FINANCIAL ANALYSIS FOR DISNEY USING PYTHON

Team Members: I-Peng Liu, Rushi Thakar, Fangning Li, Hao Gong

AGENDA

- Background

- Basic financial analysis for Disney and its relevant companies

- Regression Analysis

- Simple Moving Average Analysis – Trading strategy

- Conclusion

BUSINESS PROBLEM AND STUDY PROCESS

▶ Challenged with the chance to evaluate and understand the business environment and opportunities Disney facing. The issue is to identify where Disney have the opportunities to facilitate the future growth based on the analysis of the historical stock price.

Study and Analysis Process

Basic Financial Analysis → Regression Analysis → Trading Strategy

BASIC FINANCIAL ANALYSIS FOR DISNEY - FRAMEWORK

Problems:
- How is the performance of Disney's stock price from 2010 to 2017?
- What's the correlations among Disney and other peer companies?

Methodology:
- Basic financial analysis and advanced time series analysis   - Pandas, Matplotlib, and Numpy
- Data visualizations based on four sectors (Disney's Concentrations)
  - Studio entertainment
  - Parks and resort
  - Consumer products & Interactive media
  - Media Network

- Challenges:
  - Data collection and data cleaning
  - Statistical analysis

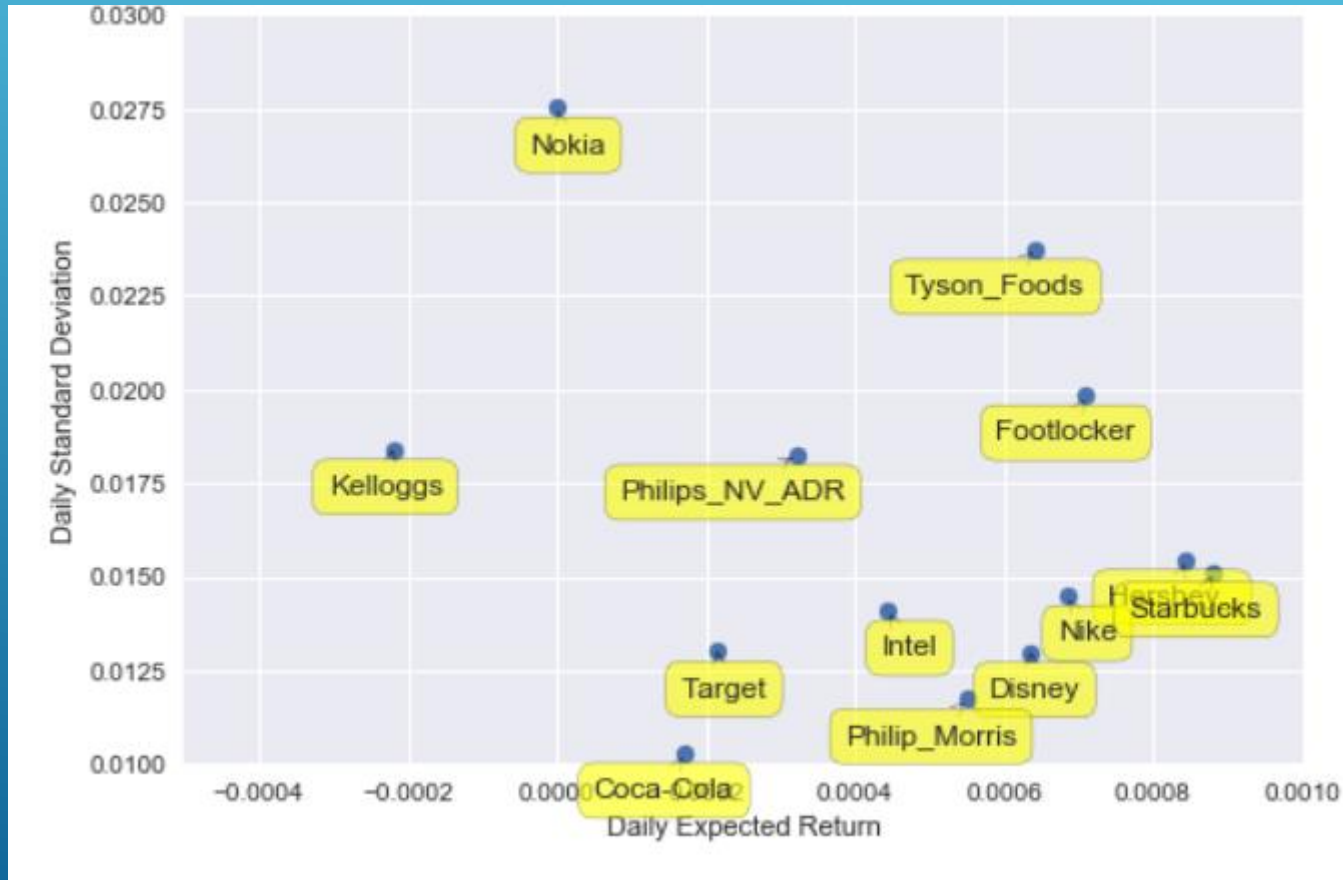# BASIC FINANCIAL ANALYSIS FOR DISNEY - FINDINGS

