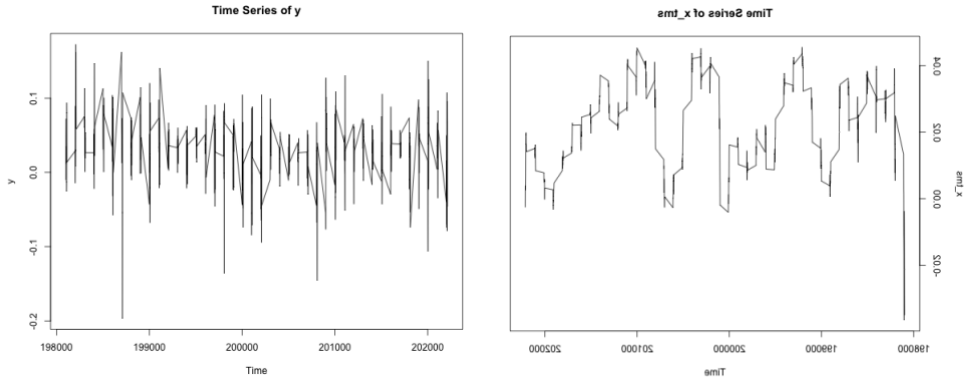
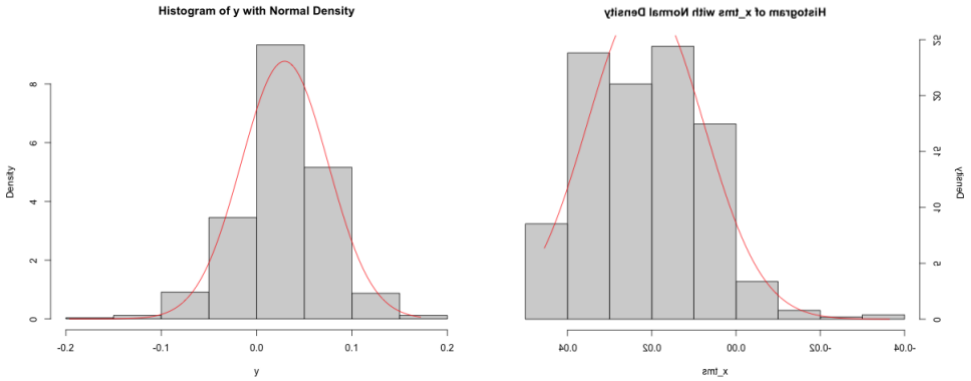
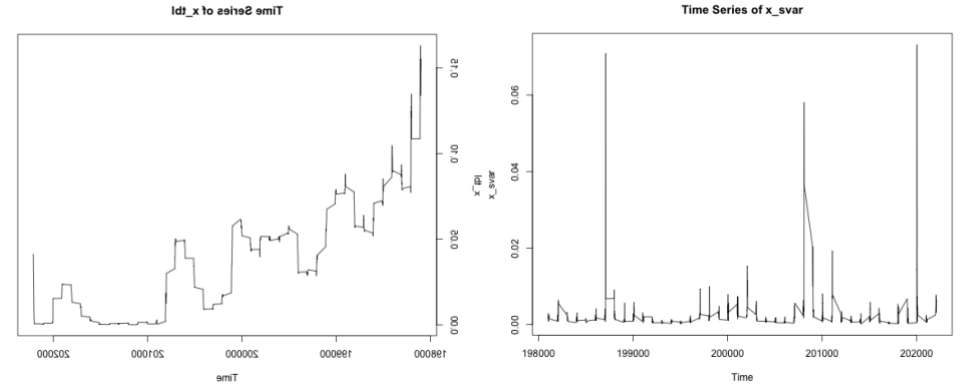
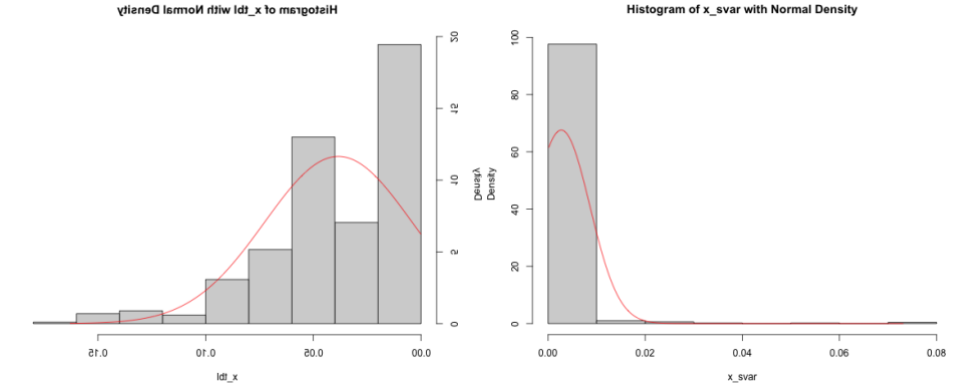
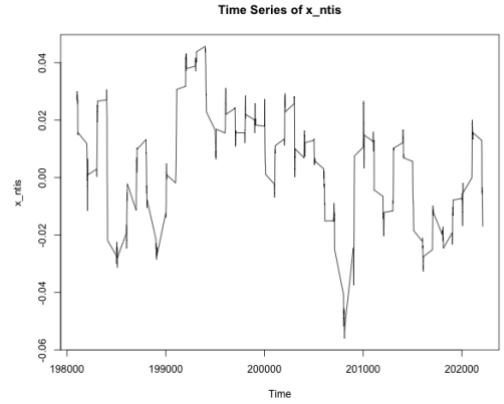
Q1 (all the code can be found at https://github.com/YuJu0819/quant-method)

