FIN 698-35B: Nobel Prize Lectures
in Economics and Finance (Second Part)

Syllabus, Spring 2020

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Class Meetings

Time: MoWE 1:15 PM – 3:15 PM; Zoom Online Lectures via Blackboard

Textbook and Course Material

- **Textbook: Options, Futures, and Other Derivatives by John Hull**

- **Lecture Slides (from Hull's book)**

- **Lecture Notes (a mathematically intensive version of the Lecture Slides)**

Office Hours: By appointment

Course Objectives

This mini-course revisits the derivation of the famous Merton, Black, and Scholes option pricing formula. Because of their innovative work in option pricing, Merton and Scholes were awarded the 1997 Nobel Prize in economics.

Covered Topics

We will first discuss how to model price and return dynamics using Wiener processes. We would then study Itô's formula on how to calculate the derivatives of functions of Wiener processes. We will then introduce the concept of risk-free valuation and hedging, and derive the basic Black and Scholes (1973) partial differential equation for option prices. We will then conclude with the solution to the Black and Scholes partial differential equation. If time permits, we will discuss how to use option pricing to model credit risk (Merton (1974)).

Honor Code

All students must comply with the University of Miami policies for conduct and academic honesty at all times during this course. Any violations of these policies will result in referral to the appropriate administrative body.

Special Accommodations

If you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of the course, the assignments, and the online activities may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities to help us determine appropriate accommodations. I will treat information you provide as private and confidential. All the lectures will be recorded in case you are planning to miss any.

General Guidelines

- **Readings:** You are expected to have required readings completed **before** each class. These include relevant sections from the textbooks, lecture slides, lecture notes, and journal articles.

- **Lecture Slides:** Lecture Slides will be handed out on Blackboard **before** each class. The Lecture Slides are based on the corresponding chapters of Hull's book.

- **Lecture Notes:** Lecture Notes will be handed out on Blackboard **before** each class. The Lecture Notes are a more mathematically advanced version of the Lecture Slides.

- **Problem Set:** There will be a single individual problem set. You need to turn in your problem set before the prespecified deadline. Problem sets submitted **after** the deadline will take a **50% grade penalty**.

- **Active Participation:** During the lecture, I like to ask a lot of questions, even in an online setting.

Difficult Topics: If you find certain sections of the course difficult, do not panic! I encourage you to discuss these topics with me and/or your colleagues.

Continuous Feedback: I encourage you to give me feedback about course material, teaching style and anything else that would help you understand finance concepts better.

Examinations and Grading

- **Exams:** There will be **no** exams for this class
- **Grading Policy:**
    - Maximum Possible Score: **100 points**.
    - Individual Problem Set: **85 points**. There will be a single problem set for which you will work individually. You will get the full 85 points if you answer all the problems in the problem set correctly, in a clean and presentable way, showing considerable effort for **ALL** questions. This problem set is the best way to rehearse the material.
    - Participation: **15 points**. During the lecture I like to ask a lot of questions. You will get the full 15 points if you are actively engaged in the online lecture and try to answer my questions.

Tentative Topics

1. Lecture 0; The Nobel prize in economics; Introduction to options;
   Suggested Readings: Chapters 10 and 11 in Hull "Mechanics of option markets" and "Properties of stock options," Lecture Slides 0, online material on Blackboard

2. Lecture 1: Stochastic processes and Itô's lemma;
   Suggested Readings: Chapter 14 in Hull "Wiener processes and Itô's lemma," Lecture Slides 1, Lecture Notes 1, online material on Blackboard

3. Lecture 2: Deriving the Black-Scholes partial differential equation for option prices;
   Suggested Readings: Chapter 15 in Hull: "The Black-Scholes-Merton model," Lecture Slides 2, Lecture Notes 2, online material on Blackboard

4. Lecture 3: Solving the Black-Scholes partial differential equation; Modeling credit risk;
   Suggested Readings: Chapter 24 in Hull: "Credit risk," Lecture Slides 3, Lecture Notes 3, online material on Blackboard

This is only a tentative list of topics that I plan to cover during the mini-course. I may add or delete topics from this list as the quarter progresses. You are responsible for any changes I announce in the class.