

Laboratory of Bank Loan Pricing

a.y. 2022/23 – 3rd term

Prof. [Roberto Torresetti](#)

Course syllabus

Below a list of subjects to be discussed in class:

Market price (a) vs Origination Price (b):

(a) Interest Rate Curve calibration, Credit Spread Curve calibration, CDS curve calibration.

(b) Bank Loan Origination pricing via target IRR: CoL (cost of liquidity) + CoC (cost of credit) + CoK (cost of capital).

CoC: Lifetime Expected Loss. Probability of Default and Loss Given Default.

CoC: Default prediction models. Typical dataset structure, module layout and prediction horizon.

CoC: Default prediction models. Univariate and Multivariate Logistic regressions.

CoC: Default prediction models. Input variables encoding and Cross Validation.

CoC: Default prediction models. Regression and Classification Trees.

CoC: Low Default portfolios PD estimation and backtesting

CoC: Default prediction models. Bank Loan Pricing impact of alternative machine learning and ensemble algorithms (Random Forest: Bagging (Bootstrap aggregating) and Boosting ensemble algorithms.).

CoC: Macro-economic scenario projections. Satellite Credit Portfolio Models as sparse problems.

CoC: Satellite Credit Portfolio Models: Bayesian Model Average.

CoL: Blended curve construction.

CoL: regulatory framework: LCR and NSFR.

CoK: Regulatory capital and Risk Weighted Assets

CoK: Risk Weighted Assets for Standardized and Advanced Internal Rating Based Banks.

CoK: new securitization framework and its impact on the RWA for a securitized portfolio

CoK: Risk Weighted Assets calculation for a securitized portfolio

CoK: Significant Risk Transfer for a securitized portfolio

Prerequisites for admission

Students must have taken either the [Data Mining and Computational Statistics](#) or the [Risk Management](#) exam.

In order to complete the final assignment, students will need to have programming skills in any language of their choice (MatLab, R, Python, C).

Teaching methods

In presence classes only. Videosharing with the class material. Seminars on specific topics are going to be taught within the Laboratory by professionals from leading Financial Institutions.

Teaching Resources

Caprioli S., Cogo R. Back-testing credit risk parameters on low default portfolios: a Bayesian approach with an application to Sovereign Risk, working paper 2023

Sala-i Martin, X., Doppelhofer, G., and Miller, R. I. (2004). Determinants of longterm growth: A bayesian averaging of classical estimates (bace) approach. *American Economic Review*, 94(4):813-835.

Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics*, 6(2):461-464.

Tasche, D. (2013). Bayesian estimation of probabilities of default for low default portfolios. *Journal of Risk Management in Financial Institutions*, 6(3): pages 302–326.

Torresetti, R. (2021), A comparison of the performance of alternative Machine Learning algorithms on a credit risk dataset, Working Paper, available at www.ssrn.com

Torresetti, R. (2021), Bayesian Model Averaging for Satellite Models in Bank's Credit Risk Projections, Working Paper, available at www.ssrn.com

Assessment methods and Criteria

Assignment to be submitted individually by each student (no group projects).