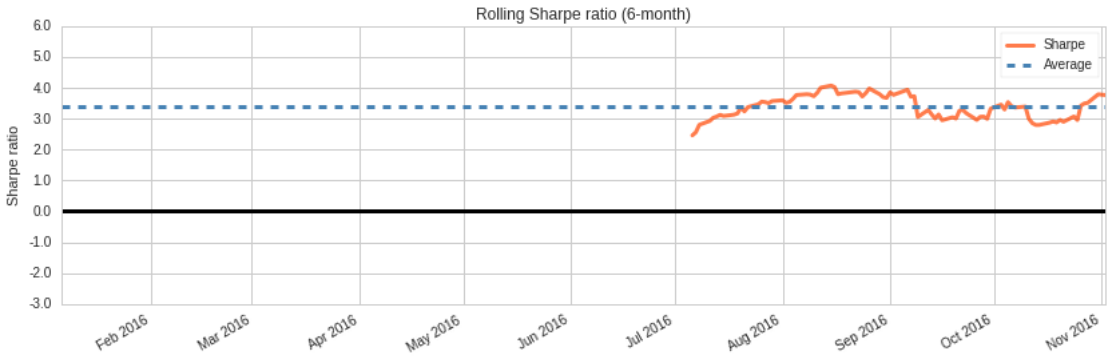

Cumulative returns volatility matched to benchmark.
Cumulative returns
1.4
1.3
1.2
1.1
1.0
0.9
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

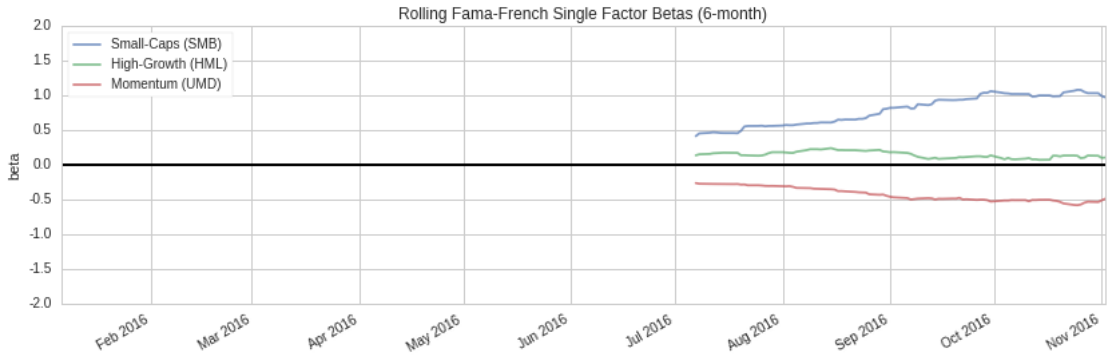

Cumulative Returns on logarithmic scale
Equity(8554 [SPY])
Backtest
Cumulative returns
10.0
1.0
0.1
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

