

Financial Theory IV, Part I (Spring 2025)

FINC-GB 2337 P1

Prof. Daniel Greenwald

Syllabus: February 4, 2025

Course Description

This course covers the theory, solution, and estimation of structural models in finance and macroeconomics. The first section of the course (3 lectures) presents core methods for solving and estimating these models, while the second section of the course (3 lectures) studies structural models of asset prices, firm finance, and household finance. The intended course outline is as follows.

- **Lecture 1: Computational Methods.** Core numerical tools for structural modeling. Most of the focus is on methods for functional approximation, which are key to solving models with projection methods. Methods and best practices for numerical integration, differentiation and root finding are also presented.
- **Lecture 2: Solving Models.** Techniques for solving structural models. We will first cover simpler methods (linearization, perturbation, perfect foresight paths) before tackling nonlinear projection methods and solution techniques for heterogeneous agent economies.
- **Lecture 3: Estimating Models.** Methods for estimating the parameters of structural models. We will review the Generalized Method of Moments (GMM), then move on to time series methods (the Kalman, particle, and Hamilton filters) and methods for Bayesian estimation (Markov Chain Monte Carlo, Sequential Monte Carlo).
- **Lecture 4: Asset Pricing.** Workhorse models to endogenously price assets based on their cash flow structure. We will focus on log-affine stochastic discount factor models — a flexible and tractable class of models that allow for time series estimation.
- **Lecture 5: Firm Finance.** Links between corporate finance and the macroeconomy. We will cover modeling key corporate finance channels influencing macroeconomic dynamics, including the financial accelerator, earnings based constraints and other debt covenants, and credit lines.
- **Lecture 6: Household Finance.** Connections between household balance sheets and the macroeconomy. We will focus on housing and mortgages, the main balance sheet items of the household. Special attention will be paid to the mechanisms connecting mortgage credit and house prices and the theoretical conditions that determine their strength.

Instructor

Prof. Daniel Greenwald

Email: dlg340@stern.nyu.edu.

Office hours: Thursday 3pm - 4:30pm (or by appointment), KMC-9-97.

Class Schedule

The class meets once per week in person on **Tuesday from 1:30pm to 4:30pm**.

Location: KMC-191 (Gruber Room).

Prerequisites

The course is designed to be self-contained. However, to succeed in this class, it is helpful to be comfortable with statistics, calculus, and microeconomics.

Course Websites

- **Brightspace** (<https://brightspace.nyu.edu/>): This is the core website for the course, where all materials and assignments can be found. It is your responsibility to keep up with the announcements posted on the course website.
- **My Website** (<https://www.dlgreenwald.com/teaching.html>): Additional copy of materials in case anyone does not have access to Brightspace.

Course Materials

- **Class notes:** These are the main materials for the course and should be self-contained. Class notes are handed out in class and are also available on the course website.
- **Related papers:** Papers mentioned in the lectures will be posted on Brightspace when possible.

Course Requirements

Course requirements include regular attendance and participation in class, as well as two problem sets.

Course Grades

Grades for this half of the course will be determined by equally weighted scores across the problem sets.

General Conduct and Behavior

Students are expected to maintain and abide by the highest standards of professional conduct and behavior. Please familiarize yourself with Stern's [Policy in Regard to In-Class Behavior & Expectations](#) and [the NYU Student Conduct Policy](#).

Academic Integrity

Our undergraduate [Academics Pillar](#) states that we take pride in our well-rounded education and approach our academics with honesty and integrity. As members of our community, all students agree to abide by the [NYU Academic Integrity Policies](#) as well as the NYU Stern Student Code of Conduct, which includes a commitment to:

- Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage.
- Clearly acknowledge the work and efforts of others when submitting written work as one's own.
- Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct.

The entire Stern Student Code of Conduct applies to all students enrolled in Stern courses and can be found here: www.stern.nyu.edu/uc/codeofconduct.

Per request of the dean, you must include a signed statement at the top of each homework assignment and exam, indicating that you adhere to the Code of Conduct. The statement is: *"I pledge my honor that I have not violated the NYU Stern Student Code of Conduct in the completion of this exam/problem set."* I provide a cover sheet for homework assignments that includes this statement. It is in your best interest that potential employers know that Stern takes honesty seriously. Stern's reputation adds to the value of your degree.

Student Accessibility

If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Student Accessibility (212-998-4980, mosescsa@nyu.edu), verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the Moses Center for Student Accessibility, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation. For more information, visit the CSA website: <https://www.nyu.edu/students/communities-and-groups/student-accessibility.html>

Student Wellness

Classes can get stressful. I encourage you to reach out if you need help. Please bookmark the [NYU Stern Well-being Resource Hub](#) for services at NYU and Stern covering a wide variety of topics including financial well-being, relationship well-being, mental well-being, and more. Any student who may be struggling and believes this may affect their performance in this course is urged to contact the Moses Center for Student Accessibility, see the above section of this syllabus. The NYU Wellness Exchange offers mental health support. You can reach them 24/7 at 212-443-9999. There are also drop in hours and appointments. Find out more at this link <http://www.nyu.edu/students/health-and-wellness/counseling-services.html>

Name Pronunciation and Pronouns

Stern students now have the ability to include their pronouns and name pronunciation in NYU Albert.

Religious Observances and Other Absences

NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. You must notify me in advance of religious holidays or observances that might coincide with exams, assignments, or class times to schedule mutually acceptable alternatives. For further assistance, please contact religiousaccommodations@nyu.edu.

NYU Stern is committed to ensuring an equitable educational experience for all students regardless of identity or circumstances and strives to recognize the obligations its students have outside of Stern. Please review all class dates at the start of the semester and review all course requirements to identify any foreseeable conflicts with exams, course assignments, projects, or other items required for participation and attendance. If you are aware of a potential conflict, please contact me as soon as possible to discuss any potential conflicts to determine whether/how they can be accommodated.

Course Schedule

This is an approximate schedule for the course; some material may take more or less time to cover than allotted below.

Lecture No.	Date	Day	Topic	Assignment
1	2/4	Tu	Computational Methods	
2	2/11	Tu	Solving Structural Models	

Lecture No.	Date	Day	Topic	Assignment
	2/18	Tu	<i>No Class: Legislative Monday</i>	
3	2/25	Tu	Estimating Structural Models	
4	3/4	Tu	Asset Pricing Models	HW #1 Due
5	3/5	Tu	Firm Finance Models	
6	3/12	Tu	Household Finance Models	HW #2 Due