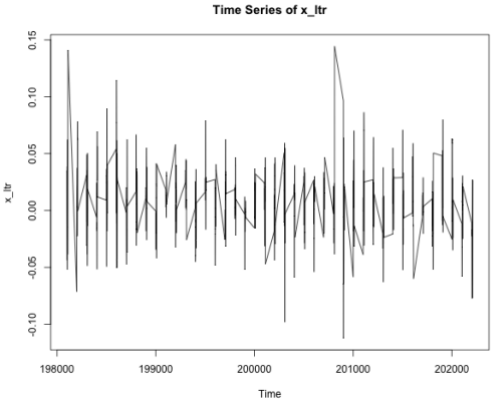


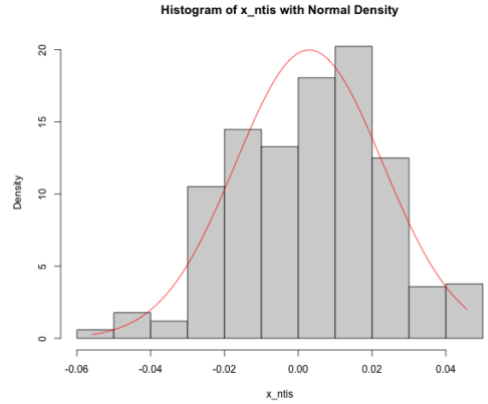


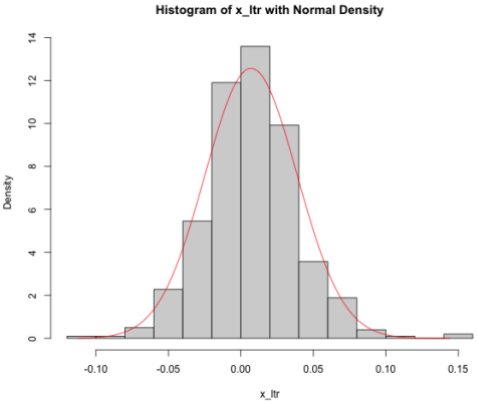


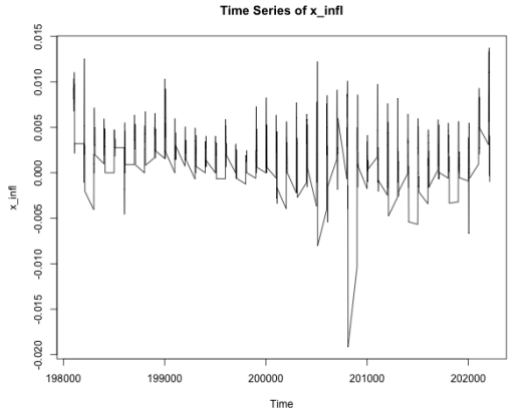


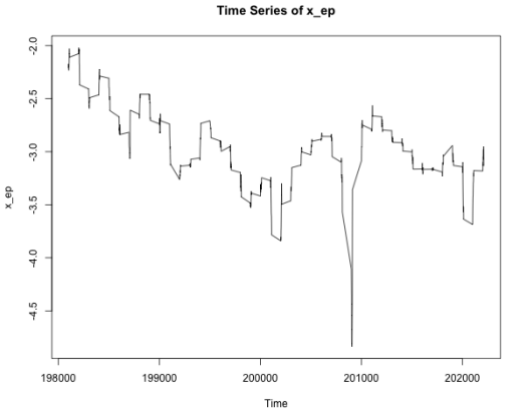

Time Series of x_ntis
x_ntis
Time
-0.06
-0.04
-0.02
0.00
0.02
0.04
198000
199000
200000
201000
202000

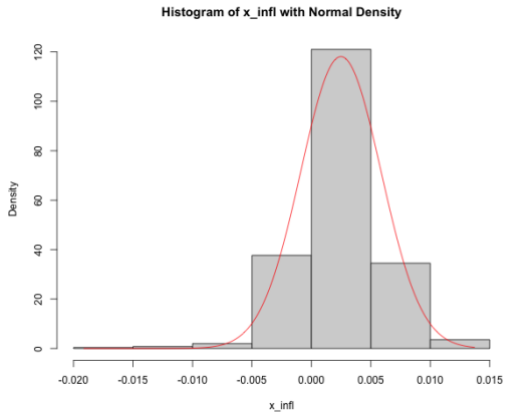

Time Series of x_ltr
