FIN3080 HW3 REPORT

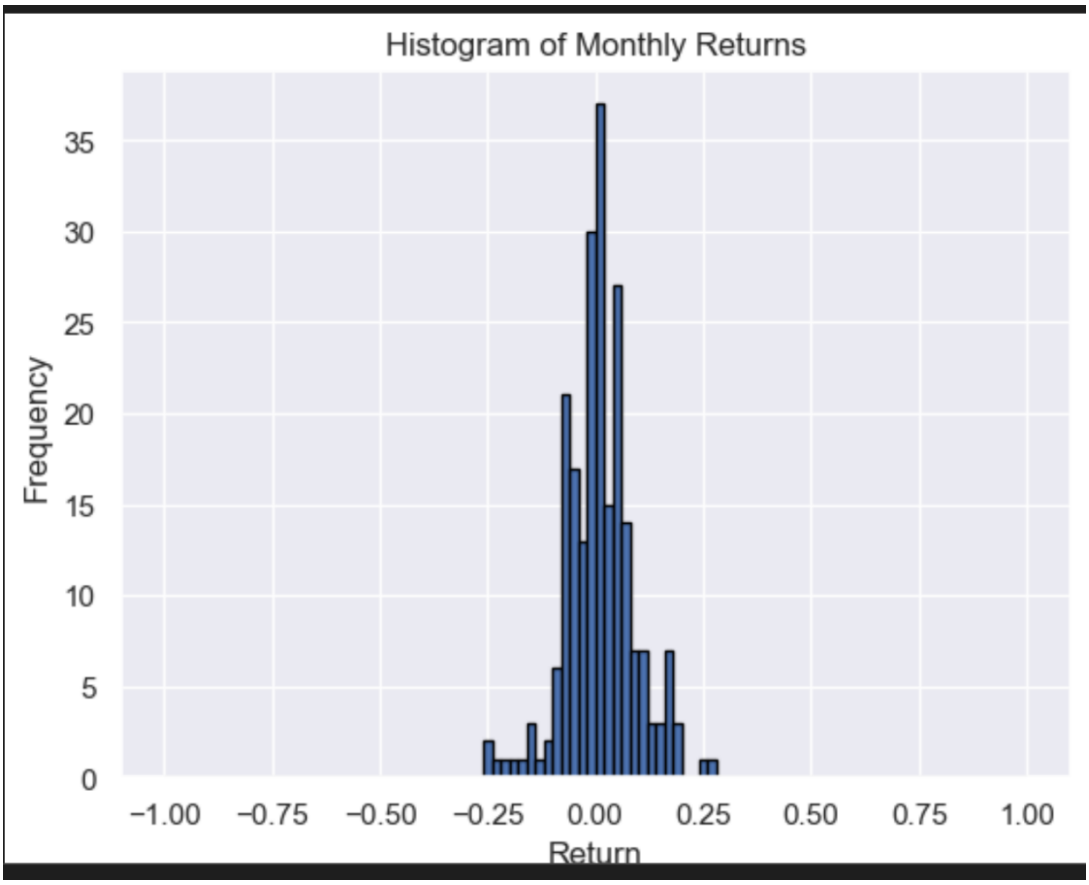
Q1:

(a) Data processing:

1. Download the closing index and manually filter the CSI 300 index, and calculating the monthly return of the index
2. Then I calculate the mean, std, skewness, and kurtosis of the monthly return.
3. Then I use matplotlib to draw the histogram

(b) Report and Discussion:

```
Mean Return: 0.00908645330332680 8
Standard Deviation of Return: 0.0807116814691055 3
Skewness of Return: 0.0152174982154723 74
Kurtosis of Return: 1.44985660090187 19
```




```
Shapiro-Wilk Test:
Statistic: 0.97113777112573, p-value: 0.00015470831822095066
```

1. The monthly returns of the CSI 300 index follow a normal

distribution.

2. As depicted in the picture, the frequency of monthly returns are similar to a normal distribution. The skewness and Kurtosis are about 0 and 1~3.
3. The Shapiro_wilk Test's result: The p-value < 0.05.

Q2:

(a) Data processing:

1 Download the weekly return data and filter the main-board A-shares.

2.Calculate the weekly market return by grouping all the main_board A-shares.

3. Download the risk_free xlsx. And merge these two table.

4. Divide the week into 3 equal groups.

5. Fill the nan value of return with the mean value.

6. For group 1 data, do the first regression and get the beta value.

7. Based on the beta value for the group1 , divide the shares into 10 equal groups.

8. For group 2 data, calculating the mean value of each group in each week to get the rp. Then I do the second the regression to get the Table 2 and new beta value for each group.

9. For group 3 data, calculating the rp and calculate the mean of rp of each group. Then, I do the third regression to get the Table 3 .

Report Table:

b mean value of weekly return: head(10) rows

	Trdwnt	Wretnd
0	2017-01	0.008763
1	2017-02	-0.043352
2	2017-03	-0.022521
3	2017-04	0.025113
4	2017-05	-0.004104
5	2017-06	0.036176
6	2017-07	0.000613
7	2017-08	0.046298
8	2017-09	0.011129
9	2017-10	0.018707

Table 2

	Beta_group	Alpha_p	Alpha_p_t_value	Beta_p	Beta_p_t_value	R_squared
0	0.0	-0.001336	-14.974993	0.577914	234.130010	0.696557
1	1.0	-0.000369	-4.274027	0.627544	262.873014	0.745220
2	2.0	-0.000780	-8.243975	0.689754	263.486187	0.746192
3	3.0	-0.000936	-10.155739	0.707483	277.476148	0.765285
4	4.0	-0.001680	-19.548569	0.765183	321.804467	0.813240
5	5.0	-0.002377	-27.026871	0.787402	323.642680	0.814508
6	6.0	-0.001865	-22.072021	0.808669	345.774227	0.835126
7	7.0	-0.001627	-18.501594	0.853503	350.665129	0.838254
8	8.0	-0.001768	-19.938150	0.858617	349.861251	0.835150

Table 3

	Gamma_0	Gamma_1	Gamma_0_t_value	Gamma_1_t_value	R_squared	F_statistic	P_value
0	-0.001556	0.005957	-1.33334	3.909797	0.656453	15.286512	0.004482

From Table 3, we know that the value of F_statistic is 15.286512, and the value of P_value is 0.004482. This means that the F statistic is relatively large, and the corresponding P-value is small, far less than the significance level of 0.05, so it can be concluded that the model is significant. The return is positively correlated with the system risk. The results show that the return increases with the increase in risk, which is consistent with the CAPM model. The constant $\gamma 0$ is non-zero, indicating the presence of Factors other than systemic risk.