

Finance Theory PhD Course

Semester One 2023

Instructor: Professor Tom Smith

Tom's research interests are in the areas of Environmental Finance, Asset Pricing Theory and Tests; Design of Markets - Market Microstructure and Derivatives. His articles have appeared in leading journals including the Journal of Financial Economics, Journal of Finance, Review of Financial Studies, Journal of Financial and Quantitative Analysis, Journal of Business, Journal of Law and Economics, Journal of Accounting Research. Tom is particularly proud of all of his PhD students and the fact that they have more than 50 tier 1 publications in the Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Financial and Quantitative Analysis and Journal of Business. Tom's students credit the PhD course work in Finance Theory and Finance Empirical as providing a great base for their research careers.

Overview

This course, which is the first in the sequence of doctoral seminars offered in finance, is designed to introduce students to the major models of asset pricing and to rational expectations models. All of the material is developed from first principles, so there are no formal prerequisites for taking this seminar. It is assumed, however, that students are familiar with basic microeconomic theory and have a working knowledge of both calculus and matrix algebra. The outline that follows provides a brief description of the material that is covered in the course. The course consists of three 2 Day Modules which deal with three broad categories of asset pricing models: single-period static models and discrete time intertemporal models (Module 1), continuous time mathematics, Black Scholes and continuous time models (Module 2) and finally rational expectations models: fully revealing equilibrium, noisy rational expectations equilibrium, the Kyle model, its extensions and future directions (Module 3). The general approach will be:

- to examine the economic intuition behind each model
- provide a mathematically rigorous derivation of the model
- discuss the model's important features, and
- outline the testable implications of the model.

Textbooks

There are no required texts for this course. The following books are useful references:

- Huang and Litzenberger, 1988 *Foundations for Financial Economics*, North-Holland (Elsevier Science Publishing, New York).
- Ingersoll, 1987 *Theory of Financial Decision Making*, Rowan and Littlefield (Totowa, NJ).
- Cochrane, 2005 *Asset Pricing Revised Edition*, Princeton University Press.
- O'Hara, 1995 *Market Microstructure Theory*, Blackwell Publishers, Cambridge Mass.

Grading

There will be two assignments in the course. These assignments can be done either individually or in groups but group work is encouraged as this helps to develop a cohort which is very valuable to you as your research career goes forward. Each group will get a chance to present solutions to the problems in class. This gives the other students in the class a chance to see how a particular group approached the problems, and also provide members of the presenting group with an opportunity to develop their presentation skills. In addition to the assignments, there will be a final exam.

The exam will be 3 hours in duration and will be closed book, closed notes. The assignments determine 30% of the course grade; the remaining 70% is based on the performance on the final exam.

Venue

The class will be online this year with a zoom session 3-5 on Saturday for each module.

Timetable

Module 1 Saturday 25th February

Module 2 Saturday 25th March

Module 3 Saturday 29th April

Final Exam: Thursday June 15th 2-5pm

List of Topics

The following is a list of topics that will be covered in the course along with the associated reading assignments. A set of class notes will be available.

Module 1 Discrete Time Models

The Capital Asset Pricing Model (CAPM)

- Class Notes
- Huang and Litzenberger chapters 3 and 4
- Ingersoll chapters 3 and 4

The Arbitrage Pricing Theory (APT)

- Class Notes
- Ingersoll chapters 2 and 7

State Preference Models

- Class Notes
- Huang and Litzenberger chapters 5, 6, and 7

The Lucas Model

- Class Notes
- Ingersoll chapters 10 and 11

The Pricing Kernel Approach: Putting the Models together

- Class Notes

Module 2 Continuous Time Models

Continuous Time Mathematics

- Class Notes
- Ingersoll chapters 12 and 16

The Black--Scholes Option Pricing Model

- Class Notes
- Ingersoll chapter 14

The Merton Model

- Class Notes
- Ingersoll chapter 13

The Breeden Model

Class Notes

- Ingersoll chapter 15

The Cox--Ingersoll--Ross Model (CIR)

- Class Notes
- Ingersoll chapter 18

Module 3 Rational Expectations Models

The Grossman Model

- Class Notes

The Admati Model

- Class Notes

The Kyle Model

- Class Notes

Extensions of the Kyle Model and future directions

- Class Notes

Review of the Course