USI, Financial Intermediation, Spring 2025
Case #2

Lecturer: **Alberto Plazzi** TA: **Giacomo Bezzi**

Due on May 25, 2025

Guidelines: In Part I and especially II of the assignment, some steps are intentionally left to your judgment (e.g., how to map your problem to S&P data, the selection of a comparable firm and bonds, etc.). Motivate your answers and clearly state any assumptions you make. If you need extra data to perform your computations, gather it from FactSet or any other reliable source.

You work as a risk officer at a US-based bank. Your current task involves analyzing loan applications from two publicly traded companies, ABC and XYZ, both operating in the consumer/service sector. Detailed balance sheet and market data for the two companies can be found in the spreadsheet named "ABC_XYZ" of **Data_Case2.xlsx**. Both companies are requesting a $100 million loan today to be repaid in two years (with no intermediate installments). Your objective is to take the following decisions: i) which loan to approve or deny, and if a loan is approved, ii) assign an internal rating among A-rated, B-rated, or C-rated, and iii) determine the terms (i.e., yield) of the loan. Due to current capital constraints, you can approve at most one loan application.

PART I: CREDIT SCORING

To begin, you decide to apply a Credit Scoring methodology. To this end, you collected balance sheet data for a historical sample of companies in a comparable sector. In the spreadsheet "HistSample," column B flags non-bankrupt companies with a 0 and companies that went bankrupt within a year with a 1. The data refer to the last fiscal year before bankruptcy (and to the same date for non-bankrupt firms).

1. Columns D-G of spreadsheet "HistSample" report the following indicators: return on sales, leverage D/V (standardized relative to the industry average), interest coverage ratio (EBIT/Interest expense), and customer retention rate over one year. If you were to select only 3 out of the 4 indicators for your model, which one would you exclude based on its univariate distribution across good and bad companies? Explain.

2. Estimate the vector γ on these three indicators using discriminant analysis. For Σ, use the weighted average VCV matrix of the indicators, where the weights are the relative fractions

of good and bad firms. (To invert the matrix, you may either use Excel or external software like Python/R and import the inverse matrix back into Excel.)

3. Calculate the in-sample type-I and type-II errors had you decided whether to grant or refuse a loan based on a cutoff α, computed as the midpoint between the average Z-scores of the two groups of firms.

4. Construct your own credit rating system and use it to assign internal ratings (A-rated, B-rated, C-rated, and Defaulted). Note that the rating classes need not be of equal size. Justify your rating system.

Based on the model above, decide whether to grant the loan to ABC or XYZ and assign the internal rating accordingly.

At the end of this process, you will have identified one company to which the loan will be assigned.

PART II: RATINGS AND CREDIT SPREAD

1. You want to assign a probability of default within one and two years to the loan you just approved. As a first alternative, use information from S&P Global's "Default, Transition, and Recovery: 2024 Annual Global Corporate Default And Rating Transition Study."[1] Based on their report, assign the corresponding probabilities.

2. As a second alternative, since the company is publicly traded (market data are in the Excel file), use the Merton (1973) model to compute the two-year probability of default and the corresponding spread and coupon (in USD) at loan maturity.

3. As a third alternative, rely on corporate bonds trading in the secondary market. Unfortunately, your selected firm does not have bonds trading. Therefore, identify a comparable company and gather its current bond yield (and spread) for one or more traded bonds from FactSet. Motivate your choice of the comparable firm and the selection of the bond(s). Based on this information, compute the spread and coupon (in USD) at loan maturity.

4. Discuss the pros and cons of the three approaches.

[1] Available at this link.