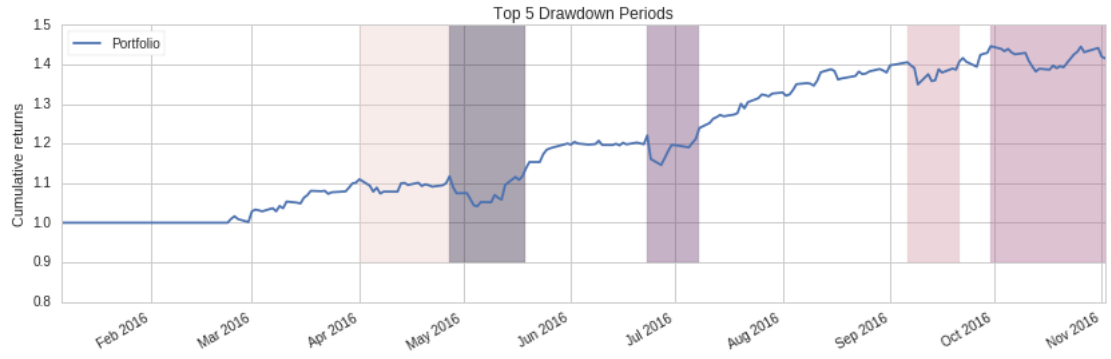

Returns
Returns
0.04
0.02
0.00
-0.02
-0.04

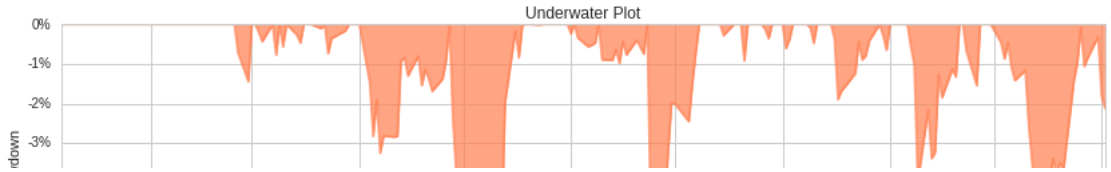

Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

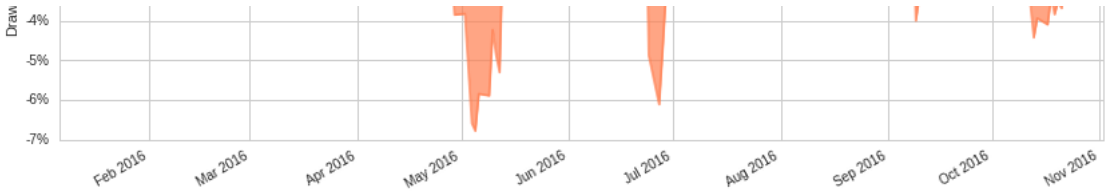

Rolling Portfolio Beta to Equity(8554 [SPY])
6-mo
12-mo
Beta
2.0
1.0
0.0
-1.0
-2.0
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

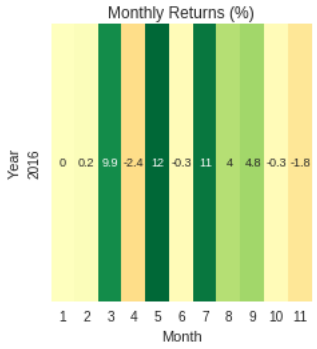

Rolling Sharpe ratio (6-month)
Sharpe
Average
Sharpe ratio
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

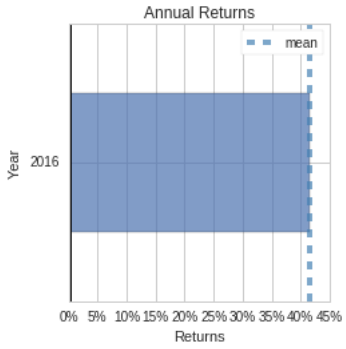

Rolling Fama-French Single Factor Betas (6-month)
Small-Caps (SMB)
High-Growth (HML)
Momentum (UMD)
beta
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

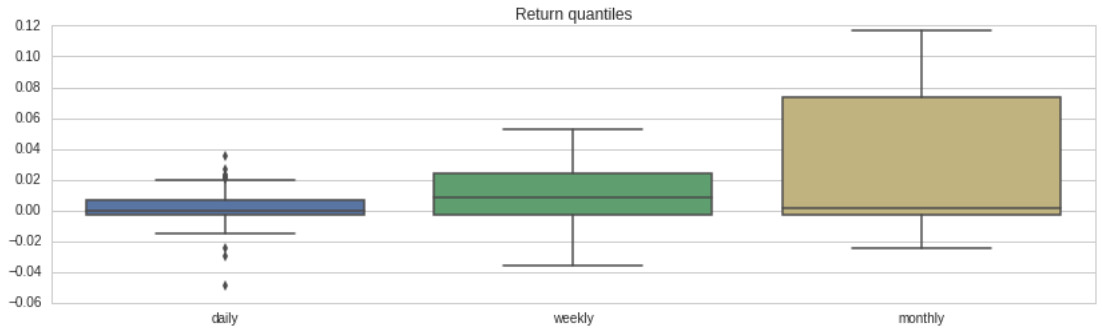

Top 5 Drawdown Periods
Portfolio
Cumulative returns
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016


