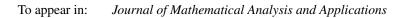# Accepted Manuscript

A PDE pricing method for double-name credit-linked notes with counterparty risk in reduced-form model with common shocks

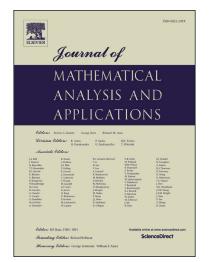Tingting Jiang, Xiaosong Qian, George X. Yuan

A PDE Pricing Method for Double-Name Credit-Linked Notes with Counterparty Risk in Reduced-form Model with Common Shocks [*]

Tingting Jiang[†], Xiaosong Qian [‡] and George X. Yuan [§] [¶]

Abstract

In this paper, we propose a PDE method to price a double-name credit-linked note(CLN) with counterparty risk under reduced-form framework. The default correlation among the CLN issuer and the reference entities of the double-name CLN relates to the occurrence of "common shocks", which is able to trigger simultaneously defaults in some pre-specified groups of the above credit entities. By assuming the stochastic intensities of common shocks being directly and inversely respectively proportional to the spot interest rate which follows CIR process, we deduce the corresponding explicit formulas for double-name CLN values. Additionally, we conduct some numerical experiments to examine how correlated default risks among the credit entities affect the double-name CLN values and its credit valuation adjustment (CVA).

Keywords: Double-Name Credit-linked Note; Counterparty Risk; Common Shock Model; Partial Differential Equation (PDE)

1 Introduction

Counterparty risk has been a crucial issue in connecting with valuation and risk management for financial credit derivatives since the financial crisis in 2008. In general terms, counterparty risk is the risk that a party to an OTC derivatives contract may fail to perform on its contractual obligations, causing losses to the other party (see [6]). However, more and more rigorous public scrutiny system has been established, it requires better pricing and corresponding risk measurement in supporting the practices.

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