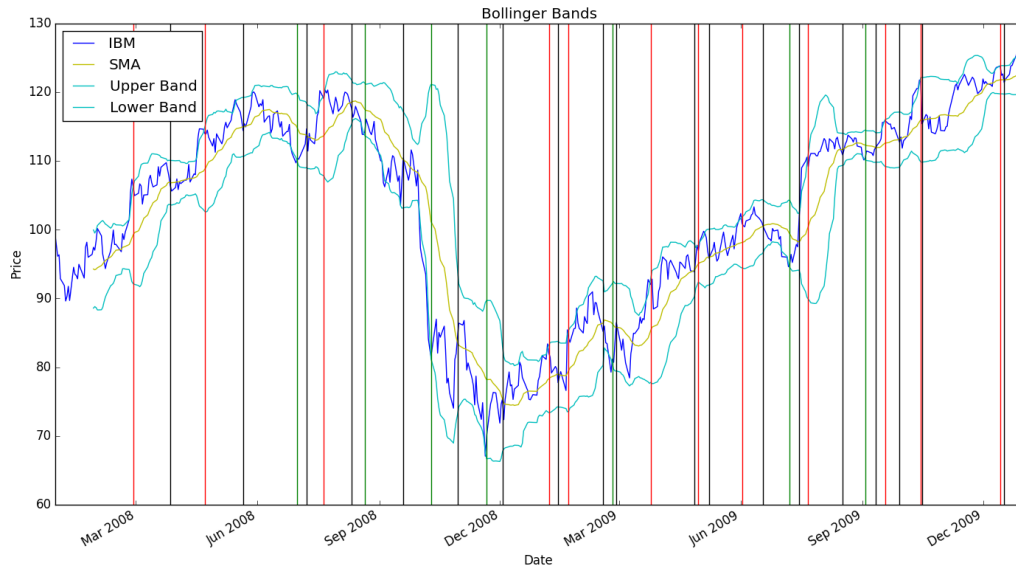


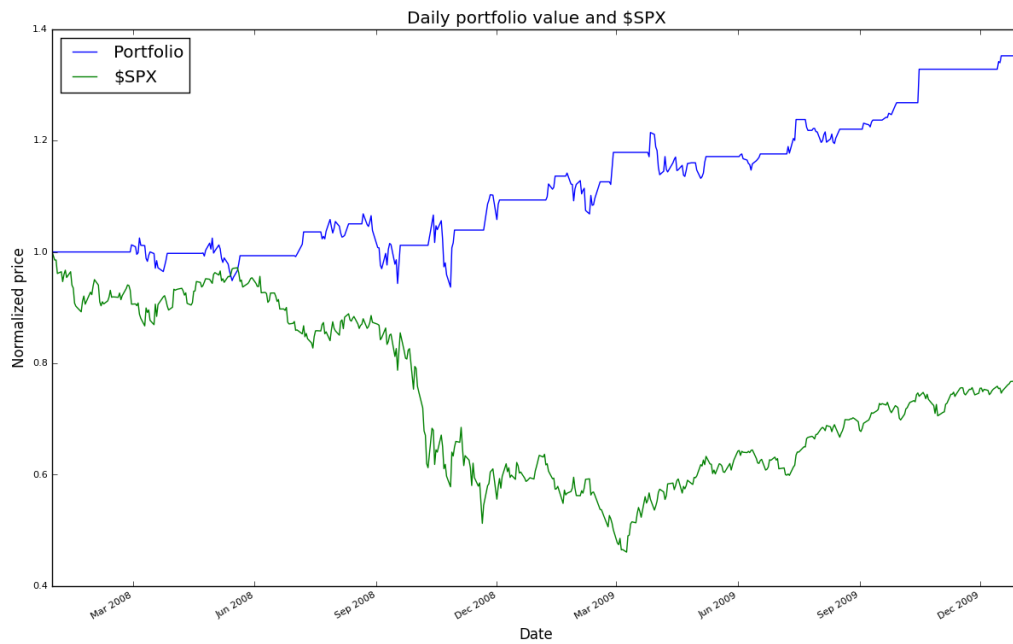
Mark Trinquero

PART I: Bollinger Band Strategy

Bollinger Band Strategy Chart



Bollinger Band Strategy Back-Test Chart



Summary of Bollinger Band Back-Test Performance Metrics

Data Range: 2007-12-31 to 2009-12-31
Sharpe Ratio of Fund: 0.97745615082
Sharpe Ratio of \$SPX: -0.21996865409
Cumulative Return of Fund: 0.3614
Cumulative Return of \$SPX: -0.240581328829
Standard Deviation of Fund: 0.0108802922269
Standard Deviation of \$SPX: 0.0219524869863
Average Daily Return of Fund: 0.000669942567631
Average Daily Return of \$SPX: -0.000304189525556
Final Portfolio Value: 13614.0