x_ltr
Time
-0.10
-0.05
0.00
0.05
0.10
0.15
198000
199000
200000
201000
202000

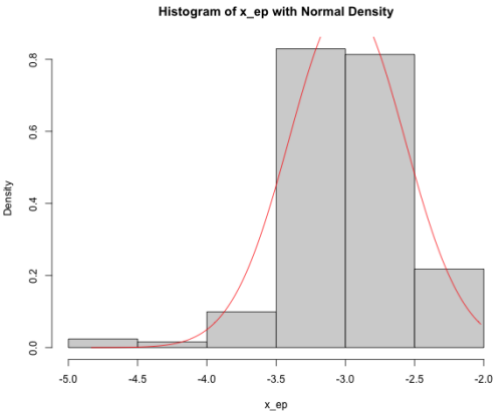

Histogram of x_ntis with Normal Density
Density
x_ntis
0
5
10
15
20
-0.06
-0.04
-0.02
0.00
0.02
0.04

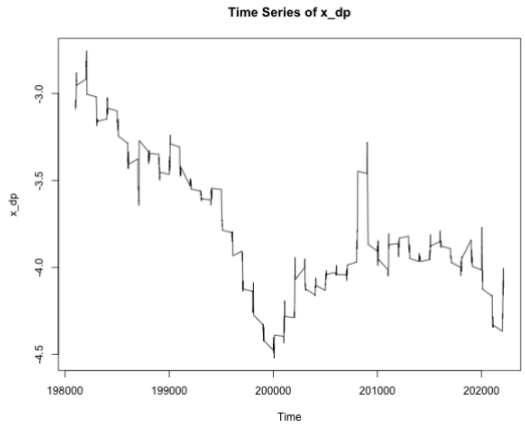

Histogram of x_ltr with Normal Density
Density
x_ltr
0
2
4
6
8
10
12
14
-0.10
-0.05
0.00
0.05
0.10
0.15

