

A GENERIC FRAMEWORK FOR STOCHASTIC LOSS-GIVEN-DEFAULT

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ABSTRACT. In this talk a method is discussed to incorporate stochastic Loss-Given-Default (LGD) in factor models, i.e. structural models for credit risk. The general idea exhibited in this text is to introduce a common dependence of the LGD and the probability of default (PD) on a latent variable, representing the systemic risk. Though our theory can be applied to any arbitrary firm-value model and any underlying distribution for the LGD, provided its support is a compact subset of $[0, 1]$, special attention is given to the extension of the well-known cases of the Gaussian copula framework and the shifted Gamma one-factor model (a particular case of the generic one-factor Lévy model), and the LGD is modeled by a Beta distribution, in accordance with rating agency models and the Credit Metrics model.

In order to introduce stochastic LGD, a monotonically decreasing relation is derived between the loss rate L , i.e. the loss as a percentage of the total exposure, and the standardized log-return R of the obligor's asset value, which is assumed to be a function of one or more systematic and idiosyncratic risk factors. The property that the relation is decreasing, guarantees that the LGD is negatively correlated to R and hence positively correlated to the default rate. From this relation, expressions are then derived for the cumulative distribution function (CDF) and the expected value of the loss rate and the LGD, conditionally on a realization of the systematic risk factor(s). It is important to remark that all our results are derived under the large homogeneous portfolio (LHP) assumption and that they are fully consistent with the IRB approach outlined by the Basel II Capital Accord.

We will demonstrate the impact of incorporating stochastic LGD and using models based on skew and fat-tailed distributions in determining adequate capital requirements. Furthermore, we also skim the potential application of the proposed framework in a credit risk environment. It will turn out that both building blocks, i.e. stochastic LGD and fat-tailed distributions, separately, increase the projected loss and thus the required capital charge. Hence, the aggregation of a model based on a fat-tailed underlying distribution, that accounts for stochastic LGD, will lead to sound capital requirements.

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