CS7646 Project 8: Strategy Evaluation

Yuxi Chen

ychen3281@gatech.edu

***Abstract*—** This report contains two sections. Section one explains my Manual strategy to trade the JPM stock while given portfolio and parameter constraints. Section two explains the Strategy Learner.

1 MANUAL STRATEGY

1.1 Introduction

My goal is to create a manual strategy to produce the portfolio results that performs better than the benchmark portfolio. With the parameters set to the JPM stock symbol, a time period from January 1, 2008 to December 31, 2009 and $100,000 in cash. Additionally, I am constrained to a max holding of 1000 shares long or short. Therefore, my max stocks traded is constrained to 2000 shares and minimum stocks traded is 0 shares. Each trade has a trading cost of $9.95 and impact of 0.005 on stock price.

1.2 Indicator overview

In project 6, I created five indicators to be used in project 8 for experimentation. These indicators include: Bollinger Band Percentage, Exponential Moving Average, Momentum, Relative Strength Index and Moving Average Convergence/Divergence.

Bollinger Band Percentage indicator uses a lookback period of 20 days, with the upper band set at 100%,indicating overbought, and lower band set at 0%, indicating oversold.

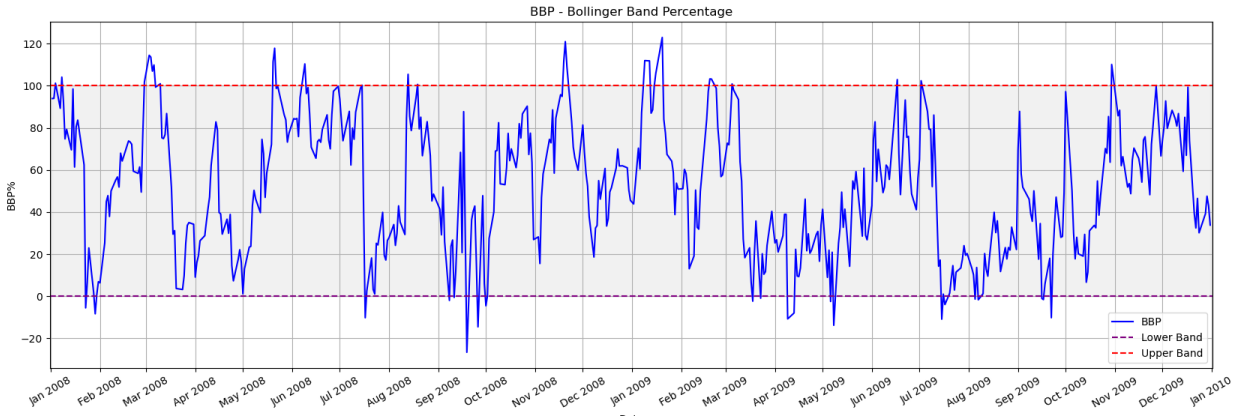

Figure 1 - Bollinger Band Percentage (20 day lookback period)

Exponential Moving Average indicator using a lookback period of 20 days. In EMA the weight of the distribution is on more recent data. In this case, if JPM is greater than the EMA value then that indicates a buy signal and if JPM is less than the EMA value then that indicates a sell signal.

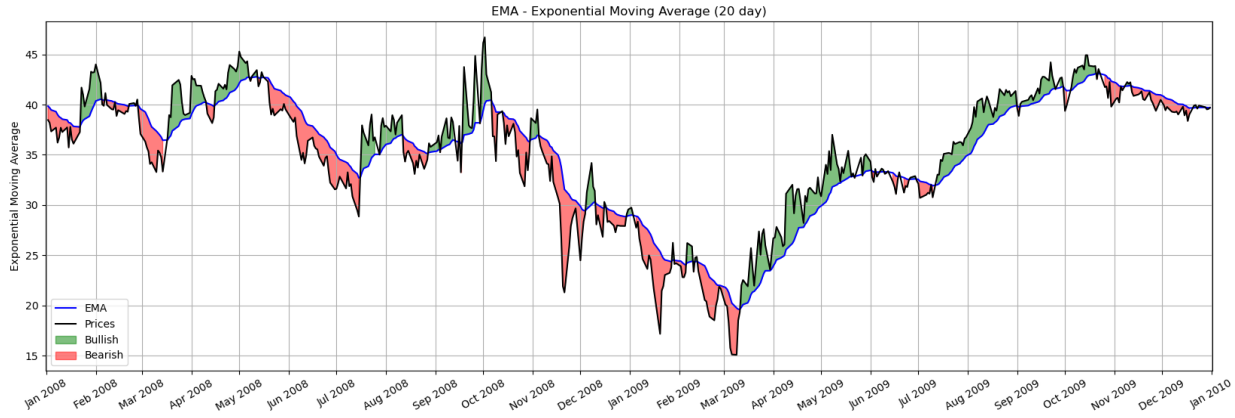

Figure 2 - Exponential Moving Average (20 day lookback period)

Momentum measures the rate of speed or strength of price changes. Using a lookback period of 20 days, a strong positive momentum upward indicates a buy signal and a negative momentum downward indicates a sell signal.

