

FINA 554: Recent Innovations in Derivative Markets (Estimating and Managing Credit Risk)

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Course Description

"It's the first law of Finance - return of your capital is more important than return on your capital"

David Wishnow, Managing Director, Warburg, Dillon, Read.

That pretty much sums up the motivation behind this course.

This course provides the concepts, skills, and techniques necessary for estimating and managing credit risks. It is aimed at participants who wish to

- have a deeper understanding of credit risks faced by firms, both financial and non-financial,
- learn techniques to identify and measure credit risks, and
- understand how derivatives and risk management techniques can be used to manage credit risks and advance the strategic goals of the firm.

In this course, we will learn about the different players (banks, finance companies, industrial firms, broker-dealers, exchanges, etc.) in the credit industry and the various kinds of credit risks faced by them, the Value-at-Risk technique and how it can be used for estimating credit risk, regulatory framework governing capital estimation and adequacy, many industry credit risk models that are currently being used by various banks and consulting firms, credit risks of derivative structures, management of credit risks through credit derivatives and asset-based structured products, and sovereign/country risk. This is a very "hands-on" kind of course where, in addition to theoretical concepts, you will get to see the detailed implementation techniques behind some of the credit risk models actually used in the industry. This is supplemented by assignments where you have to implement some of those techniques yourself.

Prerequisites

The pre-requisite for this course is FINA 512 (Corporate Finance). In addition, FINA 551 (Options and Futures) is a suggested pre/co-requisite - some background in pricing and hedging derivatives is strongly recommended.

It is also required that students be familiar with a spreadsheet package like excel, and have some familiarity with Linear and Matrix Algebra. Knowledge of a programming language (like Matlab, Gauss, SAS, C, etc.) would be useful, though not necessary, in doing the assignments in the course.

Course Materials

There is no assigned textbook for this course. Each class session would be supplemented by class notes and handouts that I'll prepare for the topic being discussed. The class notes would be put up on my website ahead of class. For each section of the course, the recommended readings list would also be distributed. Some useful reference books for this course are:

- *Credit Risk Measurement: New Approaches to Value at Risk and Other Paradigms*, Anthony Saunders and Linda Allen.
- *Managing Credit Risk*, John B. Caouette, Edward Altman and Paul Narayanan.
- *Internal Credit Risk Models: Capital Allocation and Performance Measurement*, Michael K. Ong.

Two useful practitioner journals to read in this area are "Credit" and "Risk".

Course pedagogy

There will be four group exercises and one final examination in the course, with the following weights:

Exercises and cases (4x15%)	60%
Final	40%

Course Outline

A detailed outline of each class, with the specific topics to be covered, is given below. The week before every class, I will give you a list of readings that you should go through before coming for the class.

	Topic
Lecture 1	Introduction to credit risk management; credit challenges in financial markets; why manage credit risk? Worldwide players in the credit industry - Banks, Finance companies, insurance companies, industrial firms, portfolio managers, derivative dealers, clearinghouses, exchanges; Market structure. -break- Traditional approaches to credit risk measurement; The role of credit rating agencies, credit scoring models; Credit culture in financial institutions; Corporate default experience; Credit debacles.
Lecture 2	Introduction to Value-at-Risk (VaR); Measuring VaR for individual contracts; The use of Extreme Value Theory (EVT) in estimating VaR. -break- The BIS Basel International Bank Capital Accord of January 2002; Capital adequacy of financial institutions; EVT based capital estimation; Latest developments at BIS for risk-based capital - looking to the future; Capital requirements based on systemic risk. <i>Bank Capital Estimation Exercise handed out</i>

Lecture 3	<p>Option VaR; JP Morgan's Creditmetrics and VaR models; Loans as options and KMV's CreditMonitor model; Moody's public firm model.</p> <p><i>-break-</i></p> <p>Loan portfolio theory; KMV's portfolio manager; CreditMetrics - implementing credit VaR for loan portfolios; Simulation approaches.</p> <p><i>Bank Capital Estimation report due</i></p> <p><i>Loan Portfolio credit VaR exercise handed out</i></p>
Lecture 4	<p>McKinsey (CreditPortfolioView) model; The macro-simulation approach; The risk-neutral valuation approach; Reduced form models; KPMG's Loan Analysis System; Kamakura's risk manager; Mortality models and the insurance approach; CSFP's Credit Risk Plus model.</p> <p><i>-break-</i></p> <p>The role of credit correlations in credit risk management; Estimating credit correlations; Using reduced form models for credit correlations; Modeling conditional credit correlations using GARCH.</p> <p><i>Loan Portfolio credit VaR report due</i></p> <p><i>Credit Correlations estimation exercise handed out</i></p>
Lecture 5	<p>Stress testing credit risk models; Algorithmic mark-to-future; back testing credit risk models; RAROC models and capital-at-risk; EVA models.</p> <p><i>-break-</i></p> <p>Off-balance sheet credit risk; Credit risk of derivatives; BIS and CreditMetrics swap VaR; Introduction to credit derivatives markets; Credit risk of Credit derivatives.</p> <p><i>Credit correlations estimation report due</i></p> <p><i>Interest rate Cap credit VaR exercise handed out</i></p>
Lecture 6	<p>Credit derivative structures (credit risk options, swaps, forwards); Brady bond derivatives; bank-loan based products; Corporate credit derivatives; Pricing and hedging approaches for credit derivatives.</p> <p><i>-break-</i></p> <p>Credit securitization and structured finance; Asset-backed securities markets; Mortgage securitization; Financing risky credits; CBO/CLO structures; Pricing asset-backed securities.</p> <p><i>Interest rate Cap credit VaR report due</i></p>
Lecture 7	<p>Sovereign risk; Political risk factors; Challenges in assessing country risk; The case of the Asian Financial crisis; Country rating systems; Country risk models; Systemic risk analysis.</p> <p><i>-break-</i></p> <p><i>In-class Final Exam</i></p>