

Abstract

Despite interest income from loans is a major profit contributor for commercial banks, lending inevitably makes banks bear default risks. For the sake of avoiding expected and unexpected losses, risk management methods ought to be employed by banks to meet the economical capital requirement. Besides, loan loss severity may very well be underestimated if the correlation between default events is disregarded. Therefore, in order to calculate economical capital when taking default correlation into account, we start from Merton (1974) model, and identify if loans will be in default via factor models for portfolio credit risk and portfolio losses can then be determined. To simplify our analysis in this paper, loss given default is assumed to be 100 %. To intensify correlation, default contagion is, moreover, introduced to our factor model and we investigate which model results in larger losses as well.

When determining default, we have to utilize rating transition matrices to obtain unconditional probability of default. Transition matrices published by credit rating agencies, however, have embedded drawback of insufficient information. We correct this flaw by means of another transition matrix based on continuous-time observations and produce different unconditional probability of default. Through Monte Carlo simulation, loss distributions are calibrated respectively from the two factor models under portfolio of 537 Taiwan listed and OTC companies. We find that expected and unexpected losses are larger and loss distribution is more right-skewed when infectious effects exist.

Keywords: Correlation, Contagion Effect, Transition Matrix with Continuous Observations, Value at Risk, Loss Distribution