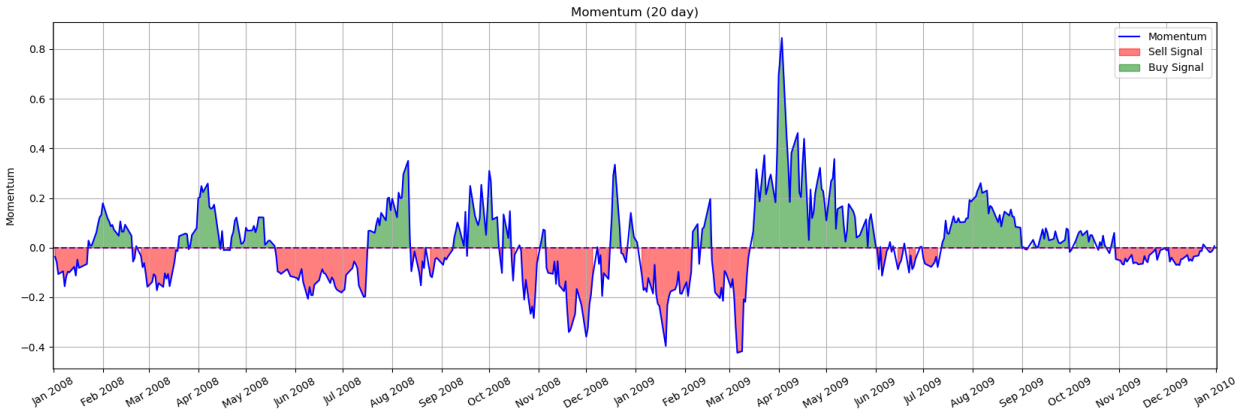

Figure 4 - Momentum (20 day lookback period)

RSI measures the change and the speed at which the change occurs. In my experiment, I will be using a lookback period of 14 days. Generally, RSI are set to an upper bound of 70 indicating a sell signal and lower bound of 30 indicating a buy signal.

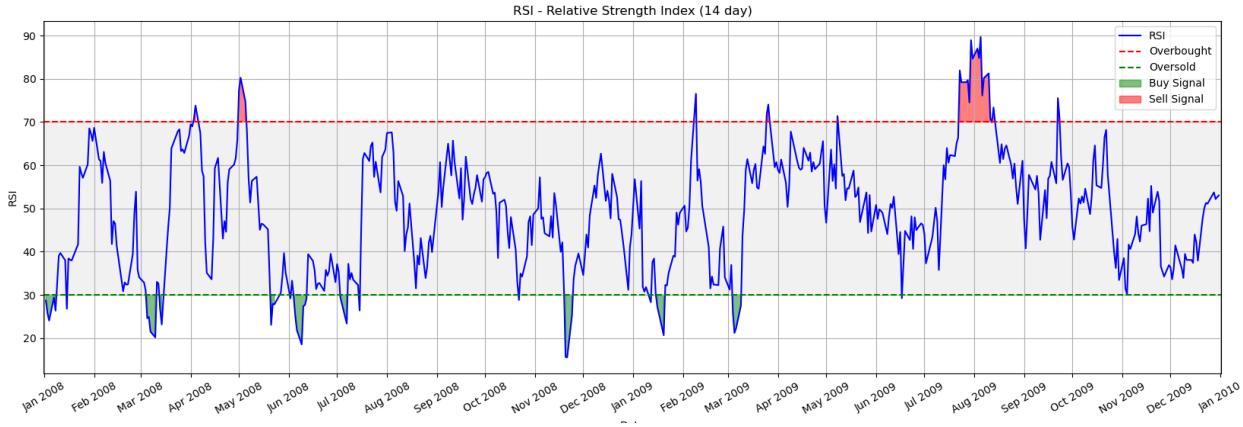

Figure 4 - Relative Strength Index (20 day lookback period)

Moving Average Convergence/Divergence (MACD) indicator uses two lookback periods. In this case, I will be using a look back period of 12 days and 26 days. When the MACD line crosses over the signal line, that indicates a buy signal and when it crosses under that indicates a sell signal.

