UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Credit Risk

2425-1-F1601M086-F1601M084M

Learning objectives

In this course, the notion of random variable will be used in order to study the default probability and the recovery rate. Furthermore, the course explores the use of accounting ratios (based on the balance sheet analysis) for the construction of a discriminant function useful in credit evaluation and approval processes. The course shows how (internal) rating classes can be defined stating from the scores obtained from discriminant analysis. Particular attention is dedicated to the calculation of the recovery rates, also through data provided by the Statistical Bulletin of the Bank of Italy. The course studies two different models: 1) the CreditMetrics model that determines the probability distribution of the forward value of a loans portfolio for which the initial rating and transition probabilities are known; 2) the CreditRisk model that determines the probability distribution of portfolio losses starting from the loss given default related to each credit.

Contents

Recalls on random variables. Definition and study of default probability and recovery rate. Discriminant analysis and its use in credit risk analysis. Introduction to CreditMetrics and CreditRisk models.

Detailed program

1.Recalls on continuous and discrete random variables. Conditional random variables. Mixture distributions.

2. Default probability: definition and estimation (logistic regression)

3. Linear discriminat analysis and application in credit classification.

4. Loss given default: definition and empirical analysis on data taken from Bank of Italy.

5. Introduction to Credit Metrics model

6. Introduction to CreditRisk+ model.

Prerequisites

Basic knowledge of descriptive statistics, probability calculations and statistical inference.

Teaching methods

Lessons and practical sessions (exercises using Excel software)
In all lessons, a "mixed" approach is adopted: erogative teaching will alternate with interactive teaching in variable proportions. Typically the "interactive component" will be greater during practical sessions. Approximately, interactive teaching regards 30% of the course.

Assessment methods

The exam is composed by a written part (usually questions and exercises) and an oral part. The oral part covers all the topics of the course.

Textbooks and Reading Materials

M. Zenga. Modello Probabilistico e Variabili Casuali. Giappichelli

Statistical Bulletin of the Bank of Italy (it can be found on the Bank of Italy's webpage)

Calabrese R., Zenga M. (2008) Measuring loan recovery rate: methodology and empirical evidence. Statistica & Applicazioni, vol VI, n.2.

De Capitani L. Zenga M. (2015). On the distribution of the sum of cograduated discrete random variables with applications to credit risk analysis. Statistica & Applicazioni, vol. XIII, n.1Blum C., Overbeck L., Wagner C. . Introduction to Credit Risk Modeling. Second Edition, Chapman & Hall.

CreditMetrics Technical Document. RiskMetrics Group.

CreditRisk+: a credit risk management framework. Credit Suisse

Material pubblished on the e-learning page

Semester

Second Semester

Teaching language

Italian

Sustainable Development Goals