

## 2018-2019: MODULE DESCRIPTION

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|-------------------|---|
| <b>Module</b>     | <b>Quantitative Methods in Finance</b>  |
| Module code       | ECOM053   |
| Credit value      | 15  |
| Module convenor:  | <b>Panagiotis Koutroumpis</b><br><b>p.koutroumpis@qmul.ac.uk</b><br><b>Office: GC 3.32</b><br><b>Office Hours: Wednesdays 10:00-12:00</b> |
| Formal assessment | 20% mid-term test, (TBC)<br>80% final exam  |

### Teaching arrangements

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|---------------------------------|---|
| Lectures (2 hours, weekly)      | Monday 6-8pm; Peston LT GCG10, Tuesday 10-12am Bancroft 2.40, Tuesday 12-2pm; Fogg LT, Tuesday 2-4pm; Skeel LT<br><br>Starting Date: Week 2, Monday October 1 <sup>st</sup> , 2018. |
| Support classes (1 hour weekly) | Starting Date: Week 2   |

### Teaching team and contact details

|                                    |  |
|------------------------------------|--|
| Lecturer: Panagiotis Koutroumpis   | <a href="mailto:p.koutroumpis@qmul.ac.uk">p.koutroumpis@qmul.ac.uk</a> |
| Teaching Associate: Fabio Calonaci | <a href="mailto:f.calonaci@qmul.ac.uk">f.calonaci@qmul.ac.uk</a>       |

## Module Overview

### (i) *General Information*

The aim of this course is to introduce a range of modern econometric techniques which are an essential part of advanced empirical and practice in finance. The course is designed to give students an understanding of why the specific econometric tools are used, and to provide them with a working ability to apply them to financial data. The course consists of 10 weekly lectures and support classes. The lecturer will cover the theory as well as applications that illustrate the theory in practice. Support classes will be focused on solving exercises and on applying the theory introduced in the lectures.

### (ii) *Support Classes*

Exercises will be posted in QM+ one week in advance. Students should solve these exercises before the class. During the class, the Teaching Assistant will discuss these exercises, and he will help students with any questions they may have on them and on the lecture material.

## Module weekly syllabus

### **Section 1: Statistical Inference**

Concepts: Estimators, Hypothesis Tests, Significance, p-values, Confidence Intervals

Reading: Brooks, Ch.1 and Ch.3

### **Section 2: Linear Regression I**

Concepts: Classical Linear Regression Model, Ordinary Least Squares, Standard Errors, t-statistics

Reading: Brooks, Ch.3

### **Section 3: Linear Regression II**

Concepts: Multiple Regression, F-tests, Goodness-of-fit statistics

Reading: Brooks, Ch.4

### **Section 4: Classical Linear Regression Model Assumptions**

Concepts: Heteroscedasticity, Autocorrelation, Multicollinearity, Non-normality, Instability

Reading: Brooks, Ch.5

### **Section 5: Panel Data**

Concepts: Dummy Variables, Fixed-effects Models, Random-effects Models

Reading: Brooks, Ch.11

### **Section 6: Volatility Models**

Concepts: ARCH, GARCH models

Reading: Brooks, Ch.9

### **Section 7: Event-study**

Concepts: Cumulative Abnormal Returns, Buy-and-hold Returns

Reading: Brooks, Ch.14

### **Section 8: Time Series Models\***

Concepts: Stationarity, MA, AR, and ARMA Models, Information Criteria, Unit-root Testing

Reading: Brooks, Ch.6 and Ch.8

### **Section 9: Instrumental Variables\***

Concepts: Endogeneity Bias, Exogeneity, Identification, Two-Stage Least Squares

Reading: Brooks, Ch.7

\* The topics in Section 8 and 9 will be covered if time permits.

## **Reading List**

The main textbook for the course is Brooks, C. (2014). *Introductory Econometrics for Finance*, Third Edition. Cambridge University Press, Cambridge.

Lecture notes will also be provided. Please check QM+ frequently, as lecture notes and problem sets will be posted there.