

# ECON0022

## ECONOMETRICS FOR MACRO AND FINANCE

### COURSE PLAN

AUTUMN 2021

#### COURSE OUTLINE

Week	Lectures	Tutorials	PS's & AS's
6 (04/10–08/11)	Introduction to time series	–	PS.1 posted
7 (11/10–15/10)	AR, MA and ARMA models	–	PS.2 + AS.1 posted
8 (18/10–22/10)	Estimation & inference in AR	PS.1	PS.3 posted; AS.1 due
9 (25/10–29/10)	Forecasting & model selection	PS.2	PS.4 + AS.2 posted
10 (01/11–05/11)	Stochastic trends	–	PS.5 posted
11 (08/11–12/11)	<i>Reading week</i>	–	–
12 (15/11–19/11)	Stock return predictability	PS.4	PS.6 + A.3 posted; AS.2 due
13 (22/11–26/11)	Structural breaks	PS.5	PS.7 posted
14 (29/11–03/12)	Dynamic causal effects	–	PS.8 + EP posted; AS.3 due
15 (06/12–10/12)	CAPM and factor models	PS.7	PS.9 posted
16 (13/12–17/12)	Volatility models	PS.8	AS.4 due

Notes: PS = problem set; AS = assignment; EP = empirical project. PS.9 will be covered in review lecture. Video recordings with answers to PS.3 and PS.6 will be posted on Moodle.

#### READING LIST

The course is based on lecture notes [LN] and slides that will be made available on UCL Moodle as we progress. Below, you will find recommended readings for each of the topics covered<sup>1</sup>:

1. Review of regression analysis ([LN] 1; [SW] 4-8); Introduction to time series data ([LN] 2; [SW] 14.1-14.2)
2. Limit results for time series data; AR, MA and ARMA models ([LN] 2-3; [SW] 14.3-14.4 and Appendix; [JH] 1-3)

<sup>1</sup>\* Indicates advanced material. LN 1 = Lecture Notes, Ch. 1, SW 4-8 = Stock & Watson, Ch. 4-8, etc.

3. Estimation and Inference in AR models ([LN] 3; [SW] 14.3; [SW] Appendix.14.1-14.4; [JH] 1-3)
4. Forecasting and Lag Length Selection ([LN] 4; [SW] 14.4-14.5 and Appendix, 16.2; [JH] 4\*)
5. Stochastic trends and unit roots ([LN] 5; [SW] 14.6 and 16.3; [SW1]; [JH] 15-17\*)
6. Stock Return Predictability ([LN] 9; [CN] 1-4 and 5-8; [PT1]; [PT2]; [CLM] 2\*)
7. Structural Breaks ([LN] 6; [SW] 14.7; [BEH]; [JH] 22\*).
8. Dynamic Causal Effects ([LN] 7; [SW] 15.1-15.7; [SW] Appendix 15.2)
9. Capital Asset Pricing Model + Multifactor Asset Pricing Models ([LN] 11; [CN] 5 and 7-8; [FF]; [LM] 5\*-6\*)
10. Volatility Models, ARCH/GARCH ([LN] 12; [CN] 20; [SW] 16.5; [RE]; [CLM] 12.2\*; [JH] 21\*)

[SW] contains the necessary basic econometrics that you should be familiar with, and provides a non-technical introduction to the time series tools that we will use. It also contains a number of empirical illustrations. [JH] is a graduate text book providing a more in-depth, rigorous treatment of the necessary time series analysis tools.

[CN] is an undergraduate text book on quantitative finance and provides a relatively non-technical introduction to the finance topics covered in this course. [CLM] is a graduate text book on financial econometrics with more emphasis on the econometric techniques involved.

Coverage of specific topics can be found in the reviews provided in [FF], [RE], [BEH], [PT1], [PT2] and [SW1]. These can be downloaded for free within the UCL network.

None of the text books and articles are required reading but make up a useful supplement to the lecture notes. In particular, since the lecture notes will not go into details with all the topics, you might find additional useful information in the books and articles that will help you understand the material better. The lecture notes will contain references to the relevant parts of these.

#### PROBLEM SETS AND ASSIGNMENTS

Problem sets will be posted weekly (on Fridays) and will contain a mix of theoretical and applied problems. Solving these problems are essential for doing well in the exam, since the exam paper format will be similar to the exercises.

A subset of the problems will be covered during tutorials; the remaining ones are meant for self-study. Solutions to all problems will be posted after tutorials so you can check your answers.

Three of the problem sets will contain assigned problems that should be handed in for marking. Each of these assignments must be handed in on Thursday the week after it has been posted.

#### EMPIRICAL PROJECT

In week 8 of Term 1 an empirical project will be posted on Moodle. Submissions are due in week 9 and will be marked. Your mark for the empirical project will count 20% towards the final one. The project will involve applying some of the tools and methods you have been taught to the analysis of a time series data set. All the exercises can be done in Stata but you can use another software package if you wish. You are allowed to work in groups of up to three persons, but can also work on your own.

## References

- [CLM] J.Y. Campbell, A.W. Lo and A.C. MacKinlay, 1997, "*Econometrics of Financial Markets*," Princeton University Press.
- [CN] K. Cuthbertson and D. Nitzche, 2004, "*Quantitative Financial Economics: Stocks, Bonds and Foreign Exchange*," 2nd Edition, Wiley & Sons.
- [RE] R. Engle, 2001, "GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics," *Journal of Economic Perspectives*, vol. 15, pp. 157–168.
- [FF] E.F. Fama. and K.R. French, 2004, The Capital Asset Pricing Model: Theory and Evidence, *Journal of Economic Perspectives* 18, pp. 25–46.
- [JH] J. Hamilton, 1994, "*Time Series Analysis*," Princeton University Press.
- [BEH] B.E. Hansen, 2001, "The New Econometrics of Structural Change: Dating Breaks in U.S. Labor Productivity," *Journal of Economic Perspectives*, vol. 15, p. 157–168.
- [PT1] M.H. Pesaran and A. Timmermann, 1992, "A Simple Nonparametric Test of Predictive Performance", *Journal of Business & Economic Statistics*, Vol. 10, pp. 461-465.
- [PT2] M.H. Pesaran and A. Timmermann, 1995, "Predictability of Stock Returns: Robustness and Economic Significance," *Journal of Finance*, Volume50, pp. 1201–1228.
- [SW1] Stock, J.S. and M.W. Watson, 1988, "Variable Trends in Economic Time Series," *Journal of Economic Perspectives*, vol 2, pp. 147–174.
- [SW] J.H. Stock and M.W. Watson, 2013, "*Introduction to Econometrics*" (4th Edition), Addison-Wesley Series in Economics.