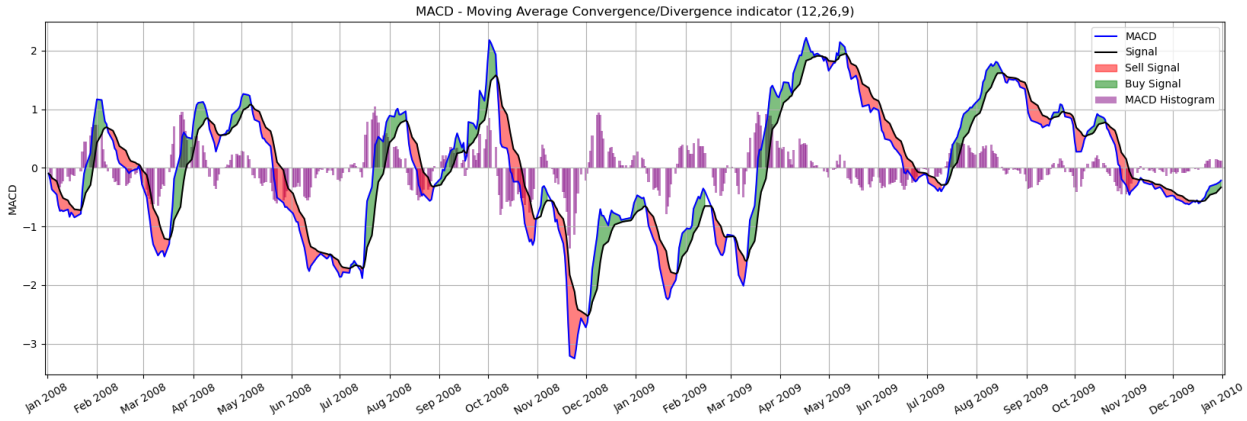

Figure 5 - Moving Average Convergence/Divergence(12 day short period, 26 day long period and 9 day signal period)

1.3 Experiments & Observations

In my manual strategy I will be using three out of the five indicators I listed above. The three indicators are Bollinger Band Percentage(BBP), Momentum and Relative Strength Index(RSI). My strategy is to minimize trading costs by reducing the number of trades performed. My indicators are set to buy only if momentum is >= 1 or RSI<=30 or BBP <=20. This means that I will only purchase the JPM stock if there is a strong momentum, or the stock indicates that it is oversold. Whereas, my sell signal is set by combining the usage of my indicators. The values are set to BBP>20 and RSI>40 and mom<=-0.1. This means that I will only sell if all three indicators are slightly above my buying indicators.

When comparing the in-sample with the out-of-sample results, it can be seen that the in-sample performs better than the out-of-sample based on the chart and summary table. It appears that the out-of-sample had fewer trades than the in-sample. Although the in-sample accrues greater trade costs, the profits from the trades outweighs holding for long periods of time.

Initially, I thought the strategy was effective based on the in-sample results. However, I can see that if the values were to change resulting in fewer trading decisions, there may only be minimal gains in portfolio value. I will need to adjust the parameters to increase the performance of both in-sample and out-of-sample.

