Exercises on estimation of Default Probabilities

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1 Questions

Ex. 1 — Use the S&P rating transition matrix in Table 2.1 of the handouts. Plot the cumulative default probabilities until 10 years, $PD(0,1), PD(0,2)$, ..., $PD(0,9), PD(0,10)$ for the ratings classes A and BB. Indicate the precise value you got for 10 years.

Ex. 2 — Get the Excel file `Logit_data.xlsx` posted next to this handout. It represents data on several clients from a given bank. For each firm, we have several financial ratios and an indicator of whether the firm defaulted ($y = 1$) or not ($y = 0$) during the year.
Estimate a logit model for the probability of default.
Do not forget to include a constant, ie, using the notation in the handouts, set $f = b_0 + b_1 X_1 + b_2 X_2$.

Note: You are only required to compute the point estimates for the b parameters. You may do this in Excel by setting up the Likelihood function and maximizing it with the solver. Alternatively, use Matlab and the glmfit() function, which easily gives you other important information, such as, p-values on each parameter estimate.

Ex. 3 — Continuing Ex. 2, suppose a new company comes up to the bank to borrow money. The company has the following ratios:
- Current Assets / Current Liabilities = 105

- EBIT / Assets = 8

1. Using the results in Ex. 2, what is the estimated Probability of Default (PD) for this company?

2. The bank determines the spread it charges on loans through the formula:
   Spread = ROE * k + PD * LGD
   Assume that ROE = 15%, k = 8%, and LGD = 60%. What is the spread that the bank should charge to this firm?