National University of Singapore
Department of Mathematics

Financial Time Series
QF5210A, AY2018-19, Semester 4

Assistant Prof. Zhou Chao
Department of Mathematics
Office : S17-0814
Email: matzc@nus.edu.sg
https://matzc.github.io/teaching/
Consultations : Before & after lectures

This module introduces students to financial time series techniques, focusing primarily on regression models, ARIMA models, conditional volatility (ARCH/GARCH models), cointegration, and their applications on real-life financial problems. We provide both the relevant time series concepts and their financial applications. Potential applications of financial time series models include modeling equity returns, volatility estimations and Value at Risk modelling. This module targets students in the Master of Science in Quantitative Finance Programme.

Books :

— *Analysis of Financial Time Series, 3rd Edition*, Ruey S. Tsay, Wiley, 2010. Chapters 1-4, 7, 8, 10.
E-book available on the website of NUS Libraries.
(https ://libportal.nus.edu.sg/frontend/)
Software : S-Plus

— *Statistics and Data Analysis for Financial Engineering*, David Ruppert, Springer, 2010. Chapters 2, 4, 5, 7, 9, 10, 12, 14, 15, 18, 19. E-book available on the website of NUS Libraries. Software : R

— *Introductory Econometrics for Finance, 2nd Edition*, Chris Brooks, Cambridge University Press, 2008. Chapters 2-8, 11. E-book available on the website of NUS Libraries. Software : EViews

Approximate Schedule

Week		*Topics*
1.	May 11	Intro : R, basic proba & stats
2.	May 11	Statistical inferences
3.	Aug 12	Linear regression
4.	Jun 29	Logit and probit models
5.	Jun 29	Univariate time series analysis
6.	Jun 30	Autoregressive (AR) models
7.	Jul 13	ARIMA modelling
8.	Jul 13	ARCH modelling
9.	Jul 14	GARCH modelling and beyond
10.	Jul 27	Risk measures
11.	Jul 27	Risk management
12.	Jul 28	Multivariate TS and cointegration
-.	Aug 3	**Final** (2.5 hours in the afternoon)

Course Requirements and Grades

The final grade will be generated from following components :

No Midterm, In-Class Test (30%), Regular Homework (20%), Final (50%)

1. Regular Homework

Homework assignments are *not* optional and must be done by *a group of two students*; they are integral to an understanding of the material. In order to encourage you in this, some of the problems on the examination may be taken from the homeworks.

2. In-Class Test and Class Attendance

Because of the short duration of the course, students are expected to attend every class meeting.

From time to time students will also be asked to solve some problems taken from the textbook in class (open book, open notes). The problems will be directly related to the lecture given on that date and the previous lecture.

3. Final Examination

This will be a **open book** examination. **The final exam will be given in the afternoon**

of Aug 3, 2019. The final exam will cover *material from the entire course.*

4. Lecture, Readings, and Back Issues of the Handouts

You are responsible for everything that transpires in class and for obtaining any written material that is distributed.

5. Final Notes

— Handouts contain important information. Make certain that you read them, understand them, and file them for future reference.

— **No late homework will be accepted**.

— **No makeup examination will be given,** unless we get a written permission from the relevant officer.