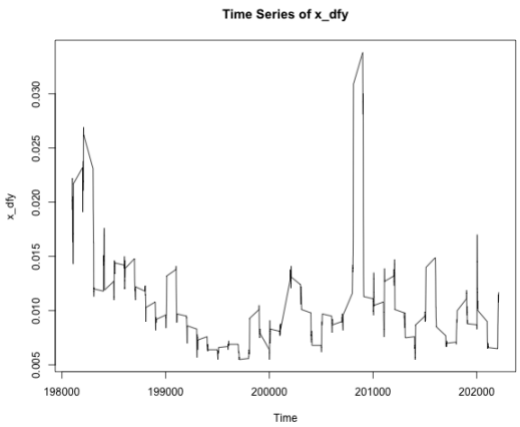

Time Series of x_infl
x_infl
Time
-0.020
-0.015
-0.010
-0.005
0.000
0.005
0.010
0.015
198000
199000
200000
201000
202000

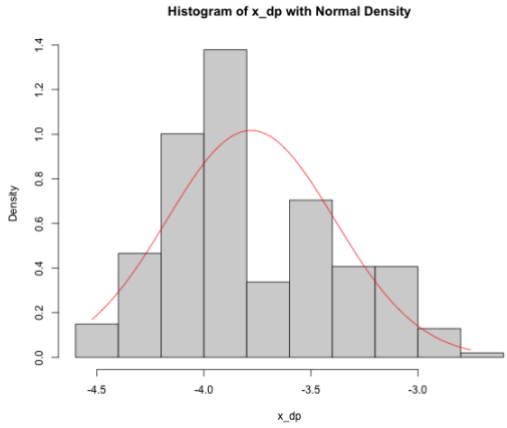

Time Series of x_ep
x_ep
Time
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
198000
199000
200000
201000
202000

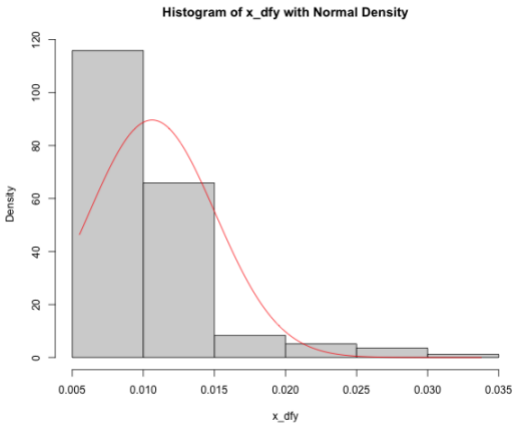

Histogram of x_infl with Normal Density
Density
x_infl
0
20
40
60
80
100
120
-0.020
-0.015
-0.010
-0.005
0.000
0.005
0.010
0.015

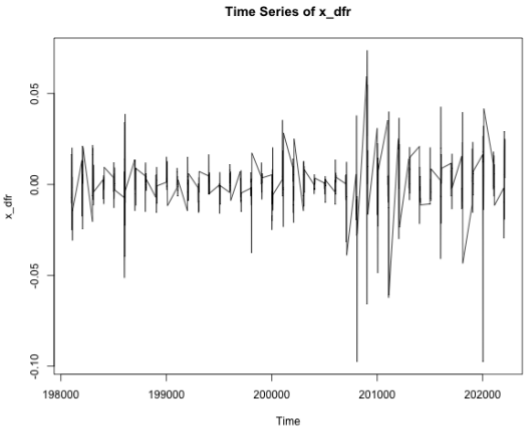

Histogram of x_ep with Normal Density
Density
x_ep
0.0
0.2
0.4
0.6
0.8
-5.0
-4.5
-4.0
-3.5
-3.0
-2.5
-2.0

