Abstract

The counterparty credit risk is particularly hard to simulate and this thesis is only the second work so far, which considers effective simulation of couterparty risk. There are two new approaches to stochastic modelling, which are useful with respect to efficient simulation of counterparty risk. These are Path-Dependent Simulation (PDS) and Direct-Jump to Simulation date (DJS). It had been show that DJS is far more effective, when it comes counterparty risk simulation of path-independent derivatives. We focus on a portfolio of interest rate swaps, which are effectively path-dependent. DJS approach yields estimates with much lower variance than PDS approach. But as expected, the DJS is also much more computationally intensive. The increase in computing time in majority of cases wipes out any gains in lower variance and PDS approach is shown to be more effective, when computing time is taken into account. We also show that in practice the convergence rate of Monte Carlo method significantly underestimates the true reduction in variance, which can be achieved with increasing number of scenarios.

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