Underwater Plot
0%
-1%
-2%
-3%

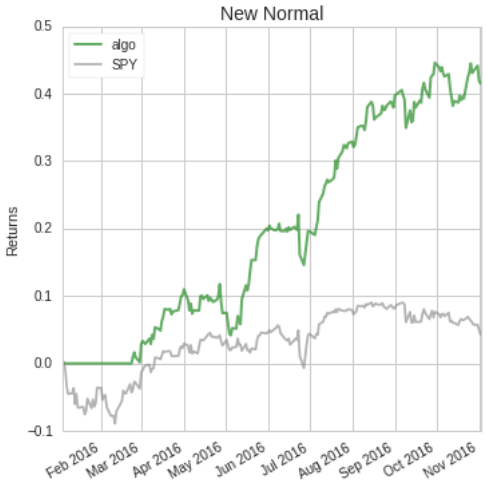








Stress Events	mean	min	max
New Normal	0.17%	-4.87%	3.50%

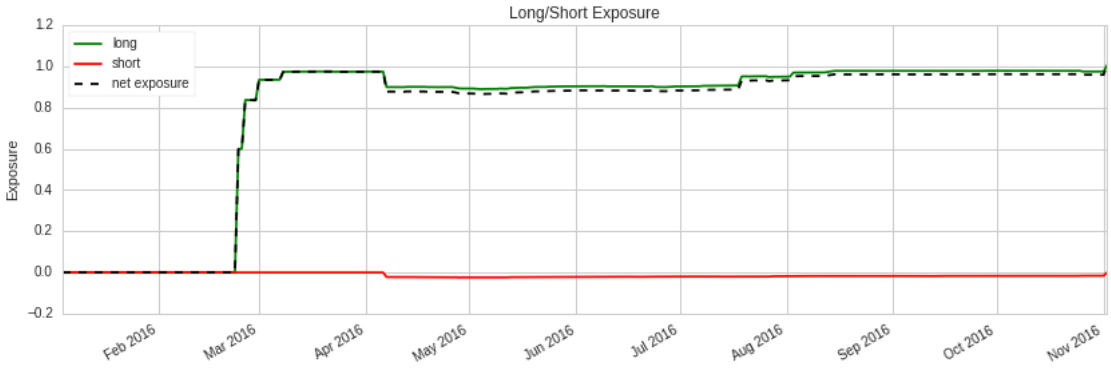


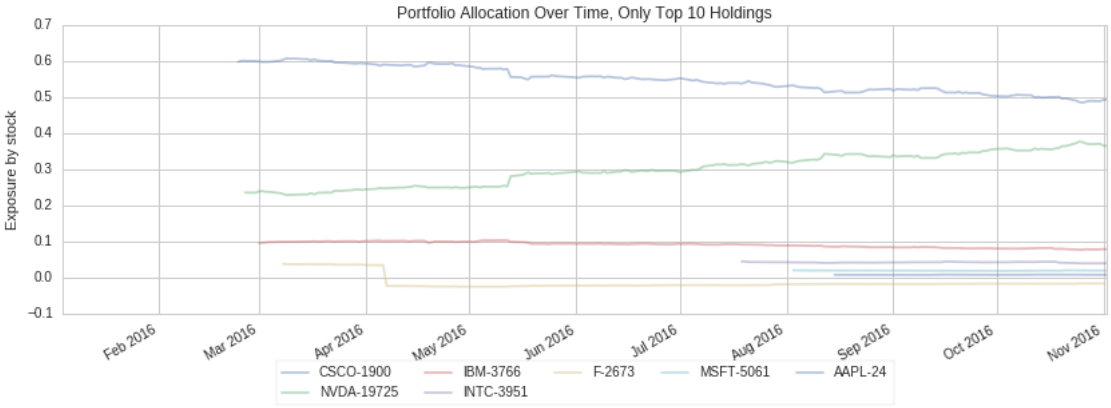
Top 10 long positions of all time	max
CSCO-1900	60.84%
NVDA-19725	37.73%
IBM-3766	10.37%
INTC-3951	4.51%
F-2673	3.81%
MSFT-5061	2.04%
AAPL-24	0.86%