Basic stock performance for Disney
- Historical stock price of Disney with moving averages
- Daily rate of return histogram for Disney
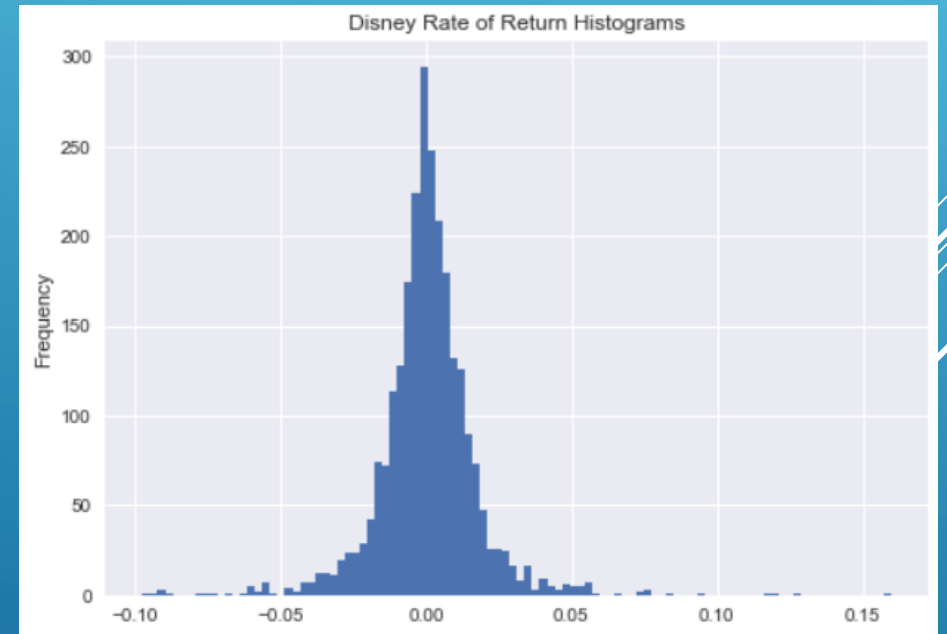
BASIC FINANCIAL ANALYSIS FOR DISNEY - FINDINGS

Daily standard deviation vs expected return

Disney
- low standard deviation
- Relatively high return

REGRESSION ANALYSIS - FRAMEWORK

Problem:

- What is the day to day co-relation of Disney and Peer company's stock price?
- How can you represent the relationship between them?

Methodology:

- Regression Analysis based on same four major company's sector

Challenges:

- Data cleaning and data organization

REGRESSION ANALYSIS – FINDINGS AND RESULTS

Studio:
= 151.6437 + 0.1542 AMCX - 3.8416 CMCSA + 0.7569 FOXA – 0.685 SNE – 0.1221 TWX
R-Square Value: 0.978

Park:
= 53.990 + 0.4724 AAL + 0.6922 FUN - 0.3044 MCD – 0.5686 SEAS + 0.6420 SIX
R-Square value: 0.8330

Media:
= 15.8563 + 1.2551 BT + 0.8169 CBS – 0.4113 DISCA + 0.1571 GLOB + 0.1070 NFLX
R-Square: 0.996

Interactive Media:
= -18.2753 – 0.0343 AMZN + 1.0024 KO + 0.3409 EA + 0.5853FL + 0.2581 HSY – 0.4213 K + 0.4175 NKE + 0.7404 PHG
R=Square: 0.997

Improvement: There is still complacency of improvement in this model. This analysis is only done based on sector-wise best fit companies' stock price.

SIMPLE MOVING AVERAGE ANALYSIS - FRAMEWORK

Problem:
- When to enter or exit the stock market to maximize the investment?