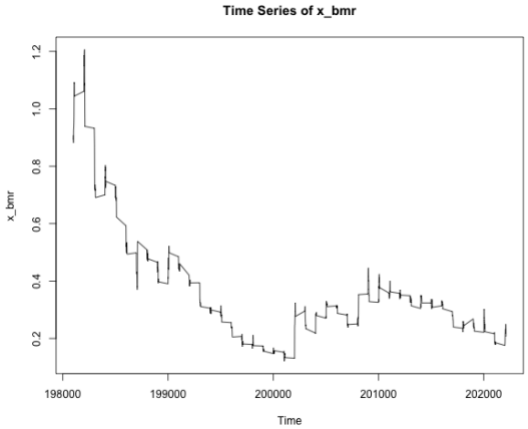

Time Series of x_dp
x_dp
-3.0
-3.5
-4.0
-4.5
198000
199000
200000
201000
202000
Time

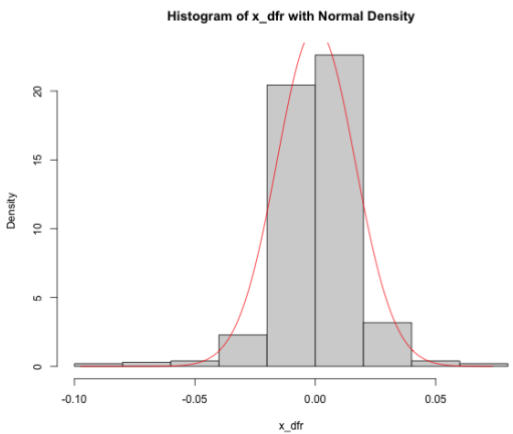

Time Series of x_dfy
x_dfy
0.030
0.025
0.020
0.015
0.010
0.005
198000
199000
200000
201000
202000
Time

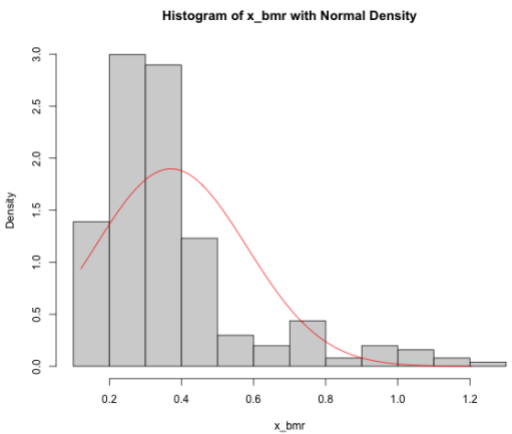

Histogram of x_dp with Normal Density
Density
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-4.5
-4.0
-3.5
-3.0
x_dp


Histogram of x_dfy with Normal Density
Density
120
100
80
60
40
20
0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
x_dfy


Time Series of x_dfr
x_dfr
0.05
0.00
-0.05
-0.10
198000
199000
200000
201000
202000
Time


Time Series of x_bmr
x_bmr
1.2
1.0
0.8
0.6
0.4
0.2
198000
199000
200000
201000
202000
Time

