FINC 780

Assignment 1

Stock Returns Analysis Report

Financial Analytics

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Date- 21st Feb, 2025

Introduction

This report analyzes stock returns for five selected stocks—AGM, BABA, HOOD, DKNG, and NFLX—using daily price data from 2012 to 2022. The objective is to compute daily and monthly returns, assess stock risk and return characteristics, and evaluate the viability of an equal-weighted portfolio of these stocks. Additionally, the correlation between stock returns and trading volume is explored. The results inform investment decisions by identifying the best-performing stocks and analyzing portfolio performance relative to a 10% annual return target.

Procedure

1. Data Collection & Cleaning

- Historical stock price data for AGM, BABA, HOOD, DKNG, and NFLX was retrieved from Yahoo Finance using the `quantmod` package.
- The datasets were converted into data frames, ensuring that the Date column was correctly formatted and sorted in ascending order.
- Data cleaning involved checking column classes and verifying the integrity of price variables.

```
> # Check the class of key columns (example for NFLX)
> print(str(NFLX_df))
'data.frame':   2768 obs. of  7 variables:
 $ Date         : Date, format: "2012-01-03" "2012-01-04" "2012-01-05" "2012-01-06" ...
 $ NFLX.Open    : num  10 10.3 11.3 11.3 12.8 ...
 $ NFLX.High    : num  10.4 11.6 11.7 12.5 14.2 ...
 $ NFLX.Low     : num  10 10.3 11 11.2 12.4 ...
 $ NFLX.Close   : num  10.3 11.5 11.3 12.3 14 ...
 $ NFLX.Volume  : num  2.92e+07 1.00e+08 8.66e+07 1.26e+08 2.14e+08 ...
 $ NFLX.Adjusted: num  10.3 11.5 11.3 12.3 14 ...
NULL
```

2. Calculating Daily Returns

Adjusted closing prices were used to compute daily stock returns using the formula:

$$Ret_{i,t} = \frac{P_{i,t+1} - P_{i,t}}{P_{i,t}}$$

$Ret_{i,t}$= return at time t

$P_{i,t}$ = price at time t

$P_{i,t+1}$= price at time t+1

Additional variables were created:

Month (1-12 or Jan-Dec)

Year (2012-2022)

3. Monthly Return Analysis

- Year and month variables were created from the Date column.
- Monthly average returns were computed for each stock by grouping data by year and month.
- The three months with the highest and lowest average returns were identified for each year using the `slice_max()` and `slice_min()` functions.

4. Risk & Return Analysis by Year

- The mean annual return and standard deviation (risk) for each stock were calculated.
- Using `data.table`, a summary was created to identify the best and worst-performing years for each stock.

5. Portfolio Annual Return Analysis

- An equal-weighted portfolio was simulated, where investments were evenly distributed across the five stocks.
- The portfolio's annual return was computed as the average of the annual mean returns of the five stocks.
- The portfolio's overall return was compared to the 10% target to assess whether it met investment objectives.
- The portfolio's performance was also compared with the S&P 500 index (SPX500) to evaluate its relative success.

6. Trading Volume and Correlation with Returns

- The total monthly trading volume was computed for each stock.
- A correlation analysis was conducted between monthly returns and trading volume.
- The overall correlation between trading volume and returns was found to be low, meaning there was little relationship between stock price fluctuations and trading activity.
- The three months with the highest trading volumes were identified and compared with months of highest and lowest returns.

Conclusion

- **Stock Performance:** Annual return and risk analysis revealed that different stocks had varying levels of return and volatility across the years. Some stocks had significantly positive returns in certain years while underperforming in others.
- **Portfolio Performance:** The equal-weighted portfolio's annual return did not consistently achieve the 10% target, suggesting that investing in these stocks alone may not be an optimal strategy.
- **Trading Volume Correlation:** The correlation between stock returns and trading volume was low, indicating that higher trading volume does not necessarily lead to higher returns.
- **Investment Decision:** Given the findings, an investor seeking a minimum 10% annual return might need to explore alternative stock combinations or consider broader market indices like the S&P 500.

This analysis provides critical insights into stock return behaviors, helping investors make data-driven decisions about stock selection and portfolio management.