

A Double HMM Approach to Altman Z-scores and Credit Ratings

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Abstract

Credit ratings and accounting-based Altman Z-scores are two important sources of information for assessing the creditworthiness of firms. In this paper we build a model based on a double Hidden Markov Model, (DHMM), to extract information about the “true” credit qualities of firms from both the Z-scores evaluated from the accounting ratios of the firms and their posted credit ratings. The evolution of the “true” credit quality over time is estimated from observed data using filtering methods and the EM algorithm. Recursive updates of optimal estimates are provided via filtering so that the model is “self-tuning”, or “self-calibrating”. We illustrate the practical implementation of the proposed model using actual accounting ratios data of firms from different regions and their posted credit ratings data

Keywords: Altman Z-scores; Credit Ratings; Double Hidden Markov Models; Reference Probability; Filters; EM Algorithm.