

Texevier Tutorial

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Abstract

This is an assignment for the Financial Econometrics 871 course offered at Stellenbosch University. The aim of this tut is to work in Texevier and get a sense of what is required for the larger research project. The results are secondary to the goal of successfully being able to create a neat write-up and include figures and tables with results.

Keywords: Univariate GARCH

JEL classification

Question 1

Create a summary table showing the first and second moments of the returns of these stocks for the following periods:

- 2006 - 2008

	Stock	mean	variance
1	JSE.ABSP.Close	-0.02	0.01
2	JSE.BVT.Close	0.03	0.05
3	JSE.FSR.Close	0.01	0.06
4	JSE.NBKP.Close	-0.03	0.01
5	JSE.RMH.Close	0.03	0.07
6	JSE.SBK.Close	0.04	0.06
7	JSE.SLM.Close	0.04	0.05

Table 0.1: 1st and 2nd Moments of Stock Returns, 2006-2008

- 2010 - 2013

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	Stock	mean	variance
1	JSE.ABSP.Close	0.01	0.01
2	JSE.BVT.Close	0.08	0.02
3	JSE.FSR.Close	0.08	0.03
4	JSE.NBKP.Close	0.01	0.01
5	JSE.RMH.Close	0.07	0.04
6	JSE.SBK.Close	0.03	0.02
7	JSE.SLM.Close	0.09	0.02

Table 0.2: 1st and 2nd Moments of Stock Returns, 2010-2013

For this question, first the returns of each stock over the entire period were calculated. Next, the first and second moments of each are calculated over the two periods before (and including) and after the GFC of 2007/08. The resulting moments of each stock are then summarised (above).

Note: The returns calculation produces two datasets: 1) a tidy dataset with the returns of each stock, 2) a wide dataset with the log-returns for each stock (for use at a later stage). The wide dataset is created by using the `spread()` function on the tidy dataset, after removing the *Close* and *Return* columns.

Comment on the differences between the different periods

Mean returns in the period 2006-2008 are lower than in the period 2010-2013. This makes sense as the first period includes the Global Financial Crisis. The variance is also lower during the period following the crisis. The high variance during the first period is indicative of the panic that struck during the crisis, and the high volatility that followed the crash.

Look at the following completely random in-text reference: Tsay ([1989](#))

Question 2

Calculate the unconditional (full sample) correlations between the stocks.

	JSE.ABSP.Close	JSE.BVT.Close	JSE.FSR.Close	JSE.NBKP.Close	JSE.RMH.Close	JSE.SBK.Close	JSE.SLM.Close
JSE.ABSP.Close	1.00	-0.42	-0.44	0.92	-0.44	-0.48	-0.48
JSE.BVT.Close	-0.42	1.00	0.95	-0.41	0.93	0.90	0.98
JSE.FSR.Close	-0.44	0.95	1.00	-0.43	0.98	0.93	0.97
JSE.NBKP.Close	0.92	-0.41	-0.43	1.00	-0.43	-0.45	-0.48
JSE.RMH.Close	-0.44	0.93	0.98	-0.43	1.00	0.94	0.94
JSE.SBK.Close	-0.48	0.90	0.93	-0.45	0.94	1.00	0.91
JSE.SLM.Close	-0.48	0.98	0.97	-0.48	0.94	0.91	1.00

Table 0.3: Unconditional Correlations Between the Stocks

Question 3

Plot the univariate GARCH ht processes for each of the series.

The wide dataset of log-returns of each stock (produced in the returns calculation of Question 1 a) is used for this question.

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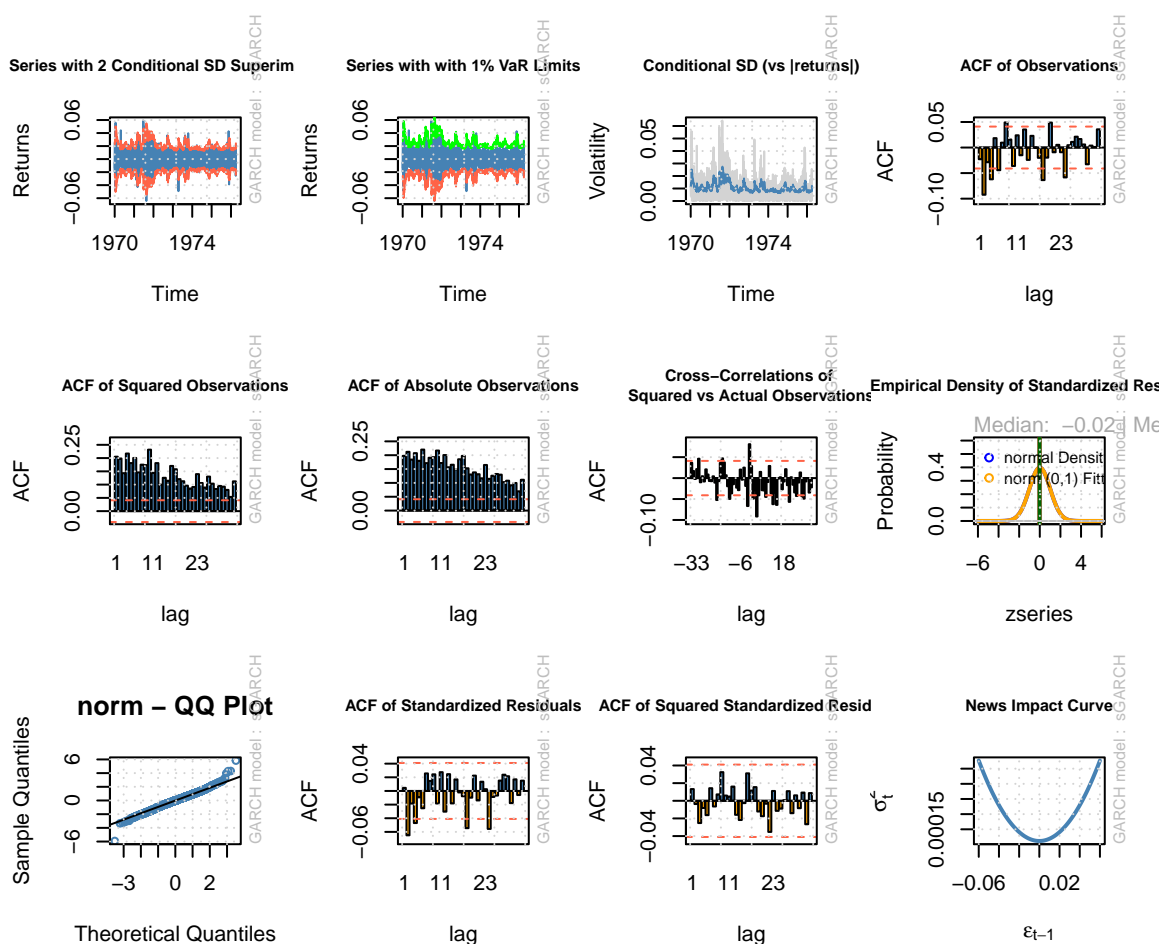


