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Econometrics II, Problem Set I, Question 4

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```matlab
clear all

% Loading data
data=xlsread('PS1SPYdata.xlsx');
h = 20; % lag length
```

Computing autocorrelations

```matlab
corr = autocorr(data(:,7), h); % Autocorrelation of raw returns
corabs = autocorr(abs(data(:,7)),h); % Autocorrelation of absolute
 returns
corsq = autocorr((data(:,7)).^2,h); % Autocorrelation of squared
 returns
```

Plotting figures

```matlab
figure(1)
autocorr(data(:,7), h)
title('Autocorrelation of raw returns')

figure(2)
autocorr(abs(data(:,7)),h)
title('Autocorrelation of absolute returns')

figure(3)
autocorr((data(:,7)).^2,h)
title('Autocorrelation of squared returns')

figure(4)
plot(1:3524,data(:,7))
xlabel('Time')
ylabel('Raw returns')
title('Plot of raw returns')
```

Autocorrelation of raw returns

Autocorrelation of absolute returns

Autocorrelation of squared returns
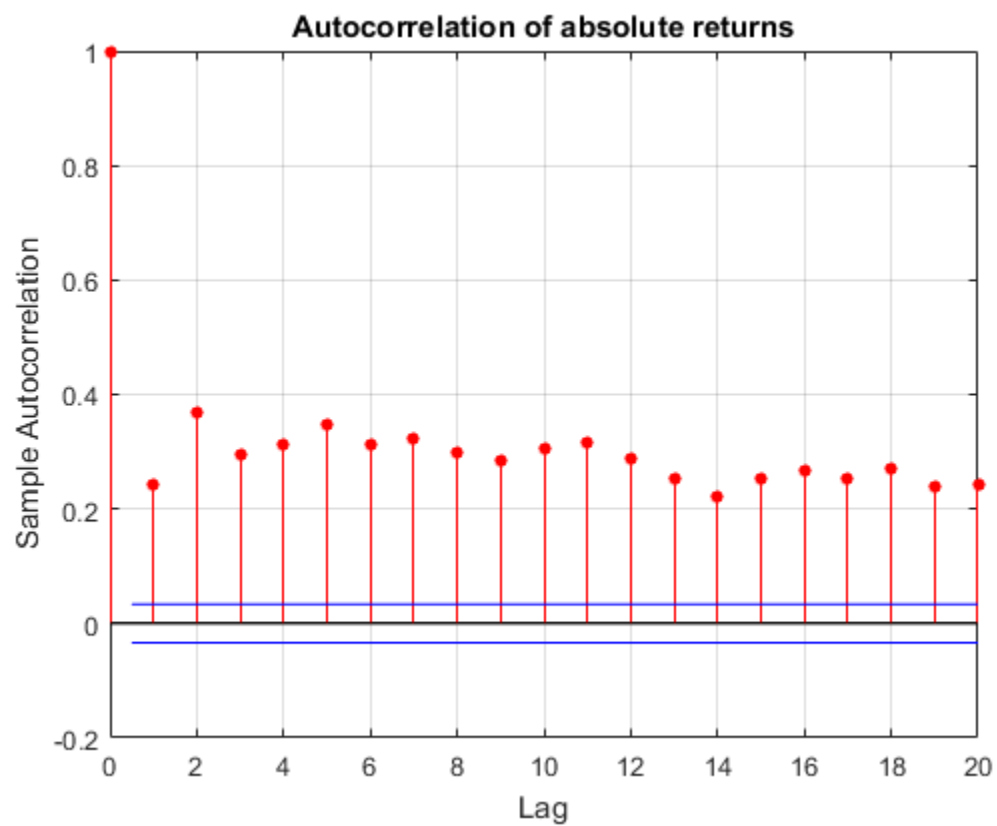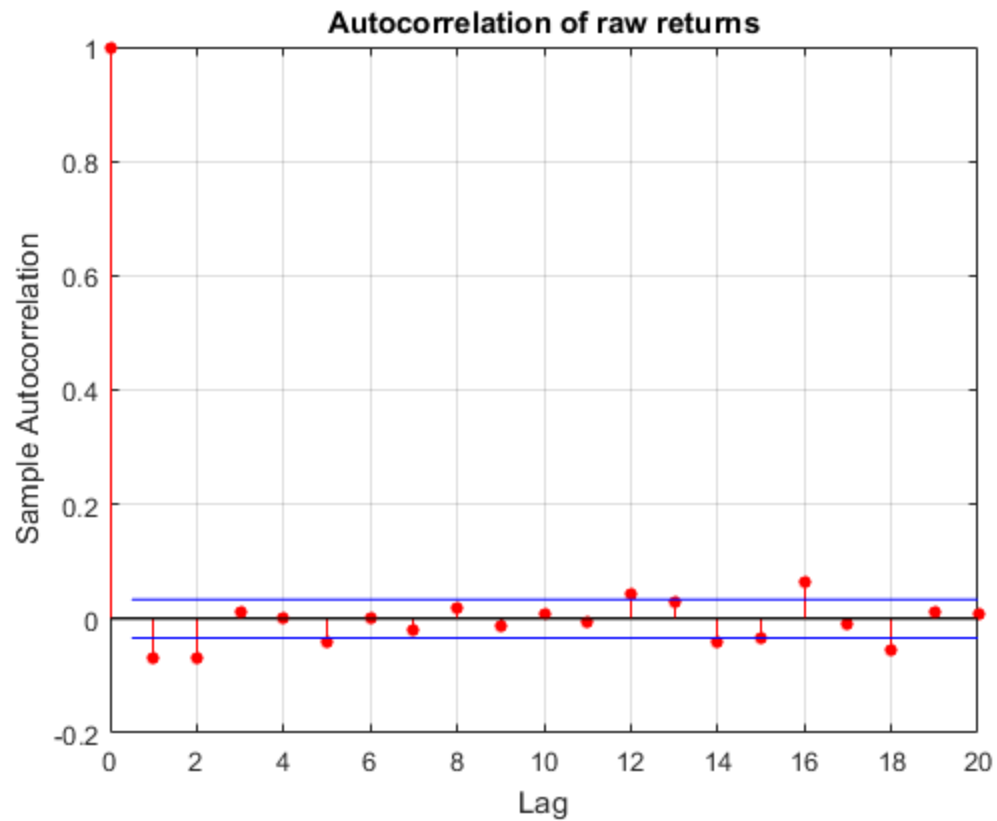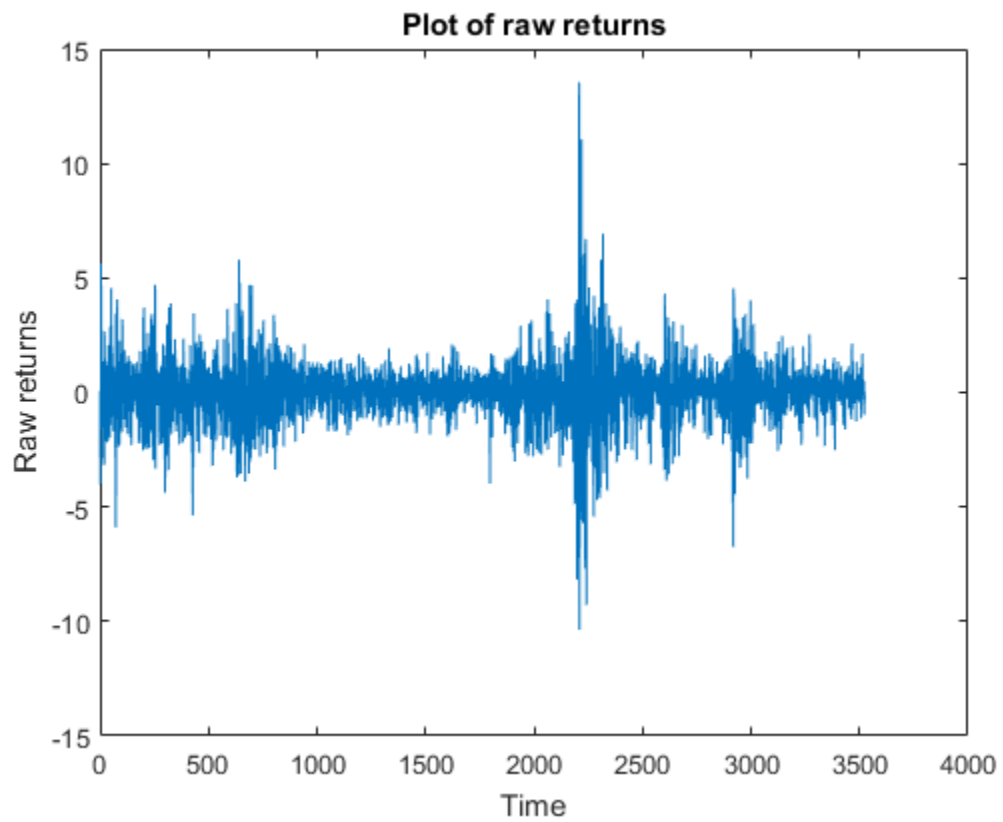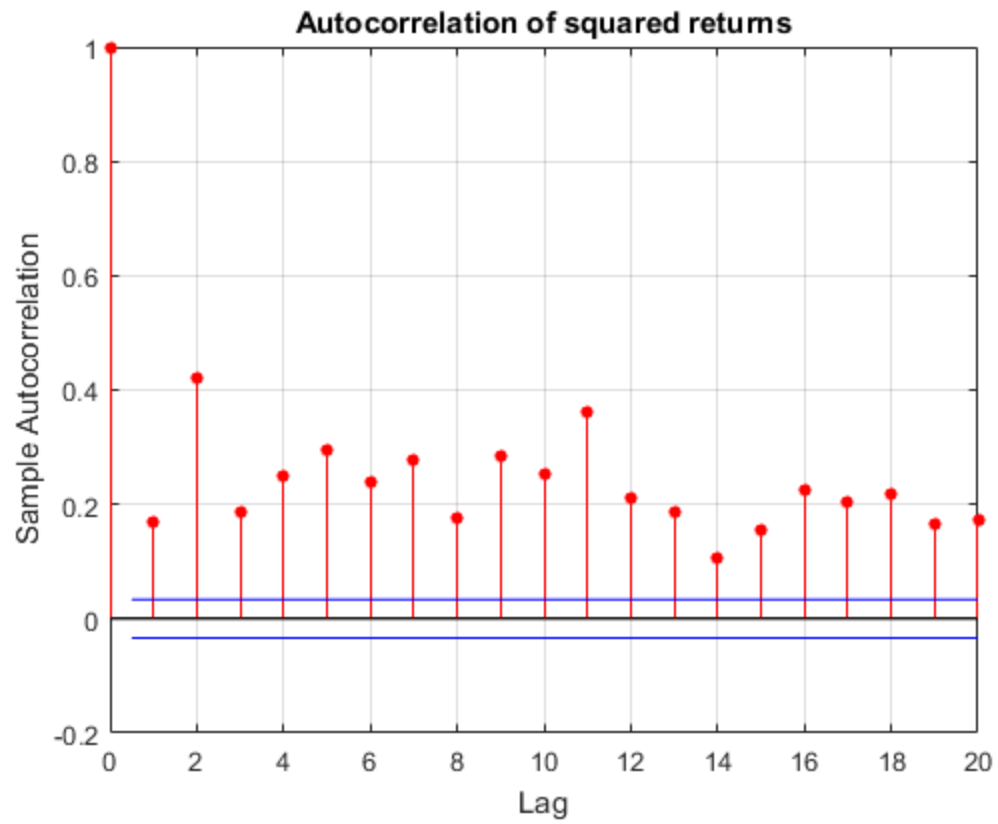
Plot of raw returns

So, from the last chart we see that raw returns are unlikely to be stationary as variance of the series changes with time (and similarly, absolute returns and squared returns). From the ACF plots, we can see that autocorrelations are significantly different from zero and don't decay as lag length increases. Hence, the series is not iid and not ergodic.

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