
Credit Risk

Projects

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Project 1

Infectious defaults

Project 1: Infectious defaults

Description of the project: This project aims at studying a CBO valuation model that is used in [\[Davis and Lo, 1999\]](#).

Target: Clear explanations of the valuation model suggested in the paper and comparison with the one exposed in the class. You also have to create a tool to price a CBO with this model coded in Python or R.

Project 2

Bankruptcy Prediction

Project 2: Predict bankruptcies of Polish companies

Description of the project: This project aims at building algorithms to predict bankruptcies or/and bankruptcy probabilities.

Target: Using at least one of the algorithms presented during the course and another of your choice (the more original, the better), train a predictive model for bankruptcies. You will use the [Polish companies bankruptcy dataset](#) from the UCI Machine learning repository. Models should be well detailed (characteristics, advantages and disadvantages, etc) and trained adequately (train set, test set, hyperparameters optimization, performance, exploratory analysis, feature engineering, etc). You will then compare the algorithms you selected and their outputs.

Project 3

Securitization and bank steering

Project 3: Securitization and bank steering (1/2)

Description of the project: In this project, you are the Chief Financial Officer of a commercial bank.

Your bank delivers consumer credits, mortgages to individuals which require capital, which you are allowed to compute under the advanced approach (IRB-A).

So as to improve your Core Tier 1 ratio, you intend to proceed to a significant risk transfer. As a CFO, you would like to securitize your consumer or mortgages portfolio and find the right balance between:

- ▶ reducing the NBI (with the option of introducing excess spread within the securitization so as to enhance the quality of the structuration),
- ▶ free capital through the securitization so as to meet your Core Tier 1 Targets, or reduce the level of necessary equity, which you have to remunerate at a high cost of capital.

You will have to pay some fees for the structuration. The funding costs for the bank are quite close to 0.

As a method, you will need to convert the losses you are going to estimate on the pool and tranches. You may take an approach where the rating of the tranche is determined by the expected loss on the tranche (look for Moody's or Scope:

<https://www.scoperatings.com/ScopeRatingsApi/api/downloadmethodology?id=8f6dc4fe-71e6-4946-bc27-3e84585c0a38>).

Project 3

Securitization and bank steering

Project 3: Securitization and bank steering (2/2)

Target: You will have to reply to the following questions within the project:

- ▶ what could be an appropriate cost of capital for a bank? Justify.
- ▶ On Kaggle, select some portfolio data. Propose some structuration for this portfolio:
 - No excess spread, securitize the whole pool. Propose relevant tranches (with prices) with corresponding rating and prices (take current market prices).
 - Same question, but you may desire to securitize only the “good part” of the portfolio.
 - Same question, but you know authorize yourself to introduce excess spread (this will improve your risk transfer capacity but reduce also more your net NBI).
- ▶ Compute your final RWA on the remaining exposure. What is the RWA saving you achieved through an efficient risk transfer.
- ▶ Find the optimum (and see how this optimum varies according to your assumptions).
- ▶ (Optional) apply your optimisation program on a real bank balance sheet (see results from EBA Stress tests:
<https://eba.europa.eu/risk-analysis-and-data/eu-wide-stress-testing/2018>).



Davis and Lo (1999).

Infectious defaults.

[Link.](#)