

ICEF, Higher School of Economics Moscow
MSc in Financial Economics, 2nd year

Credit Risk

Course Syllabus

Spring semester 2011
Lecturer: Carsten Sprenger

Course Objective

This course is part of the MSc course in Risk Management, and gives an introduction to commonly used models of credit risk. Credit risk is the risk of loss due to a debtor's non-payment of a bond or a loan. Models of default risk of a single counterparty are studied, and then extended to the case of portfolios of bond or loans. The major complication with portfolios is the correlation of defaults. A widely used tool to deal with it, Copula distributions, is introduced. At the end, issues of regulation such as the Basel II Accord, and devices to mitigate credit risk, such as credit derivatives are discussed. The course is designed to strike a balance between a practical approach to the most popular credit risk models and their theoretical underpinnings. In addition, the course prepares for the credit risk parts of the Financial Risk Manager[®] and Professional Risk Manager[™] Examinations provided by the professional risk manager associations GARP and PRMIA, respectively.

Prerequisites

Financial Economics I (Asset Pricing)

Grade Determination

The grade for this part of the course in Risk Management will be fully determined by the final exam.

Literature

Lecture slides will be provided to students as handouts. In addition, a number of books are recommended for self-study.

- Required readings (books available at the ICEF library):
 - Hull, John C. (2007), Risk Management and Financial Institutions, Pearson (short: **H**).
 - Saunders, Anthony and Linda Allen (2nd edition 2002): Credit Risk Measurement, Wiley (short: **SA**), or 1st edition, 1999.
 - Duffie, Darrell and Kenneth J. Singleton (2003): Credit Risk, Princeton UP (short: **DS**).
- Journal articles:
 - Leland, Hayne E., and Klaus Bjerre Toft (1996): Optimal Capital Structure, Endogenous Bankruptcy, and the Term Structure of Credit Spreads, The Journal of Finance, 51(3), 987-1019.
 - Merton, Robert C. (1974): On the Pricing of Corporate Debt: The Risk Structure of Interest Rates, The Journal of Finance, 29(2), 449-470
- Optional:
 - Jorion, Philippe (2007): Financial Risk Manager Handbook, Wiley.
 - De Servigny, Arnoud and Olivier Renault (2004): Measuring and Managing Credit Risk, Mc Graw Hill.
 - Crouhy, Michel, Dan Galai, and Robert Mark (2001): Risk Management, McGraw Hill.
 - Resti, Andrea and Andrea Sironi (2007): Risk Management and Shareholders' Value in Banking, Wiley.
 - Lando, David (2004): Credit Risk Modeling, Princeton UP.
 - McNeil, Alexander, Rüdiger Frey, and Paul Embrechts (2005): Quantitative Risk Management – Concepts, Techniques and Tools, Princeton UP.
 - CreditMetrics and Moody's KMV Technical Documents at www.riskmetrics.com and www.moodykmv.com

Course Outline

References to the required readings and corresponding chapter numbers are given in [].

1. Introduction [SA 1, DS 1]
 - Outline and literature
 - Market vs. credit risk
 - Job description of a credit risk officer

2. The elements of credit risk [H 8.1, 8.2, 11, DS 2.4-2.5]
 - Default
 - Exposure
 - Loss given default or recovery
 - Expected, unexpected loss, and VaR

3. Models of Single Counterparty Default Risk [H 12, SA 2, 4-9 or SA, 1st ed. 2-8, DS 3-4]
 - Overview: From traditional to modern credit risk models
 - Scoring, logit and probit
 - Ratings
 - Rating-based models: CreditMetrics, CreditPortfolioView
 - Asset-based (structural) models: Merton's model and its implementation by KMV, first passage models, Leland and Toft's endogenous bankruptcy model
 - Intensity-based (reduced-form) models
 - Actuarial Approach: Mortality tables, CreditRisk+

4. Portfolio Models of Default and Recovery [H 6, 12.7, SA 11 or SA 1st ed. 10, DS 10]
 - CreditMetrics
 - Correlated defaults
 - Copula distributions
 - KMV for portfolios

5. Regulatory issues and Basel II [H 7, SA (2nd ed. only) 3, DS 2.5]
 - Short history and current provisions of the Basel Accord
 - Calculation of capital charges

6. Credit risk management [H 13, SA 15 or SA, 1st ed. 14, DS 8]
 - Economic capital
 - Exposure mitigation: Netting, collateral, limits, guarantees
 - Credit derivatives: Credit default swaps, Total return swaps, collateralized debt obligations