Screenshot from terminal output

```
Marks-MacBook-Air:mc2_p2 trinquero$ python -m bollinger_st
Data Range: 2007-12-31 to 2009-12-31

Sharpe Ratio of Fund: 0.97745615082
Sharpe Ratio of $SPX: -0.21996865409

Cumulative Return of Fund: 0.3614
Cumulative Return of $SPX: -0.240581328829

Standard Deviation of Fund: 0.0108802922269
Standard Deviation of $SPX: 0.0219524869863

Average Daily Return of Fund: 0.000669942567631
Average Daily Return of $SPX: -0.000304189525556

Final Portfolio Value: 13614.0
```

PART II: “My Strategy”

Description: I decided to expand upon the Bollinger Band strategy from Part I by adding additional indicators to track. After looking through the available data, I choose to add SPY and MSFT to serve as the basis for the new indicators. The goal was to supplement my IBM trading strategy from the previous section with consideration of SPY and MSFT’s Bollinger values. While evaluating strategies I sought to improve overall portfolio return while maintaining a reasonable Sharpe Ratio. Trade volume (# of shares bought/sold) and timescales were adjusted based on my judgment of the technical and fundamental ‘value’ of the indicator in question. Details for each indicator have been provided below.

IBM Indicator (same strategy as Part 1)

- Rolling Window = 20 days
- Trade Execution Volume = 100 shares (shorts & longs)

Supplemental Indicator 1: ‘SPY’ (SnP500) was selected to account for overall market movements. My reasoning to include SPY was that it would be a good basis for overall market movements and could help identify large-scale trends such as market expansions and contractions. Since in my eyes, IBM and SPY are not fundamentally correlated, I decided to only trigger shorts on IBM using this indicator. This allowed me to hedge against large downward market movements, but keep my strategy unaffected during upward market movements.

- Rolling Window = 18 days.
 - The goal of this adjustment was to trigger shorts slightly before IBM’s 20 day window would register similar movements
- Trade Execution Volume = 500 shares (shorts only)*
 - Shorts only to hedge against large downward market movements

Supplemental Indicator 2: ‘MSFT’ (Microsoft) was selected to serve as a proxy for the Tech sector as a whole. My reasoning to include MSFT was partially due to its similar in nature to IBM and partially due to its market share, allowing it to serve as a good proxy for the technology sector. I treated MSFT and IBM as being fundamentally correlated and therefore wanted to capture any significant upward or downward movements they experienced. I decided to trigger both longs and shorts of IBM based on Microsoft’s movements. Since IBM is a part of the technology sector, and its movements are often correlated to tech sector movements – this would allow me to capture additional ‘information’ in my trading strategy.

- Rolling Window = 10 days
 - I choose to shorten this window because I only wanted to act on short-term tech sector movements. I.e. MSFT beats Q3 earnings and shares jump, as a result pull’s other tech sector stocks up slightly.
- Trade Execution Volume = 500 shares (shorts & longs)
 - Shorts and Longs due to similar / comparable nature of MSFT & IBM

Strategy Comparison:

