

# Pricing the exotic: Path-dependent American options with stochastic barriers

Download Other Working Papers Keep in mind

The series Working Papers on Economics is published by the Office for Economic Studies at the *Banco de la República* (Central Bank of *Colombia*). It contributes to the dissemination and promotion of the work by researchers from the institution. This series is indexed at Research Papers in Economics (RePEc).

On multiple occasions, these works have been the result of collaborative work with individuals from other national or international institutions. The works published are provisional, and their authors are fully responsible for the opinions expressed in them, as well as for possible mistakes. The opinions expressed herein are those of the authors and do not necessarily reflect the views of Banco de la República or its Board of Directors.

AUTHOR OR EDITOR Alejandro Rojas-Bernal Mauricio Villamizar-Villegas

The series Borradores de Economía (Working Papers on Economics) contributes to the dissemination and promotion of the work by researchers from the institution. On multiple occasions, these works have been the result of collaborative work with individuals from other national or international institutions. This series is indexed at Research Papers in Economics (RePEc)

Publication Date: Monday, 8 of March 2021

The opinions contained in this document are the sole responsibility of the author and do not commit Banco de la República or its Board of Directors.

Abstract

We develop a novel pricing strategy that approximates the value of an American option with exotic features through a portfolio of European options with different maturities. Among our findings, we show that: (i) our model is numerically robust in pricing plain vanilla American options; (ii) the model matches observed bids and premiums of multidimensional options that integrate Ratchet, Asian, and Barrier characteristics; and (iii) our closed-form approximation allows for an analytical solution of the option's greeks, which characterize the sensitivity to various risk factors. Finally, we highlight that our estimation requires less than 1% of the computational time compared to other standard methods, such as Monte Carlo simulations.