

Enclosed are data about municipal general obligation bonds. The details are from Moody's Municipal and Government Manual. The information on the following financial ratios are available:

21202

- x General obligation debt per capita
- y Assessed property valuation per capita

The values of x, y and the current rating for each municipal bond are presented in the following table. The objective is to predict the bond rating of the municipalities, whether the rating will be [A or Aa] versus [Baa].

A researcher has proposed a discriminant model based on the following Z score:

$$Z = (0.00435) * \text{General obligation debt per capita} + 0.00064 * \text{Assessed property valuation per capita}$$

The Z scores of the municipalities are also given in the table.

City	General obligation debt per capita	Assessed property valuation per capita	Z score	Moody's Rating
Austin	192	5905	2.944	Aa
Corpus Christi	266	4188	1.52322	Aa
Fresno	52	3011	1.70084	Aa
East Cleveland	32	2286	1.32384	A
Franklin, Texas	41	2428	1.37557	A
Rome, GA	160	4515	2.1936	A
Hamtramck, Mich.	62	4725	2.7543	Baa
Great Bend, Kan	144	2597	1.03568	Baa
Franklin, PA	157	2478	0.90297	Baa
Vicksburg, Miss	128	2137	0.81088	Baa
Crowley., LA	100	870	0.1218	Baa
Midfield, ALA	360	1652	-0.50872	Baa

Questions:

- 1 Using the data from the table, construct two univariate models to predict the bond ratings using one ratio at a time. Given a criterion of minimizing the number of misclassifications, what cutoff point will you use. Present the classification matrix for the model with this cutoff point and estimate the accuracy.
- 2 Construct a multivariate model using the Z scores. Given a criterion of minimizing the number of misclassifications, what cutoff point will you use. Present the classification matrix for the model with this cutoff point and estimate the accuracy.
- 3 Under what circumstances would a criterion different from minimizing the total number of misclassifications be appropriate for you decision problem?
- 4 Suppose the market yield rates are primarily set based on the Moody's ratings. As an investment advisor, which bonds will you suggest investing in and why ?