

Marinus_Tutorial

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Abstract

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Keywords: GARCH

JEL classification

1. Introduction

The objective of this tutorial is to accumulate experience in working with Texevier and RMarkdown. The tutorial was written in a README with accompanying R Scripts in order to neaten the process. The tutorial answers the following questions: * Create a summary table showing the first and second moments of the returns of these stocks for the following periods: + 2006 - 2008 + 2010 - 2013 * Calculate the unconditional (full sample) correlations between the stocks. * Plot the univariate GARCH ht processes for each of the series. * 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. * See if including the GARCH11 conditional volatility series of SLM (ht,Sanlam) improves the GARCH11 model fit of ABSP (interpret the p-value of the regressor).

2. Data

After loading our findata we inspect the 1st and 2nd moments. From table [2.1](#) and table [2.2](#) it is evident that our sample period from 2006-2008 differs greatly from 2010 - 2013. Upon closer inspection we can see that both the mean and median for the 2nd moment of 2006-2008 is more than twice that of 2010-2013. This paired with the maximum 2nd moment value indicate towards considerably more volatility during the Global Financial Crisis (GFC) period.

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Structurally we can gather from the skewness and kurtosis values of the returns that our period from 2006-2008 have wide tails and fat tails, compared to 2010-2013 where we find negative skewness, indicating relatively more positive returns.

	vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
Return	1	4585.00	-0.01	2.11	0.00	-0.02	1.44	-12.58	12.64	25.22	0.05	3.31	0.03
Return_Sqd	2	4585.00	4.47	10.30	0.94	2.18	1.38	0.00	159.77	159.77	6.18	58.96	0.15

Table 2.1: 1st and 2nd Moments (2006-2008)

	vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
Return	1	7000.00	0.04	1.43	0.00	0.06	1.03	-36.42	6.87	43.29	-2.46	61.35	0.02
Return_Sqd	2	7000.00	2.06	16.33	0.48	1.00	0.70	0.00	1326.58	1326.58	76.38	6184.91	0.20

Table 2.2: 1st and 2nd Moments (2010-2013)

	ABSP	BVT	FSR	NBKP	RMH	SBK	SLM
ABSP	1.00	0.02	0.01	0.18	0.05	0.04	0.04
BVT	0.02	1.00	0.50	0.04	0.48	0.50	0.49
FSR	0.01	0.50	1.00	0.01	0.76	0.71	0.51
NBKP	0.18	0.04	0.01	1.00	-0.00	0.02	0.04
RMH	0.05	0.48	0.76	-0.00	1.00	0.65	0.50
SBK	0.04	0.50	0.71	0.02	0.65	1.00	0.52
SLM	0.04	0.49	0.51	0.04	0.50	0.52	1.00

Table 2.3: Unconditional Correlations

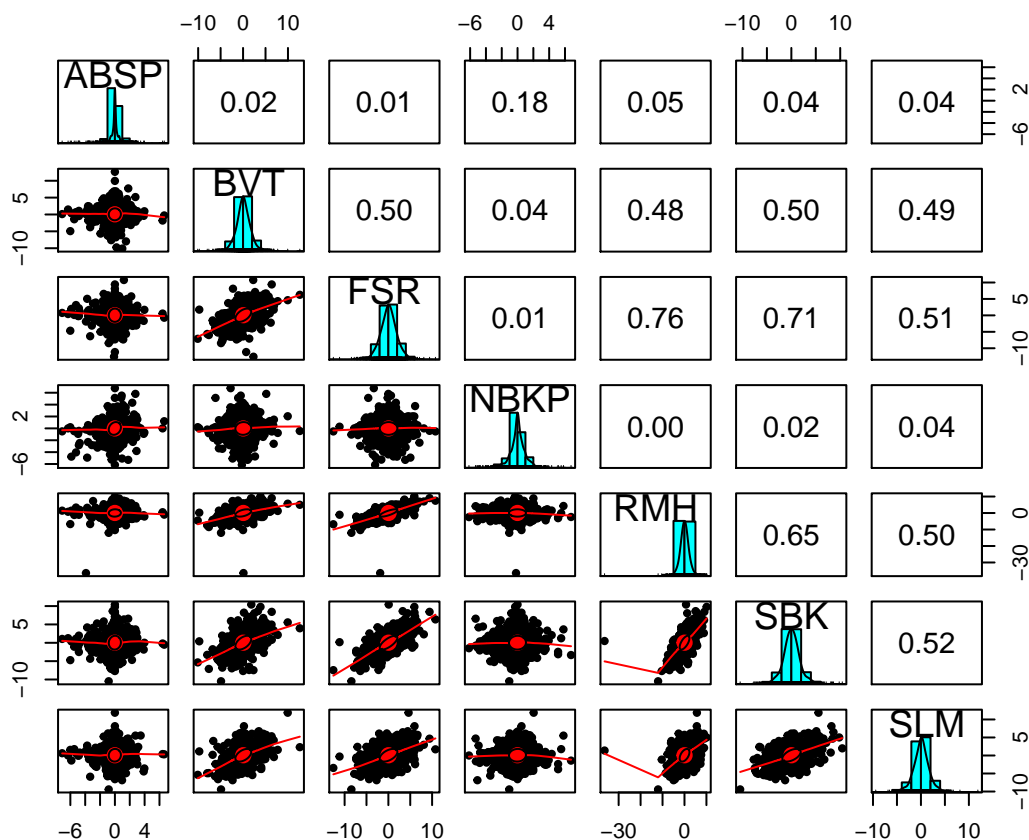


Figure 2.1: Pairs Panel

Table 2.3 and Figure 2.1 above convey the unconditional correlations between the stocks as a table and a pairs panel.

3. Results

The following section illustrate the GARCH ht processes of each stock along with the GARCH11 model for ABSP with a supplementary external regressor (SLM's conditional volatility).

3.1 3.2

	Estimate	Std. Error	t value	Pr(> t)
mu	0.01	0.01	0.84	0.40
ar1	-0.08	0.03	-2.88	0.00
omega	0.06	0.01	5.36	0.00
alpha1	0.19	0.03	6.22	0.00
beta1	0.78	0.03	24.58	0.00
gamma1	-0.14	0.03	-4.79	0.00

Table 3.1: GARCH11

	Estimate	Std. Error	t value	Pr(> t)
mu	0.01	0.01	0.85	0.39
ar1	-0.08	0.03	-2.91	0.00
omega	0.05	0.01	5.12	0.00
alpha1	0.20	0.03	6.53	0.00
beta1	0.76	0.03	24.98	0.00
gamma1	-0.15	0.03	-4.96	0.00
vxreg1	0.01	0.00	2.91	0.00

Table 3.2: GARCH11 with SLM external regressor

According to the work of Tsay ([1989](#)), blah blah

References

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