Seminar on Credit Risk Modeling - Assignments

The assignments are based on data downloadable from the course directory. The firm-level data is not really “firm-level”, but average firm data. Each number is an average of data about at least 4 and at most 6 firms.

• Assignment based on Chapter 1: Use the pre-2007 data in the “firmdata” table of the univie.xls file in order to specify a Logit model that can be used to predict defaults. Feel free to define additional explanatory variables. Please explain how you selected the model. Then, predict the probability of default for the year 2007.

• Assignment based on Chapter 3: Use the data in the “ratingdata” table in order to generate a one-period transition matrix based on the cohort approach. Then, take this transition matrix as a given, and use it to construct an approximate generator. Please explain how the generator can be used in order to obtain a $T$-period transition matrix.

• Assignment based on Chapter 4: Use the data in the “marketdata” table in order to specify a Poisson regression that can be used to predict defaults based on variables that describe the markets in which the firms operate. Predict a default rate for each market and backtest the model.

• Assignment based on Chapter 5: Use the data in the “longrundata” table in order to estimate the correlation between the firms’ asset values using the method-of-moments and the maximum-likelihood approaches. Why do these two estimation approaches yield different results? What are the relative merits of each estimation approach?

• Assignment based on Chapter 6: Use the data in the “portfoliodata” table in order to simulate a default-mode model using a Monte-Carlo simulation. Base your simulation on the following assumptions: loss-given-default=50% and exposure-at-default=100. Use a one-factor model in order to model the correlation between the firms’ asset values. Assume that all firms’ asset values are similarly exposed to the systematic shock, and that the asset values are normally distributed. Show how the results of the simulation depend on your assumptions about the factor sensitivity of the firms’ asset values, and the standard deviation of idiosyncratic shocks.
Assignment based on Chapter 7: Use the data in the “ratingdata” table in order to compute the accuracy ratio of the rating system, and to bootstrap 95% confidence intervals for the accuracy ratio. Please explain the meaning of the confidence intervals.

Variable description

• All data: “idnr” is a (meaningless) firm ID number, “year” is the year.

• “firmdata”: “default” is an indicator for whether the firm defaulted in a given year, “sales” are the firm’s sales, “energy” are costs of energy, “twages” are costs of personnel, “gop” is gross operating profit, “tassets” is the book value of all assets, “tdebt” is the book value of debt, “sdebt” is the book value of short-term debt, “cash” is the book value of liquid assets.

• “ratingdata”: “rating” is the rating, where D is the default category.

• “marketdata”: “idnr” is a (meaningless) ID number for a cluster of 4-6 firms in a specific market, “year” is the year, “totdef” is the total number of defaults in the cluster of firms across all years, “defno” is the number of defaults in the cluster of firms in a given year, “mfirms” is the total number of firms in the same market, “maggout” is the aggregate output of all firms in the market.

• “longrundata”: “defnr” is the number of defaults in a given year, “obligors” is the number of obligors.

• “portfoliodata”: “dprob” is the default probability.