

Stat 349 Spring 2020

Final Take-home Exam

Option 1 Report

Your Name

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1 Steps 1-3

1.1 Dataset 1: Stock (name of the stock symbol)

The original log return series is plotted in Figure 1.1 on the left panel. The fitted residuals (standardized returns or pseudo-returns) are plotted on the right panel.

1.1.1 The best fitted model is GARCH(1,1) with the following estimated parameter values and standard errors.

Coefficient(s):

	Estimate	Std. Error	t value	Pr(> t)
a0	8.262e-07	2.565e-07	3.221	0.00128 **
a1	8.576e-02	7.835e-03	10.945	< 2e-16 ***
b1	9.130e-01	8.244e-03	110.752	< 2e-16 ***

- Report the sum of the squared error of the final model.
- State the reason why this model is the final model, instead of GARCH(1,2), GARCH(2,1), or GARCH(2,2).

1.1.2 Some diagnostic results

```
> shapiro.test(na.omit(residuals(m11)))  
      Shapiro-Wilk normality test  
data:  na.omit(residuals(m11))
```

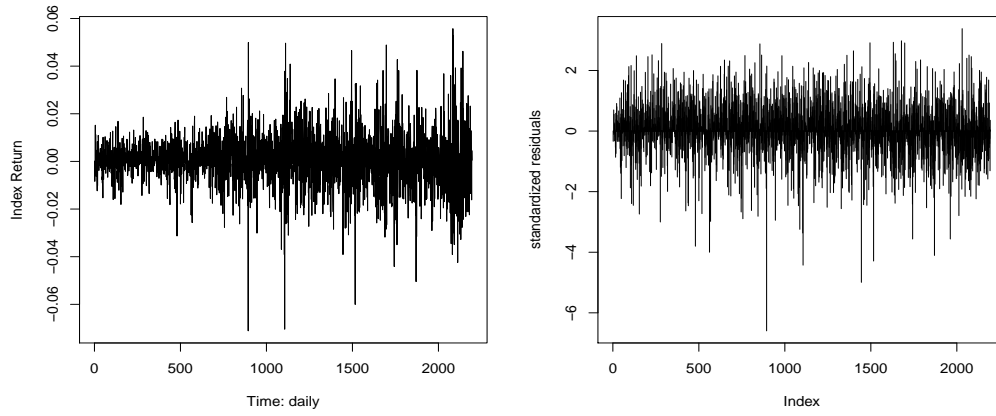


Figure 1.1: The left panel is the log return original series from xx/xx/xxxx to xx/xx/xxxx. The right panel is the fitted residuals (standardized returns or pseudo-returns.)

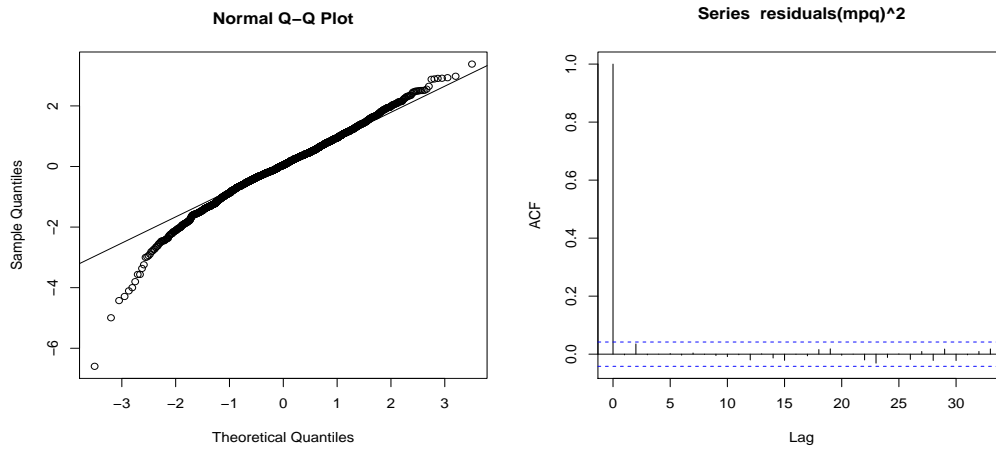


Figure 1.2: The left panel is the residual QQ plot. The right panel is the squared residual ACF plot.

```

W = 0.983, p-value = 1.627e-15
> jarque.bera.test(na.omit(residuals(m11)))
      Jarque Bera Test
data:  na.omit(residuals(m11))
X-squared = 411.39, df = 2, p-value < 2.2e-16
~~~~~

> skewness(na.omit(residuals(m11)))
[1] -0.4531134
> kurtosis(na.omit(residuals(m11)))
[1] 1.918043

```

- The QQ plot and the ACF plot are shown in Figure 1.2.

1.2 Dataset 2: Stock (name of the stock symbol)

Do the same as Dataset 1

1.3 Dataset 3: Stock (name of the stock symbol)

Do the same as Dataset 1

1.4 Dataset 4: Stock (name of the stock symbol)

Do the same as Dataset 1

1.5 Dataset 5: Stock (name of the stock symbol)

Do the same as Dataset 1

1.6 Dataset 6: Stock (name of the stock symbol)

Do the same as Dataset 1

1.7 Dataset 7: Stock (name of the stock symbol)

Do the same as Dataset 1

1.8 Dataset 8: Stock (name of the stock symbol)

Do the same as Dataset 1

1.9 Dataset 9: Stock (name of the stock symbol)

Do the same as Dataset 1

1.10 Dataset 10: Stock (name of the stock symbol)

Do the same as Dataset 1

1.11 Comments on all fitted results with all 10 datasets

You may need to go back to watch the recorded video on those things I emphasized.

2 Step 5

1. Report the sample mean $mean(1/10, 1/10, \dots, 1/10) = ?$ and sample standard deviation $std(1/10, 1/10, \dots, 1/10) = ?$ of r_t .
2. Report the best $(c_1, c_2, \dots, c_{10}) = (?, ?, ?, ?, ?, ?, ?, ?, ?, ?)$, the sample mean $mean(c_1, c_2, \dots, c_{10}) = ?$ and sample standard deviation $std(c_1, c_2, \dots, c_{10}) = ?$ of r_t .
3. Report your optimization procedure.

3 Step 6

The same as Section Step 5.

4 Step 7

The same as Section Step 5.

5 Step 8

Do both similar to Steps 1-3 Dataset 1 and Step 5.

6 Step 9

Do both similar to Steps 1-3 Dataset 1 and Step 5.

7 Step 10

Compare results from Step 5 to Step 9.