Advanced Credit Risk Modeling for Basel II using SAS

12.-14. May 2008, SAS Training Centre, Bratislava

Aims and Scope

In this advanced course, we start with providing an overview of all issues and difficulties that arise when modeling loss given default (LGD) and exposure at default (EAD). We also elaborate on how to do validation, backtesting and stress testing. We then discuss some recent techniques that have been developed for PD, LGD and EAD modeling in the context of the Basel II regulation. More specifically, we will discuss neural networks, support vector machines and Bayesian probabilistic network classifiers. We also discuss how survival analysis may be used to do profit scoring and risk based pricing. The course aims at providing a sound mix of both theoretical, technical insights as well as practical implementation details, illustrated by several real-life cases. It will be highly interactively organised. The target audience consists of people who are involved into building scoring systems (e.g. for Basel II) and/or are responsible for monitoring their behaviour and performance.

Prerequisites

The course assumes that the participants have the following background knowledge:

- Basic implications of the Basel II Capital Accord
- Difference between Application Scoring/Behavioural Scoring/Profit Scoring
- Preprocessing for credit scoring (weights of evidence, outliers, missing values, coarse classification)
- Know how to develop scorecards using logistic regression
- Setting cut-offs; dealing with reject inference
- Measuring scorecard performance

Lecturer

Prof. dr. Bart Baesens is assistant professor (Lecturer) at the School of Management from the University of Southampton**.** His research focuses on the use of data mining and machine learning techniques for credit scoring and customer relationship management (CRM) applications. His findings have been published in various journals and presented at international conferences.
For more information, please, visit http://support.sas.com/training/us/bks/instr.html#baesens.

Course Outline

A Review of Basel II

- New developments in the Basel II Capital Accord
- A brief review of PD modeling
- Portfolio models for credit risk
- The Basel II capital requirement formula's

Modelling LGD and EAD

- Modelling Loss Given Default (LGD)
- Defining LGD
  - Measuring collateral
  - Workout approach
  - Market Approach
  - Collection scoring
- Time weighted versus default weighted versus exposured weighted LGD
- Choosing the discount factor and the workout period
- Economic downturn LGD

- Modelling LGD using segmentation
- Shaping the Beta distribution for LGD
- Risk Drivers for LGD
- Modelling LGD using regression
- Modelling Exposure at Default (EAD)
    - Estimating credit conversion factors (CCFs)
- Cohort/Fixed time horizon/Momentum approach for CCF
- Risk drivers for CCF
- CAP Curves for LGD and CCF
- Calibrating PD/LGD/CCF
- Correlations between PD, LGD and EAD
- Calculating expected loss (EL)
- Measuring PD, LGD and EAD at the portfolio level

Validating and stress testing PD, LGD and EAD models

- Validating PD, LGD and EAD models
- Quality Control
- Quantitative versus Qualitative validation
- Use testing
- Through-The-Cycle (TTC) versus Point-In-Time (PIT) validation
- Backtesting for PD, LGD and EAD
- Traffic Light Indicator Approach
- Backtesting action plans
- Stress testing for PD, LGD and EAD
- Static versus Dynamic stress stesting
- Correlated Trend Analysis
- Monitoring PD, LGD and EAD models
- Segmenting PD, LGD and EAD models
- Benchmarking
- Internal versus External benchmarking
- Kendall's tau and Gamma for benchmarking
- Scorecard management
- Low Default Portfolios (LDPs): implementation and validation
- Value-at-risk (VaR) models
- The Merton/Vasicek model for calculating the regulatory capital

New techniques to develop PD, LGD and EAD models for Basel II

- A brief review of traditional techniques for scorecard development
- Neural networks
    - The neuron model
    - Multilayer perceptrons (MLPs)
    - Training an MLP
- Support Vector Machines
    - The SVM classification model
    - Building scorecards using SVMs
- Real life case study: Using logistic regression and support vector machines to develop a country rating system.

Survival analysis for profit scoring

- Survival analysis for developing customer lifetime models
    - The censoring problem
    - Survival curves versus hazard curves
    - Kaplan Meier analysis
    - Proportional hazards regression
- Using survival analysis for LGD modeling and profit scoring
- Risk Based Pricing