Methodology:
- Use moving Average Crossover Strategy to identify "Go long" or "Go short" signals
- Conduct backtesting to test the performance and risk of trading strategy on historical stock price data

Method:
- Fetch Disney's historical stock price (2010.1.1-2017.10.24) from Yahoo Finance

```
              Open       High        Low       Close    Adj Close     Volume
Date
2010-01-04    32.50   32.750000   31.870001   32.070000   28.723677   13700400
2010-01-05    32.07   32.160000   31.700001   31.990000   28.652029   10307700
2010-01-06    31.90   32.000000   31.680000   31.820000   28.499765   10709500
2010-01-07    31.77   31.860001   31.540001   31.830000   28.508720    8202100
2010-01-08    31.66   31.940001   31.530001   31.879999   28.553509    7657500
```

- Plotted the stock price in candlestick chart
- Defined two lookback periods:
    o a 50-day short window
    o a 100-day long window
- Created two moving average filters using Simple Moving Average (SMA) to calculate the mean stock price on the Disney's "Ajusted Closing Price"

- Created two moving average filters using Exponential Moving Average (EMA)
- Compare SMA & EMA
  - SMA timeseries lag the original price timeseries, which means that changes in the trend are only s with a delay (lag) of L days, which can significantly affect our strategy
  - EMA can help reduce the lag because it puts more weights on more recent observations

Identify the "Enter/ Go long" or "Exit/ Go short" signals:

- If the short moving average exceed the long moving average then it's a signal to go long or buy in the stock, because this signals marks a stock price will constantly go up.
- If the long moving average exceeds the short moving average then it's a signal to go short or exit the market.

