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Pricing and Hedging of American Knock-In Options

Farid Aitsahlia, Lorens Imhof, Tze Leung Lai

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Abstract

Barrier options are some of the most popular among the myriad of “exotic” derivative products. Although they are path-dependent, “out” options are easy to value in a standard binomial or other lattice model. The path-dependence of “in” options can not be handled using a tree, but for European-style contracts, by “in-out parity” an out option is equal to the value of the plain vanilla option minus the price of the matching out option. Unfortunately, the parity relation is broken by American exercise, since the complementary in and out contracts will not be rationally exercised early at the same time. In this article, AitSahlia, Imhof, and Lai show how to price an American knock-in option by decomposing it into corresponding European knock-in plus the early exercise premium, which can be approximated separately.

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