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Evaluation of Counterparty Risk for Derivatives with Early-exercise Features*

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Abstract

We introduce an efficient numerical approach to evaluate counterparty risk and we compute the Credit Valuation Adjustment for derivatives having early-exercise features. The approach is flexible and can account for wrong-way risk and various models for the underlying risk factor's dynamics. Numerical experiments are presented to illustrate the efficiency and versatility of the method.

Keywords: Finance, Credit risk, Credit valuation adjustment, Dynamic programming, computational method.

1 Introduction

The financial crisis of 2007–2008 highlighted a number of shortcomings in the regulation of financial institutions. One of these was the misestimation of *counterparty risk*, defined as the risk of incurring losses in over-the-counter contracts, in the event of a counterparty defaulting on its payment obligations. The *credit valuation adjustment* (CVA) is the market value of counterparty risk. It is a pricing adjustment applied to the default-free value of the contract in order to obtain a fair value

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