**Assignment 7 Normality**

## **Notification:**

## **The result of this part is output by Excel, the related Excel file is in the same directory with this file.**

## **1. for every year (out of 5 years), compute the number of days with positive and negative returns.**

**Because the stock I choose only have 3 years, I can only use thes 3 years data to do.**

**2019-2020**

Positive returns: 118 days

Negative returns: 134 days

**2020-2021**

Positive returns: 128 days

Negative returns: 124 days

**2021-2022**

Positive returns: 124 days

Negative returns: 128 days

## **2. for each year, compute the average of daily returns µ and compute the percentage of days with returns greater than µ and the proportion of days with returns less than µ. Are there more positive or negative return days? Does it change from year to year? Summarize your results for this question in a table for each year and discuss your findings. Your table should have the following format: year trading days µ % days < µ % days > µ**

| Year | Trading days | µ | days  < µ | % days < µ | days  > µ | % days > µ |
| --- | --- | --- | --- | --- | --- | --- |
| 2019-2020 | 252 | -0.04788 | 131 | 51.98 | 121 | 48.02 |
| 2020-2021 | 252 | -0.01917 | 119 | 47.22 | 133 | 52.78 |
| 2021-2022 | 252 | -0.0311 | 128 | 50.79 | 124 | 49.21 |

## **3. for every year, compute the mean and standard deviation of your daily returns. Compute the number of days that your (by absolute value) returns are more than 2 standard deviations from the mean. In other words, if µ = 5 and σ = 2, compute the number of days that your (percent) daily returns are less than 1 (5 - 2\*2) or more than 9 (5 + 2\*2). The number of such days per year predicted by normal distribution is less than 5% (out of 252 trading days) - 2.5% below µ − 2σ and 2.5% above µ + 2σ.**

| Year | Trading days | µ | σ | days  < µ − 2σ | % days < µ − 2σ | days  > µ + 2σ | % days > µ + 2σ |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2019-2020 | 252 | -0.04788 | 0.794988 | 9 | 3.57 | 6 | 2.38 |
| 2020-2021 | 252 | -0.01917 | 1.881678 | 29 | 11.51 | 26 | 10.32 |
| 2021-2022 | 252 | -0.0311 | 1.416734 | 26 | 10.32 | 30 | 11.9 |

## **4. Summarize your findings in a table for each year and discuss your findings**

I find that there is one standard line in my data, if the standard deviation is greater than this line, the days of negative returns will be more than the days of positive returns, and vice versa.