MF 772 - Credit Risk - Fall 2021

Boston University Questrom School of Business

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Office hours: In person: before the lecture on Friday, zoom 9am -10 am Wednesdays, or by appointment.

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Office hours: Fridays 12.30-1.30 pm, online Thursdays 12.30-1.30pm

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Course description

The current financial crisis we are living in right now and its impact on the broader economy underscore the importance of financial risk management in today's world and in particular credit risk management. Credit risk has been omnipresent in the portfolio of a typical financial institution and insurance companies and is becoming even more critical in these contemporary unprecedented times. The objective of this course is to study the most common approaches for modeling credit risk and pricing of credit derivatives. Lectures will start with some terminologies and basic concepts of credit risk, and will continue with the analysis of the main credit derivatives and their pricing models. We will cover the intensity approach, the structural model, and the method of rating models, default correlation. We will also cover important practical subject of calculation of CVA and DVA.

Class Schedule and Location

Thursdays from 8am to 10.15 am online, zoom link will be provided

Fridays from 2.30 am to 5.15 pm, HAR 404

Target Audience and Prerequisites

This course is intended for Math Finance students at Boston University Questrom School of Business. The course will make use of stochastic processes, stochastic calculus and some knowledge of ODE and PDE. Knowledge of a programming language such as Matlab, Mathematica, R, Python or C++ is required for numerical applications.

Course material

- Bluhm, Overbeck and Wagner *Introduction to Credit Risk Modeling*, Second Edition Chapman, Hall/ CRC Financial Mathematica Series, 2010 (Required).
- Hull J.C. *Risk Management and Financial Institutions, Fifth Edition*, Wiley, 2018 (Optional)
- Gregory J. *The XVA Challenge, Counterparty Risk, Funding, Collateral Capital and Initial Margin, Fourth Edition*, Wiley, 2020 (Optional).
- Lecture notes: available on QuestromTools.

Course Structure

Typically, we will go through the material of the class, followed with discussions, solving concrete examples in small groups, review of the previous homework and occasional short quizzes. You are encouraged to attend TA office hours and talk to me regularly.

Grading

- Individual Home assignments (30%)
- A Midterm exam (30%)
- A Final exam (35%)
- Class contributions and Quizzes (5%)

If you have to miss a class, you should inform me or TA in advance by email.

Exam Dates

Midterm exam: Thursday , October 28, 2019; Time 8 am - 10:00 am (to be confirmed, students who has a conflict please contact me or TA)
Final exam : It will take place at the final exam week (December, 15-18).

Course outline (tentative)

1. Credit Risk: An introduction, the Basics of Credit Risk Management
2. Term Structure of Default Probability: Survival Function and Hazard Rate
3. Basics of bond pricing
4. Credit Derivatives
5. Structural Models
6. Intensity-Based Models
7. Default Correlation and Portfolio Credit Risk
8. Introduction to Copulas, Gaussian copula for Credit Risk
9. The Credit Risk Model
10. Risk Measures and Capital Allocation
11. CVA and DVA

Course Policies

1. *Attendance policy*
   Students are expected to attend each class session unless they have a valid reason for being absent. Students may be required at any time to account for undue irregularity in attendance, either by personal explanation to their faculty advisor or dean or by written statement from a parent or another authority. Any student who has been excessively absent from a course may be required to withdraw from that course without credit. Students who expect to be absent from class for more than five days should notify their dean promptly.

   Students absent from classes more than two days for illness should be under a doctor's care. Students who are absent five days or more for illness should present to Student Health Services a certificate of fitness from their physician or be examined at the University Clinic.

2. *Diversity and Inclusion*
   In developing the materials and assignments for XXX, I have aimed to be thoughtful about how identity and culture impact the course content.

   During the semester we may discuss content that will inspire debate, different opinions, and shared experiences. Learning can only happen in a community that is respectful and inclusive. All members of class will conduct themselves in a professional manner. Remember, you can disagree with the idea and still respect the person.

   I invite you to share your personal experiences and perspective related to the course content; we can learn from each other. If there are topics or conversations that you feel would benefit from incorporation of social context, a differing perspective, or Questrom's Center for Diversity, Equity, and Inclusion, please inform me and I will explore resources and opportunities for us to engage a wide variety of perspectives in our classroom.

   If you feel you have experienced improper conduct or have witnessed improper conduct, please report your concerns using this link

3. *Academic accommodations for students with special needs*

   Boston University provides reasonable accommodations to eligible individuals with disabilities in conformance with Section 504 of the Rehabilitation Act of 1973 and with the Americans with Disabilities Act of 1990. Requests for disability accommodations must be made in a timely fashion to Disability & Access Services, 25 Buick Street, Boston, MA 02215; 617-353-3658 (Voice/TTY). Students seeking accommodations must submit appropriate medical documentation and comply with the policies and procedures of Disability & Access Services.

4. *Academic Integrity Policy* The University has developed an Academic Conduct Code
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