Figure 0.1: GARCH Univariate Plot

Question 4

Plot the cumulative returns series of a portfolio that is equally weighted to each of the stocks - reweighted each year on the last day of June

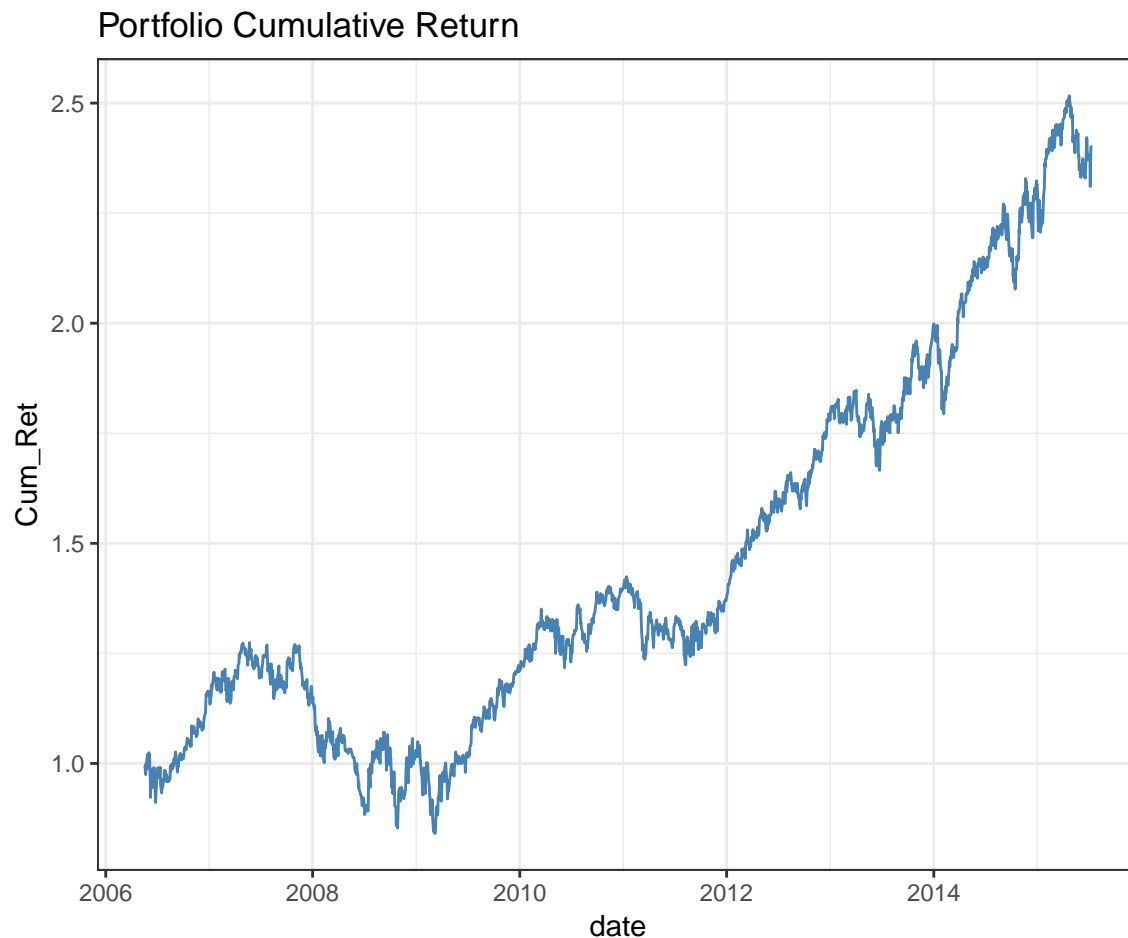


Figure 0.2: Cumulative Plot

The above plot illustrates the cumulative returns of the equally weighted portfolio of the stocks, over the entire period. I was unable to annually reweight the portfolio on the last day of June.

References

Tsay, Ruey S. 1989. "Testing and Modeling Threshold Autoregressive Processes." *Journal of the American Statistical Association* 84 (405). Taylor & Francis Group: 231–40.