

ECONOMETRICS OF HIGH FREQUENCY DATA

ENFIN824		3 Credits
Professor	Aleksey Kolokolov	
Assitant	-	

COURSE DESCRIPTION

The course provides an introduction to high frequency financial econometrics with emphasis on understanding the core theory and its applications. Topics include financial price modelling in continuous time (jump diffusions, semi-martingales), volatility estimation and forecasting using high-frequency data and overview of recent developments, such as measurement errors (noise) and inference for the drift. The primary focus is on understanding and applying the main theorems with the ideas made understandable by application to observed data at realistic frequencies.

Nowadays financial econometrics has evolved into a highly sophisticated discipline, characterized by elevated mathematical rigor and complexity. However, the objective of this course is not in explaining the mathematical details of derivations or reproducing the details of the proofs. It is rather in explaining the main ideas of the theory and relevant mathematical concepts intuitively to render financial econometrics more accessible for a broader audience.

I.- COURSE LEARNING OBJECTIVES

The course is intended for both those students seeking a general background in high frequency financial econometrics for possible use in other areas and for the potential specialists who need some exposure to the frontiers of the sub-field.

1. Main objective of the course is to gain the amount of knowledge of high-frequency econometrics sufficient for understanding current literature
2. Understanding financial price modelling in continuous time (diffusions and jumps)
3. Understanding the difference between high-frequency econometrics and classical time series financial econometrics.
4. Understanding the principle of realized variance. Studding the current approaches to volatility predictions.
5. Understanding the challenges faced by an econometrician/practitioner, which appear in applications.

II.- CONTENTS

Topic	Content	Mandatory Reading	Activities
1	Modelling financial prices in continuous time	Lecture slides, Ait-Sahalia, Y. and J. Jacod (2014). High Frequency Financial Econometrics. Princeton.	Lectures, home reading
2	Measuring and predicting volatility using high-frequency data	Lecture slides, Ait-Sahalia, Y. and J. Jacod (2014). High Frequency Financial Econometrics. Princeton.	Lectures, home reading
3	Market microstructure noise	Lecture slides, Ait-Sahalia, Y. and J. Jacod (2014). High Frequency Financial Econometrics. Princeton.	Lectures, home reading
4	Modelling drift	Lecture slides	Lectures, home reading

III.- METHODOLOGY, EVALUATION AND BASIC REGULATIONS

3.1.- Methodology:

The course is delivered in a form of in-class lectures. The students are required to attend the lectures and read additional material supplied during the lectures. Students will be proposed several take home exercises, which helps to understand the lectures. Solving the exercises is optional (it does not affect the course evaluation).

3.2.- Evaluation:

The evaluation is based on an in-class exam

3.3.- Basic Regulation

1. Students must have at least 75% attendance in the course to be able to pass it.
2. The classes will be the days and hours indicated by the program address.
3. For each class, the students must have read and studied in advance the corresponding bibliography.
4. The qualification of all the evaluations will be done with a score from 1 to 7.
5. The teacher reserves the right to add, delete or replace bibliography during the course of the program if he deems it appropriate for the course of the course.
6. The unjustified absence of a student to a requirement will be scored with note 1.
7. It is important to emphasize that each student must assume his / her own responsibility in fulfilling the program, especially in relation to:
8. to. Be up to date on the development of the subject and the various indications given by both the

teacher and the course coordinator. For example, absence from a class session does not exempt you from the academic obligations indicated on that day.

9. Ensure the faithful compliance with the dates and deadlines established for the different evaluation activities. Once fixed and known, they will not be modified.
10. Obtain the support material indicated for the chair when appropriate.
11. All work submitted during the course of the program will only be of value to the extent that the author is able to explain and endorse them personally. Deliveries that contradict the above are not accepted. All medical justification corresponding to non-attendance to a requirement must be presented through the regular channels established by the University.
12. All forms of copy and / or plagiarism are penalized drastically, failing the chair with a grade of 1.0. To avoid any inconvenience, please check the relevant regulations here.

IV.- BIBLIOGRAPHY

Mandatory Readings

- Ait-Sahalia, Y. and J. Jacod (2014). High Frequency Financial Econometrics. Princeton.

*Syllabus subject to changes