**Aim**

This is an ***individual*** assignment with the explicit purpose of giving you a chance to apply the econometric techniques encountered in the course of the module.

**Objectives**

To demonstrate:

* competence in the use of EViews;
* skill in interpreting regression output and performing *appropriate* statistical tests.

**The Task**

Your task is to model volatility in returns using univariate financial data. You are required to select **three** *related* financial time series and model the returns correcting for volatility assuming a GARCH (1,1) specification is correct (which needs to be tested). Your data should include a reasonable set of observations (the more the better) and cover a number of recent years (you are advised to use daily, weekly or monthly data).

In carrying out your task you should consider the following questions:

* Is each series stationary? Make any necessary transformation to the data based on your observations (you will need to use graphs and correlograms (which can be reported in an appendix)) and Dickey-Fuller tests.
* Is a GARCH(1,1) appropriate or are there any other GARCH type specifications that may be more appropriate?
* Is each model correctly specified? (You will need to use standard specification tests and make any necessary corrections if warranted).

You are also required to:

* Interpret the estimated coefficients in the mean and variance equations and estimate the *long run* unconditional variance and the annualised volatility.

**Requirements**

* Your assignment should be word processed and set out in a formal professional manner and should include:

a) An introduction that includes a brief description of the modelling technique adopted

stating why it is appropriate.

(10 marks)

b) A brief description of the data employed in the analysis (e.g. their source, frequency,

mean and standard deviation, the sample period etc.).

(10 marks)

c) A description of any testing procedure(s) adopted.

(25 marks)

d) A discussion and interpretation of your results. How do they compare to the results

found in the literature?

(30 marks)

e) A conclusion that includes a statement on which specification performs ‘best’.

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(15 marks)

All statistical tests undertaken and estimated equations should be appropriately reported in table form with standard errors beneath the relevant coefficient estimate together with any diagnostic statistic you think relevant. 10 marks for this assignment will be awarded for the presentation of your written work including the bibliography/reference section. Cutting and pasting of Eviews output is *not* acceptable in the main text but Eviews output can be included in the appendix.

**Note**

* The word limit: is 2,250-2,500 (you are allowed a 10% variation in your word count which means an absolute maximum of 2,750 words excluding appendices and bibliography/references)
* You must also state any data transformations you have employed.
* All sources used: lecture notes, textbooks, research monographs, journal articles, websites etc. should be referenced appropriately.

**Suggested References**

\*Alberg, D., Shalit, H., and Yosef, R. (2008). Estimating stock market volatility using asymmetric GARCH models, 18:1201–1208.

Asteriou, D., and Hall, S. (2011). *Applied Econometrics (chapter 14)*,2nd ed. Palgrave Macmillan.

Brooks, C. (2008). *Introductory econometrics for finance (chapter 8),* 2nd ed. Cambridge: CUP.

Du, Y. (2012). Modeling the volatility of Shanghai composite index with GARCH family models. Sweden: Dalarna University.

\*Emenike, K. (2010). Modelling stock returns volatility in Nigeria using GARCH models. *MPRA*

\*Engle, R. (2001). GARCH 101: the use of ARCH/GARCH models in applied econometrics. *Journal of Economic Perspectives*, 15( 4):157–168.

\*Predescu and Stancu (2011). Portfolio Risk Analysis using ARCH and GARCH Models in the Context of the Global Financial Crisis. *Theoretical and Applied Economics,* 18(2): 75-88.

***Note:***

These articles vary in complexity and you should make every effort to read at least two of them. The paper by Du (2012) is a student paper but does provide a useful guide on how to lay out your report. The paper by Alberg *et al.* (2008) is rather technical and you should avoid the passages on the theoretical proofs. Engle (2001) provides an accessible overview and Emenika provides a reasonable analysis of the Nigerian case (note that the latter article has not been published). Predescu and Stancu use ARCH and GARCH models to help explain volatility to assess portfolio risk during the financial crisis of 2007. However, before reading these articles I suggest you first read the relevant chapters in the textbook.