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Nonsteady Corporate Model in Bankruptcy Prediction

T he traditional technique in bankruptcy pre- diction is to estimate a static cross-sectional multivariate financial ratio model to discriminate between bankrupt and nonbankrupt firms with a minor attention to the dynamics in corporate progress. The principal idea of these models is to derive a multivariate index (or, a more complex statistical construction) with constant parameters, to be used as a master model to give an approximation of failure risk for a company, on the condition set by the values of the financial ratios in that company. The main problem in these kinds of cross-sectional models is in their static nature. The models use information only from a given static point of time and are only informative if the failure process remains relatively stable over time. This assumption is usually violated. The purpose of this study is to present a nonsteady corporate model (allowing the growth and profitability of the firm to change over time) and to test whether the parameter estimates of such a model will include incremental information over traditional financial ratios. The model is based, firstly, on the assumption that the growth path of the modelled firm follows the second-order Pascal distribution which allows the growth rate to vary over time. Secondly, it is assumed that the internal rate of return of periodic investment projects may also vary over time depending on the steady rate of change in monetary productivity (the ratio of revenue units to investment expenditure). This model may have superior features in comparison to traditional steady models in depicting the unsteady behaviour of failing firms.

The discriminatory power of the corporate model parameter estimates is tested in a sample of 42 failed and 42 nonfailed Finnish limited companies. The financial data available cover a time series of seven years prior to bankruptcy. Because of the short-time series the model is only estimated for the first year before bankruptcy. Seven financial ratios and other variables are used to form a benchmark model.The parameters of the nonsteady model are estimated by the Marquardt (1963) iterative method. Stepwise logistic regression is applied as the statistical method to discriminate between failed and nonfailed firms. The set of variables used in this logistic analysis is consisted of the estimates for the nonsteady model parameters and of the variables used as a benchmark (seven financial ratios and variables), all from the first year before bankruptcy. The results show that the parameter estimates associated with the steadiness of growth (growth model) and the firm-level profitability (profitability model) are significant variables to discriminate between bankrupt and nonbankrupt firms. However, only the growth model parameter estimate includes incremental information over the benchmark variables and improves the classification accuracy of the benchmark model. The parameter estimates referring to periodic (not firm-level) profitability or its changes prove not to have any discriminatory power.

The empirical results may be affected by the fact that only the first year before failure was considered. The use of earlier data could lead the parameter estimates associated with the periodic profitability and its change, to outperform the firm-level profitability and benchmark variables as discriminators. The first year before failure for bankruptcy firms is characterized by very poor levels of financial ratios that contain the majority of the important information. Especially the ratios of liquidity and solidity (the direct causes of failure) usually include a lot of discriminatory power. Followingly, profitability (an indirect cause) estimates are often outperfomed by these ratios in that year. However, a firm with poor liquidity and solidity ratios may have a smaller bankruptcy risk under a steady growth than under a nonsteady growth. This line of thinking was supported by the incremental information included in the truncation parameter estimate (a measure of the steadiness of the growth).