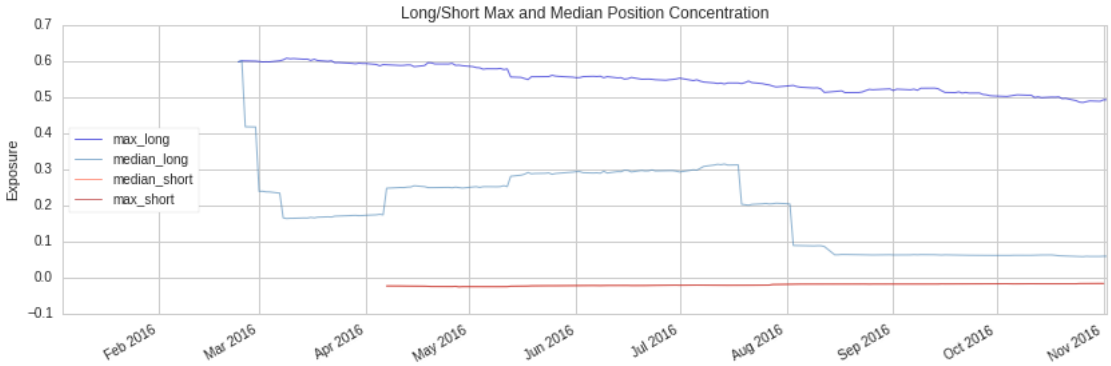
Top 10 short positions of all time	max
F-2673	-2.53%

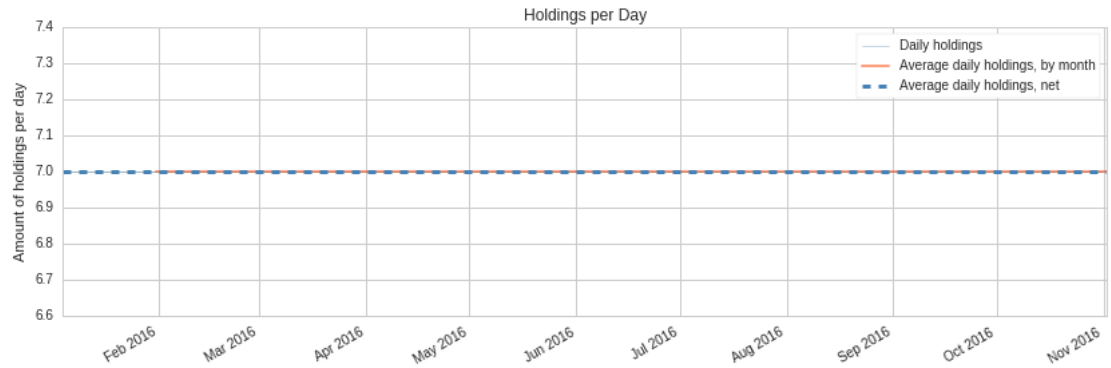
Top 10 positions of all time	max
CSCO-1900	60.84%
NVDA-19725	37.73%
IBM-3766	10.37%
INTC-3951	4.51%
F-2673	3.81%
MSFT-5061	2.04%
AAPL-24	0.86%

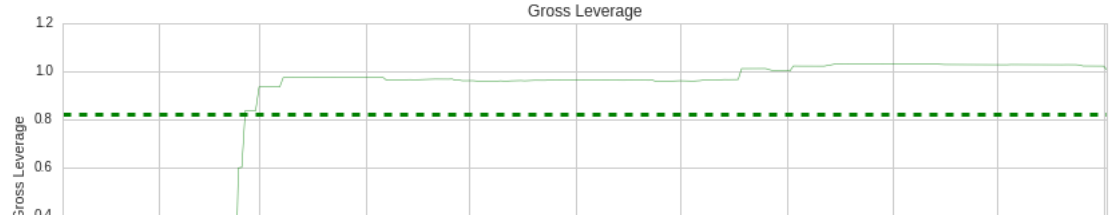
All positions ever held	max
CSCO-1900	60.84%
NVDA-19725	37.73%
IBM-3766	10.37%
INTC-3951	4.51%
F-2673	3.81%
MSFT-5061	2.04%
AAPL-24	0.86%


Long/Short Exposure
long
short
net exposure
Exposure
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

