

Webinar Series

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'Valuation of Basket Credit Default Swaps Under Stochastic Default Intensity Models'

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ABSTRACT: Portfolio credit derivatives, including the basket credit default swaps, are designed to facilitate credit risk transfer amongst market participants. Investors consider them as cheap tools to hedge a portfolio of credits, instead of individual hedging of the credits. The prime aim of this work is to model the hazard rate process using stochastic default intensity models, as well as extend the results to the pricing of basket default swaps. We focused on the n th-to-default swaps whereby the spreads are dependent on the n th default time, and we estimated the joint survival probability distribution functions of the intensity models under the risk-neutral pricing measure, for both the homogeneous and the heterogeneous portfolio. This work further employed the Monte-Carlo method, under the one-factor Gaussian copula model to numerically approximate the distribution function of the default time, and thus, the numerical experiments for pricing the n th default swaps were made viable under the two-portfolio types. Finally, we compared the effects of different swap parameters to various n th-to-default swaps.

AMS subject classifications: 91G20, 91G30, 91G40, 91G60, 91G70, 62P05, 65C05

Key words: Portfolio credit derivatives, basket default swaps, Gaussian copula, Monte-Carlo simulations, stochastic intensity modelling, hazard rate, joint survival probability distribution.



BIO: Dr Umeorah Nneka received her Bachelor's degree in Mathematics at the University of Nigeria, in 2012. She obtained an MSc in Mathematical Sciences and a Research Masters in Risk Analysis at the University of the Western Cape/African Institute for Mathematical Sciences (AIMS) and at the North-West University, Potchefstroom respectively. She visited Germany in 2018 for a 6-month short-term research visit under the DAAD - Deutscher Akademischer Austauschdienst sponsorship. In July 2020, she was awarded a PhD in Risk Analysis (Thesis Topic: Price estimation of basket credit default swaps using numerical and quasi-analytical methods) from the Unit for Business Mathematics and Informatics, North-West University, Potchefstroom Campus, South Africa. Her research interests are Financial Mathematics (Derivatives pricing), Statistical Risk Analysis and Numerical Analysis.

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