PART I

Sharpe Ratio of Fund: 0.97745615082

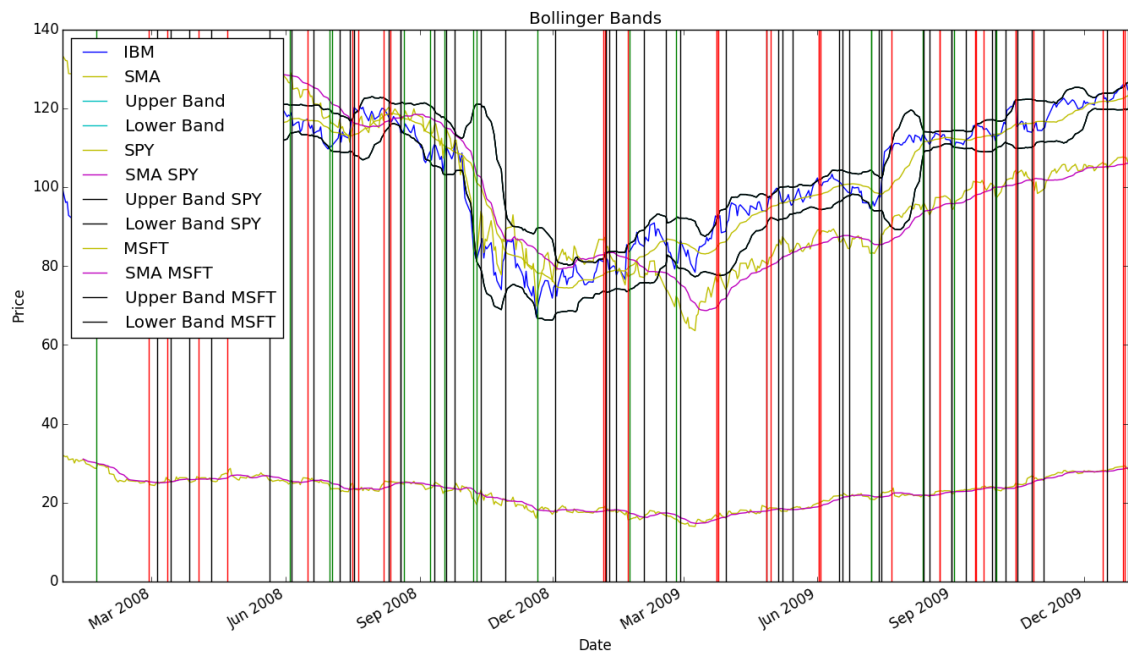
Final Portfolio Value: 13614.0

PART II

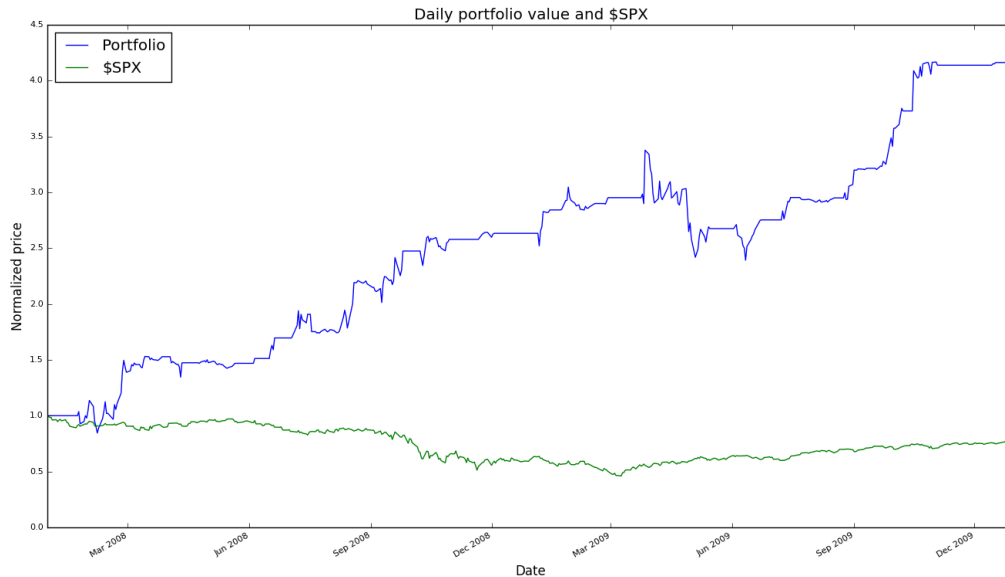
Sharpe Ratio of Fund: 1.83280201483

Final Portfolio Value: 42384.0

“My Strategy” Chart



“My Strategy” Back-Test Chart



Summary of “My Strategy” Back-Test Performance Metrics

Data Range: 2007-12-31 to 2009-12-31

Sharpe Ratio of Fund: 1.83280201483

Sharpe Ratio of \$SPX: -0.21996865409

Cumulative Return of Fund: 3.2384

Cumulative Return of \$SPX: -0.240581328829

Standard Deviation of Fund: 0.0281585430715

Standard Deviation of \$SPX: 0.0219524869863

Average Daily Return of Fund: 0.00325106358637

Average Daily Return of \$SPX: -0.000304189525556

Final Portfolio Value: 42384.0

Screenshot of PART II Strategy Back Test Metrics

```
Marks-MacBook-Air:mc2_p2 trinquero$ python -m my_strategy
Data Range: 2007-12-31 to 2009-12-31

Sharpe Ratio of Fund: 1.83280201483
Sharpe Ratio of $SPX: -0.21996865409

Cumulative Return of Fund: 3.2384
Cumulative Return of $SPX: -0.240581328829

Standard Deviation of Fund: 0.0281585430715
Standard Deviation of $SPX: 0.0219524869863

Average Daily Return of Fund: 0.00325106358637
Average Daily Return of $SPX: -0.000304189525556

Final Portfolio Value: 42384.0
```