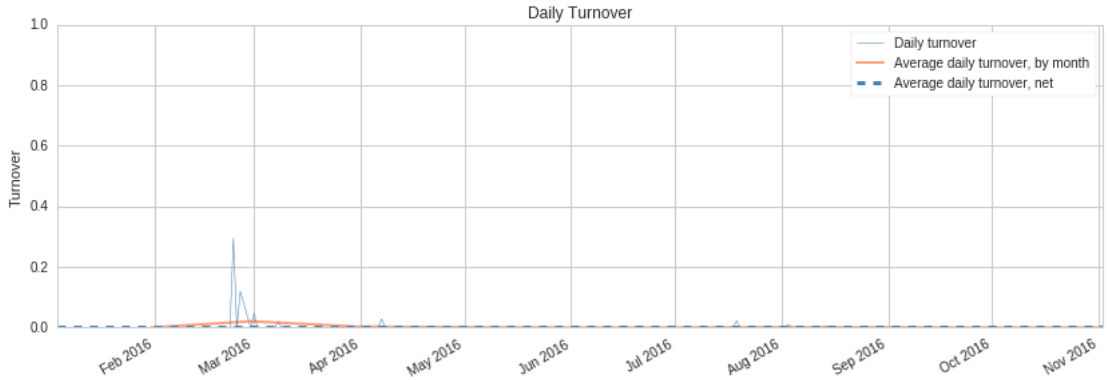

Portfolio Allocation Over Time, Only Top 10 Holdings
Exposure by stock
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016
CSCO-1900
IBM-3766
F-2673
MSFT-5061
AAPL-24
NVDA-19725
INTC-3951

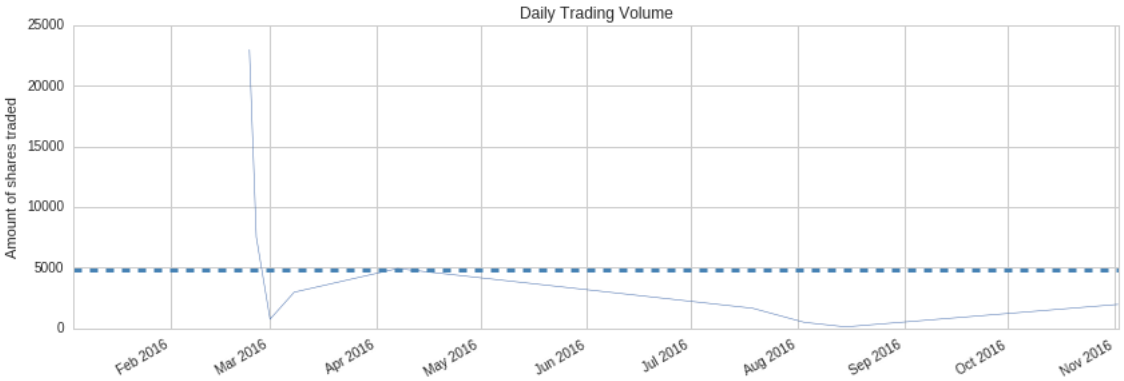

Long/Short Max and Median Position Concentration
Exposure
max_long
median_long
median_short
max_short
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016

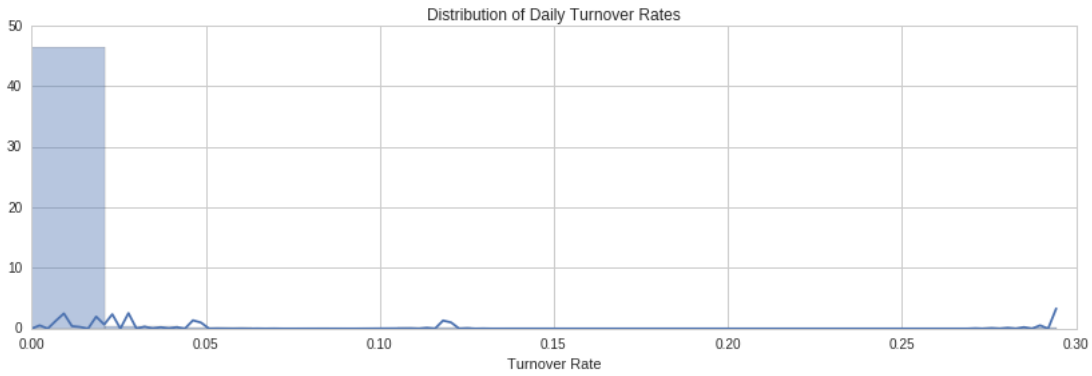

Holdings per Day
Amount of holdings per day
Daily holdings
Average daily holdings, by month
Average daily holdings, net
7.4
7.3
7.2
7.1
7.0
6.9
6.8
6.7
6.6
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016


Gross Leverage
1.2
1.0
0.8
0.6


0.4
0.2
0.0
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016


Daily Turnover
Daily turnover
Average daily turnover, by month
Average daily turnover, net
Turnover
1.0
0.8
0.6
0.4
0.2
0.0
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016


Daily Trading Volume
Amount of shares traded
25000
20000
15000
10000
5000
0
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016


Distribution of Daily Turnover Rates
50
40
30
20
10
0
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Turnover Rate