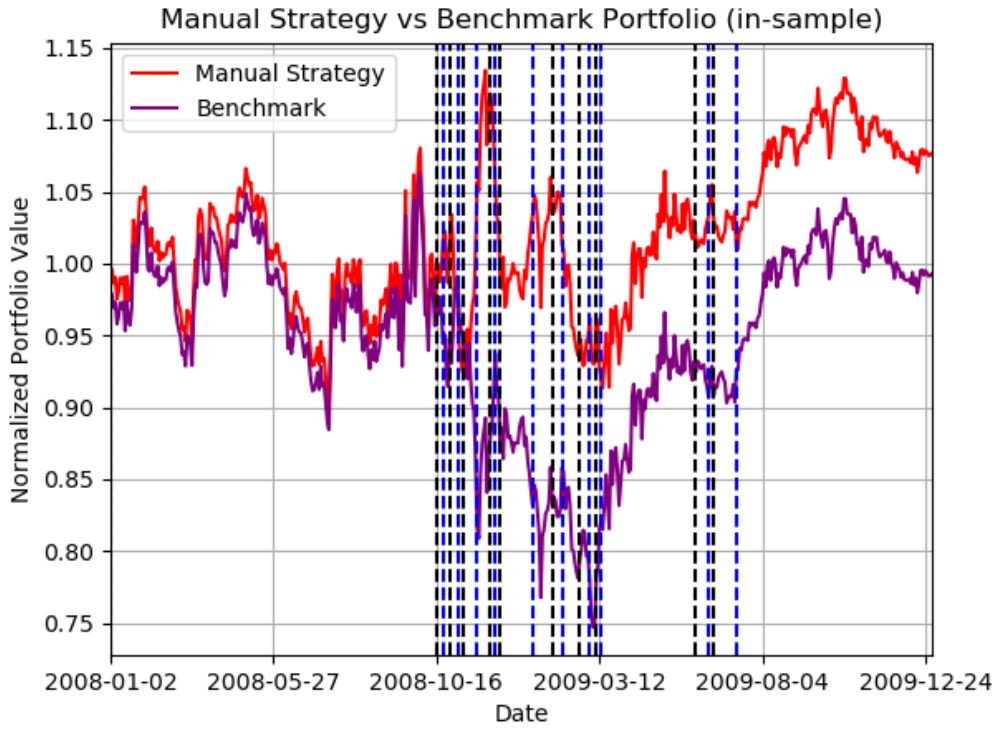

Figure 6 - Manual Strategy vs Benchmark Portfolio (in-sample) results

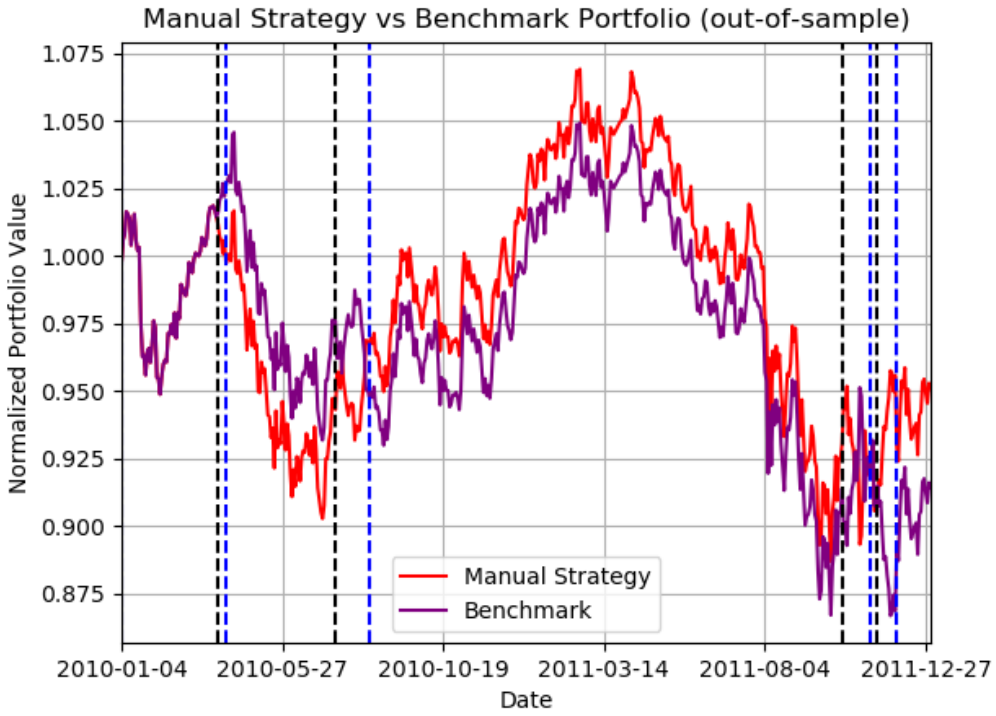

Figure 7 - Manual Strategy vs Benchmark Portfolio (out-of-sample) results

In Table 1, there are two separate tables with the top table being the in-sample summary and bottom table being the out-of-sample summary.

Returns	Cumulative Return	Standard Deviation of Daily Return	Average Daily Return
Benchmark	0.012543	0.017364	0.000175
Portfolio	0.121036	0.016031	0.000354

Returns	Cumulative Return	Standard Deviation of Daily Return	Average Daily Return
Benchmark	-0.083579	0.008500	-0.000137
Portfolio	-0.006642	0.008418	0.000022

Table 1 - Manual Strategy vs Benchmark Portfolio performance summary

2 STRATEGY LEARNER

3 EXPERIMENTS

3.1 Experiment 1

3.2 Experiment 2

4 References

1. https://www.investopedia.com/
2. https://stockcharts.com/