Homework 7

Group Member: Yingshan He (yh29) Shixue Feng (shixuef2)

1. Average of the 20 estimates of $RV_t^{OPEN} = 7.00933178210082*10^{-5}$

2. $RV_t^{15min} = 6.25425527628554*10^{-5}$

   $RV_t^{10min} = 6.1150353706819*10^{-5}$

   $RV_t^{5min} = 6.29004010717707*10^{-5}$

   $RV_t^{2min} = 6.64758504787805*10^{-5}$

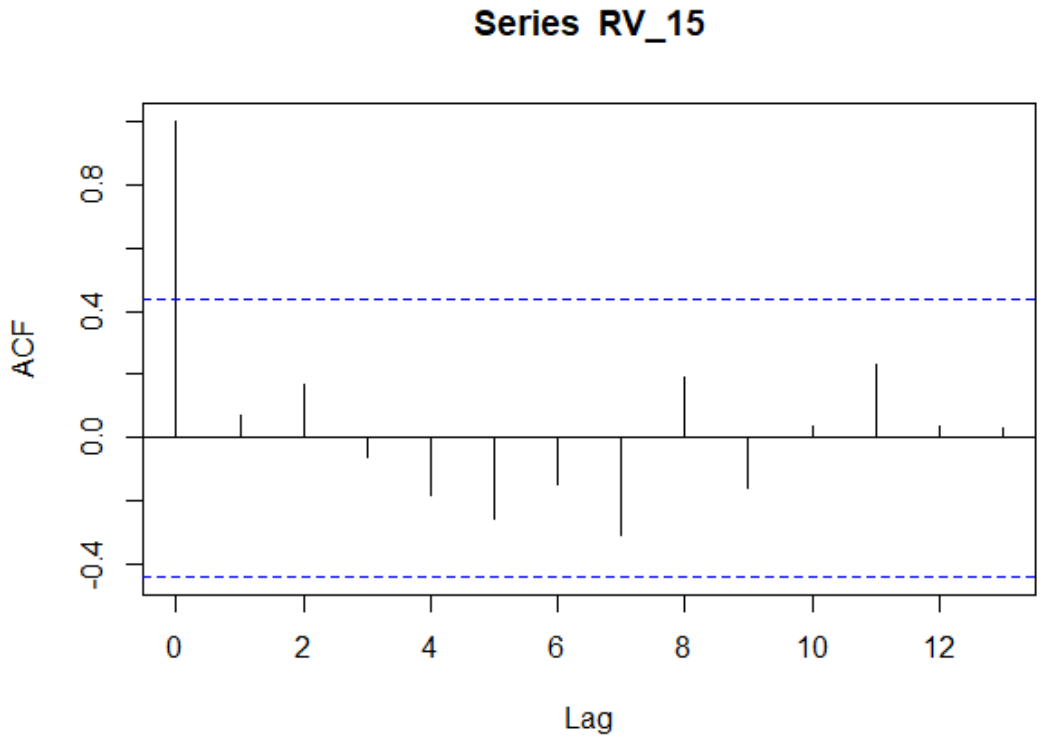
   I will adjust the 24 estimators by multiply 25/24 to make each group have the same amount of estimators, so we can directly calculate the mean of the 14 adjusted groups and 1 original group, and each group can be seemed as 25 estimators in it. The method is same in other kinds of intervals.

   My estimates of realized variance generally decrease as the return interval becomes longer.

   $RV_t^{15min}/ RV_t^{1min} = RV_t^{15min}/ RV_t^{OPEN} = 0.89227553648645$

   $RV_t^{15min}/ RV_t^{10min} = 1.02276681935008$

3. ACF of RV_t^{15min}




```
Autocorrelations of series 'RV_15', by lag

    0     1     2     3     4     5     6     7     8     9    10    11    12    13
1.000 0.071 0.169 -0.061 -0.184 -0.256 -0.147 -0.311 0.193 -0.162 0.036 0.232 0.037 0.030
```

4. First Approach:

   $RV_t^{24h} = 0.000134696511362485$

Second Approach:

$RV_t^{24h} = 0.00695577454397357$

5. First:

   Scale up the market-open RV using the daily squared returns. Just the same as the formula in PPT.

   Second:

   Add the market-open RV with the squared returns constructed from the 3:00 p.m. on day t to the 9:30 a.m. on day t+1, and then add the square returns constructed from the 11:30 a.m. on day t+1 to 1:00 p.m. on day t+1.

   $RV_{t+1}^{24h} = \ln(S_{t+1}^{9:30am} / S_t^{3:00pm})^2 + \ln(S_{t+1}^{1:00pm} / S_{t+1}^{11:30am})^2 + RV_{t+1}^{Open}$