Bermudan swaptions conundrum

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The issue of valuation of interest rate derivatives differs substantially from its equity or currency counterpart — since the problem itself is multidimensional. We first outline the Heath–Jarrow–Morton framework being the main analytical tool related to this market and then present the "curse of dimensionality" problem in pricing of Bermudan swaptions.

We show then how Markovian projection can be used to reduce a full-edged interest rate model to a "minimal" form in which the swap rate evolves essentially like a dividend-paying stock. Using a number of numerical examples we compare such a minimal "poor man's" model to a full-edged interest model models such as market benchmark Hull-White and Libor market model. Numerical tests demonstrate that the "poor man's" model is in fact sufficient to price Bermudan interest rate swaptions. The main practical implication of this finding is that - once local volatility, dividend and short rate parameters are properly stripped from the volatility surface and interest rate curve - one can readily use the widely popular equity derivatives software for pricing exotic interest rate options such as Bermudans.

References

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