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

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Publication Date: Monday, 8 of March 2021

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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.

Fuente: https://www.banrep.gov.co/en/pricing-exotic-path-dependent-american-options-stochastic-barriers