



The University of Dublin Trinity College



**School of Business
TRINITY COLLEGE DUBLIN**

Masters in Finance

**FINANCIAL ECONOMETRICS
February 2011
PRELIMINARY**

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COURSE OUTLINE AND LEARNING OUTCOMES

The purpose of the course is to help you learn relatively advanced econometric techniques to analyze data and how to use those techniques to reliably extract information from data. The course explores characteristics of time series and how to discern summary statistics and patterns that are informative. The course will focus on linear and nonlinear time series analysis, including substantial analysis of volatility estimation.

Learning outcomes:

Upon successful completion of this course, you will:

- Be able to intelligently use basic time series analysis, including applying these techniques to messy data.
- Be able to intelligently use linear time series analysis.
- Be able to intelligently use volatility models to characterize data. This includes the ability to reliably estimate such models and tell the difference between reasonable inferences and not so sensible inferences.
- Have a basic knowledge of Value at Risk.
- Be able to explain the importance of examining your data before applying some fancy econometric technique to them.

CFA Candidate Body of Knowledge:

The material covered in this course is related to the Quantitative Methods of the CFA Candidate Body of Knowledge. De Fusco et al., (2007) *Quantitative Investment Analysis* has been used for CFA Level I, II and III examinations. This course covers partly overlapping material, although the content goes well beyond that book and is intended to provide knowledge enough to work as a quantitative analyst given other knowledge.

TEXTBOOK AND READINGS

Textbook

Brooks, Chris. *Introductory Econometrics for Finance* 2nd Edition.

Additional required and suggested readings may be assigned from relevant books and academic journals and other sources.

Empirical analysis of data will be a very important part of the course. I suggest that you buy a student copy of a time series program. I will use EViews in class. The student version of Eviews is cheap (relative to such programs, not necessarily your income). If you are comfortable with some software program, familiar with it and the program can do estimation discussed in class, use that program. I generally use SAS at work but am using EViews because you are unlikely to be familiar with SAS. Eviews includes the statistical techniques covered in this class, is relatively simple to learn and use and is used in the website related to the book at <http://www.cambridge.org/features/economics/brooks/student.html>. MATLAB and RATS are two other programs besides Eviews and SAS that are commonly used by financial professionals.

ASSESSMENT

Assessment will be based on analysis of a couple of data series chosen by you using techniques in class (10%), an individual project in which you analyze data and draw inferences (35%) and an examination after the course (55%).

Exam Date: TBA

Exam venue: TBA

Deadline for Project Submissions: A reasonable length of time after the lectures. The simple analysis using the techniques learned in class will be due a week after class ends. The larger individual project will be due about two weeks before the exam.

Late Submission Policy: Students unable to submit an assignment on time for medical reasons must produce a medical certificate to the lecturer within three working days of

the missed submission deadline. Assignments submitted after the indicated deadline in all other cases will not be accepted.

Plagiarism

Plagiarism is interpreted by the University as the act of presenting the work of others as one's own work without acknowledgement, and as such, is considered to be academically fraudulent. The University considers plagiarism to be a major offence and it is subject to the disciplinary procedures of the University. The University's full statement is set out in the University Calendar, Part I, "General regulations and Information":

http://www.tcd.ie/about/calendar/pdf/general_information.pdf

ATTENDANCE

I will not track attendance. The very intense schedule with all classes in one week makes each class quite important. Missing one class will be equivalent to missing two weeks during a regular term.

INTRANET

Lecture slides, announcements and projects and term results will be posted on the School of Business Intranet site.

FACULTY

Gerald P. Dwyer is Director of the Center for Financial Innovation and Stability at the Federal Reserve Bank of Atlanta, where he leads the Bank's efforts on these issues. Prior to joining the Atlanta Fed, Dr. Dwyer was a faculty member at research universities. He is a past President of the Society for Nonlinear Dynamics and Econometrics, which honored him by creating the Gerald P. Dwyer prize in Financial Econometrics. His research on financial markets and banking has appeared in leading economics and finance journals, including his recent research on the financial crisis. He writes a monthly commentary available at http://www.frbatlanta.org/cenfis/pubscf/notes_from_vault.cfm, and additional details are available at <http://www.jerrydwyer.com>.

COURSE SCHEDULE

This is indicative. The time allocated to subjects will change over time.

The courses will consist of four to five hours of lectures per day. This will be followed by analysis of data using the statistical techniques discussed that day. Class will be held Monday through Friday.

Each day will consist of lectures combined with some analysis of data before the next class. The slides for last year's class are available at <http://www.jerrydwyer.com/courses/>. The book for this year is different, so the slides this year will be quite different but the

coverage is broadly similar. The slides will be available before each class on the School of Business Intranet website.

Your background knowledge should be enough that you are broadly familiar with the material on linear regression in Chapters 2, 3 and 4 in Brooks, material that will not be covered in class.

The topics listed are the ones I intend to cover. For this course, you need not concern yourself with mathematical analysis to prove statements or computer programming to obtain estimates. Rather, the goal is to learn statistic and econometric tools and be able to use them to analyze financial markets and, to a lesser degree, to forecast the future. The lecture notes are good guides to what is most important. There is not enough class time to talk about less important things.

Topics

Estimation

The notes are adequate reminders, so there is no required reading. You might want to consult a statistics or econometrics book with which you are familiar about the discussion in class to see the relationship between what you already know and what I'm saying.

Introduction to financial econometrics

Brooks, Chapter 1

Univariate linear time series

Brooks, Chapter 5

Multivariate linear time series analysis

Brooks, Chapter 6

Long-run relationships

Brooks, Chapter 7

Volatility

Brooks, Chapter 8

Nonlinear time series

Brooks, Chapter 9

“[Nonlinear time series and financial applications](http://www.jerrydwyer.com)”, Gerald P. Dwyer, available at <http://www.jerrydwyer.com>

Introduction to Value at Risk

Value at risk

RiskMetrics: Gilles Zumbach, A Gentle Introduction to the RM 2006 Methodology

(available on the School of Business Intranet website and at

<http://www.riskmetrics.com/publications/techdocs/rm2006.html>)

If you are interested, you might want to read further in Gilles Zumbach, The RiskMetrics 2006 Methodology (also available on the Intranet website and at RiskMetrics)

Simulation in financial econometrics

Brooks, Chapter 12