

Nonparametric approach for firms' default

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Abstract: A new intuitive approach is discussed for firms' default or generalized shock models using urn processes. This approach is not depending on a parametric model as in sum or extreme shock models or even the more generalized shock models introduced in Gut and Hüsler (2005). The urn approach allows us to indirectly model the moving risky threshold in generalized extreme shock models. This plays the important role in modeling firms' default. The basic idea is to link the types of the balls in the urn with the risk or the levels of risk a system can face. The evolution of the process is given by a triangular reinforcement matrix. Thus no parametric distribution is assumed for the risk process.

In particular, assuming that a firm can experience three different levels of risk (no risk, risk and default), we introduce a dependence among the levels, so that the probability of default increases every time the firm enters the risky state, while it decreases (but does not disappear) the more the firm spends in the non-risky one. This approach makes it possible to predict firms' default probabilities with a good degree of approximation and to obtain limit distributions that nicely reproduce the empirical results one can find in the literature. The model is applied to real data to show the prediction accuracy of the firms' default times and default probabilities and to compare it with a known benchmark prediction model.