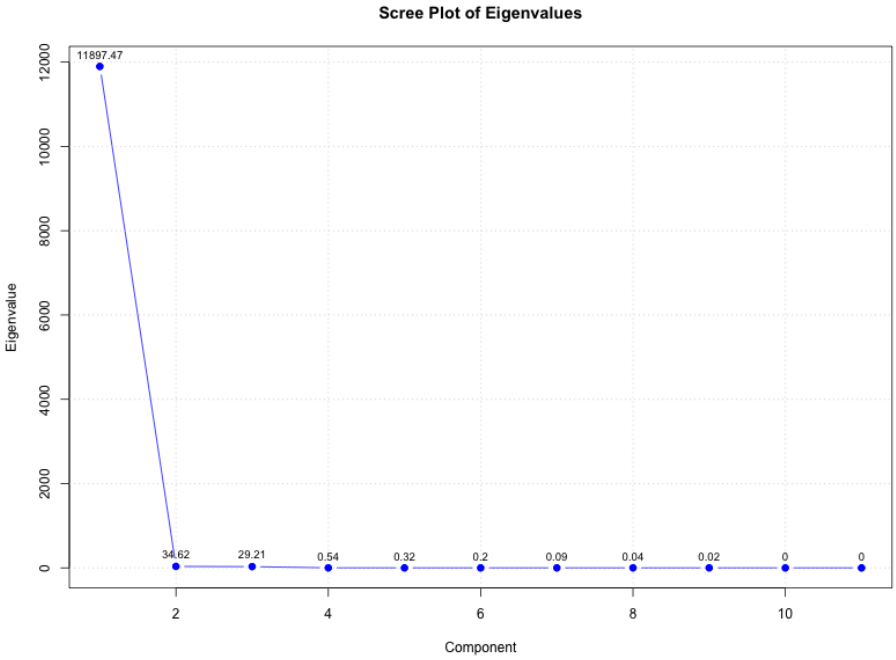

Histogram of x_dfr with Normal Density
Density
20
15
10
5
0
-0.10
-0.05
0.00
0.05
x_dfr


Histogram of x_bmr with Normal Density
Density
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.2
0.4
0.6
0.8
1.0
1.2
x_bmr

Q2

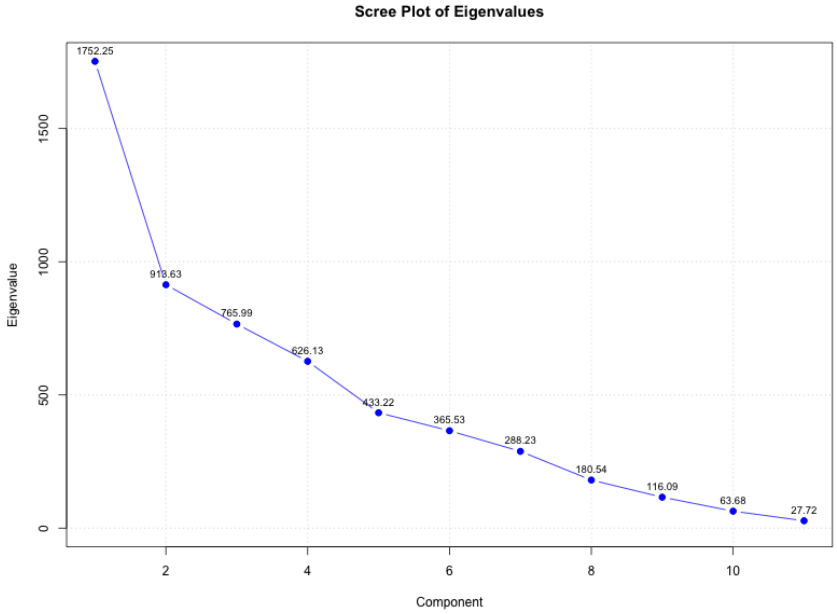
```
Question 2-1:
The sum of the diagonal elements of the result matrix is:  11
Question 2-2:
The sum of the diagonal elements of the final matrix is:  493
```

Q3



Q4.

XT*X and X*XT result in same eigenvalue



Q5.

The code can be found on github Q5.R

```
check inverse result:  TRUE
check identity matrix:  TRUE
```

Q6.

The code can be found on github Q6.R

```
[1] "Result of b:"
               [,1]
 [1,] -0.0051961288
 [2,] -0.0012814334
 [3,] -0.0005996872
 [4,] -0.0045372084
 [5,] -0.0108741731
 [6,]  0.0044648300
 [7,]  0.0177837102
 [8,]  0.0040115413
 [9,] -0.0008651173
[10,]  0.0060527912
[11,]  0.0013990910
```