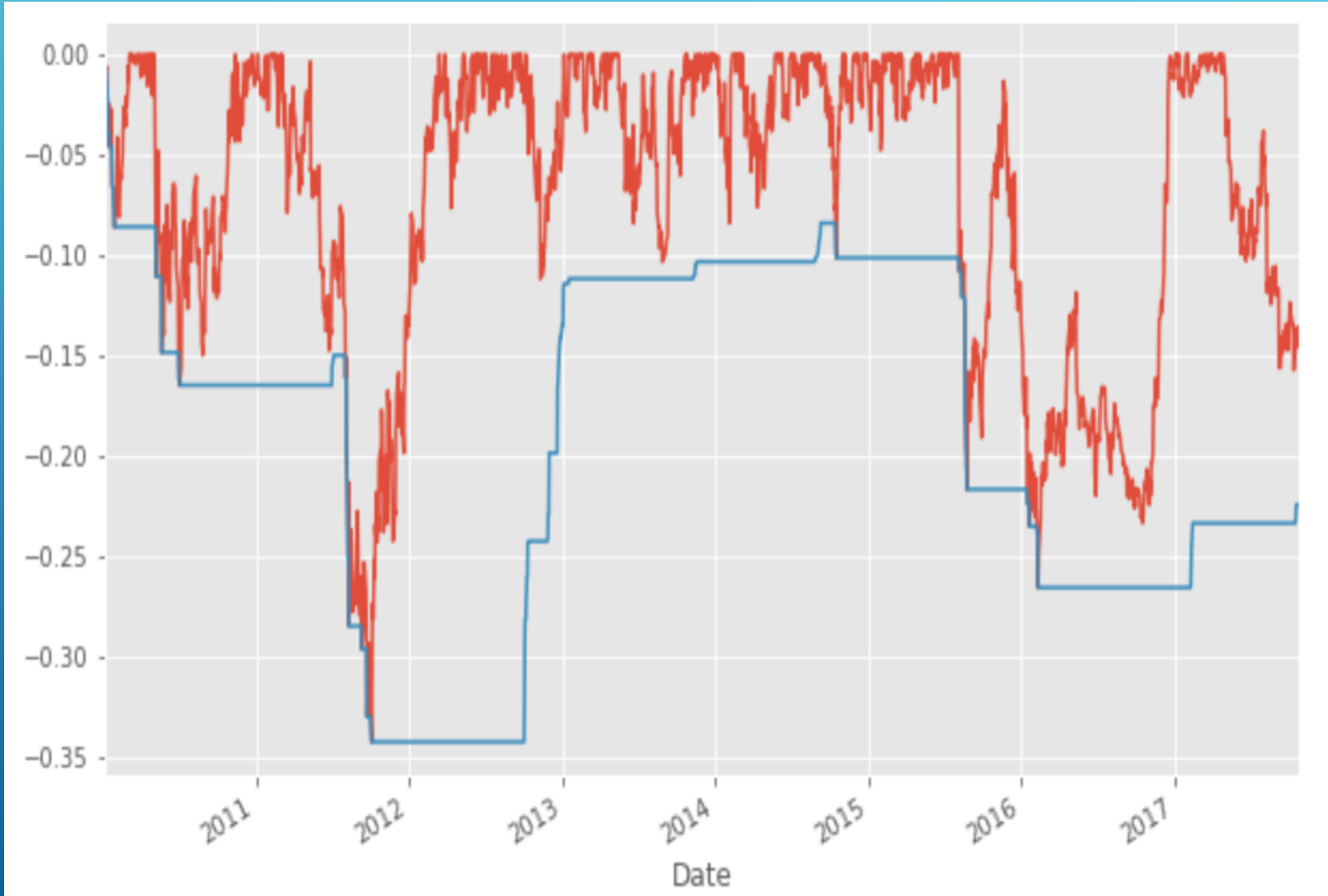Backtesting: to test the performance and risk of trading strategy on historical data
- Set $100000 initial_capital, bought in 100 shares at every "Go long" signal
- Portfolio ['holdings'] = # of stock * stock price['Adj Close']
- Cash = initial_capital – Portfolio ['holdings'];
- Portfolio['total'] = Cash + portfolio['holdings']
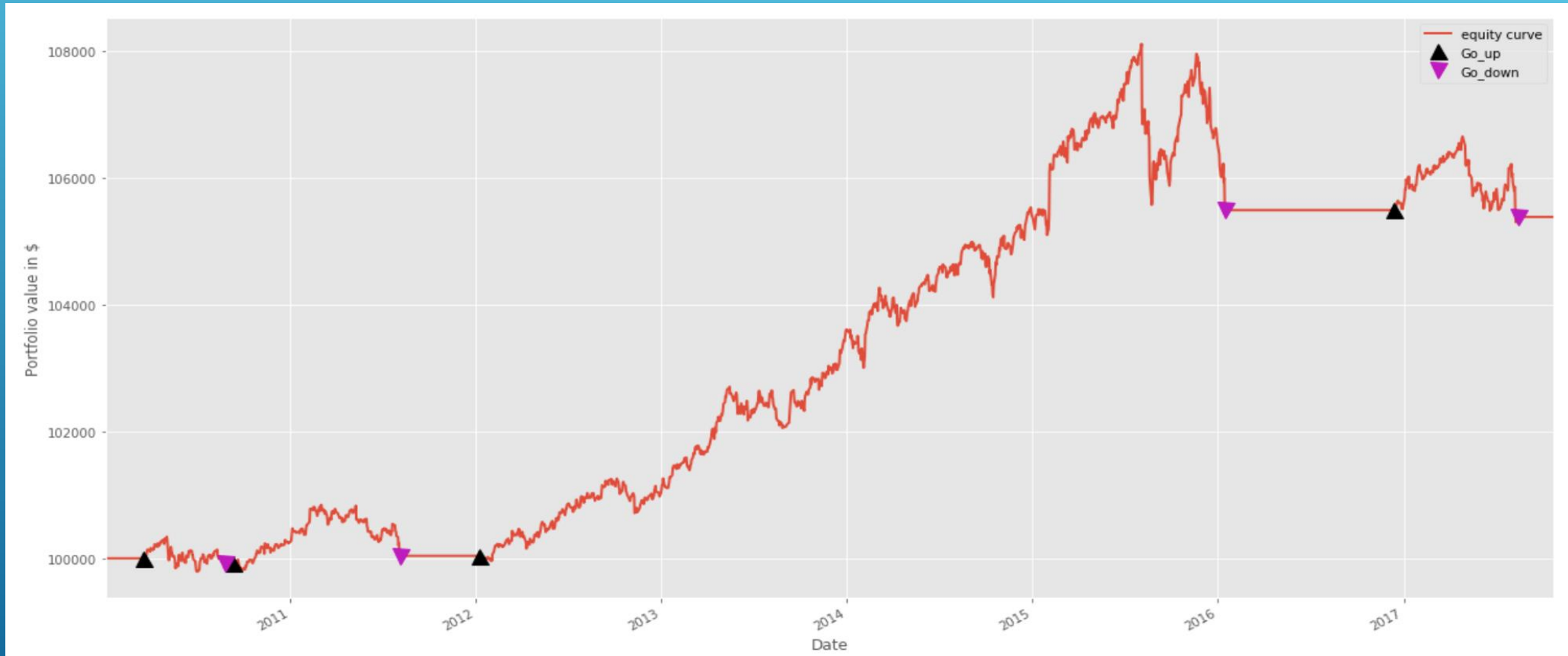
Equity Curve:
Profit: (105500 – 100000)/100000 = 5.5%

Maximum Drawdown

Risk Measurement:
- Sharpe Ratio: 0.584

Improvements:
- Use complex algorithms, like KMeans, Classification to improve trading model
- Multi-symbol portfolios, by adding more columns to a pandas DataFrame
- Realistic handling of transaction costs – fees, slippage and possible market impact

THANK YOU