

EFFICIENT MONTE CARLO COUNTERPARTY CREDIT RISK PRICING AND MEASUREMENT

Samim Ghamami, UC Berkeley, USA, samim_ghamami@berkeley.edu

Bo Zhang, IBM Research, USA, bozhang@gatech.edu

Counterparty credit risk (CCR), a key driver of the 2007-08 credit crisis, has become one of the main focuses of the major global and U.S. regulatory standards. Financial institutions invest large amounts of resources employing Monte Carlo simulation to measure and price their counterparty credit risk. We develop efficient Monte Carlo CCR frameworks by focusing on the most widely used and regulatory-driven CCR measures: expected positive exposure (EPE), credit value adjustment (CVA), and effective expected positive exposure (eEPE). Our numerical examples illustrate that our proposed efficient Monte Carlo estimators outperform the existing crude estimators of these CCR measures substantially in terms of mean square error (MSE). We also demonstrate that the two widely used sampling methods, the so-called Path Dependent Simulation (PDS) and Direct Jump to Simulation date (DJS), are not equivalent in that they lead to Monte Carlo CCR estimators which are drastically different in terms of their MSE.