

# Forgive, or Award, Your Debtor? - A Barrier Option Approach

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## Abstract

We introduced in this study a model of sovereign debt with an embedded DIP to capture the discontinuity in sovereign debt pricing. We show that debt forgiveness is the most effective containing yields over the course of debt crisis. Repayment bonus or award or capital market exclusion penalty invites moral hazard and push up yields. Although a debtor's current repayment capability reflects its current levels of repayment award, debt forgiveness or default threshold. While forgiveness works unconditionally, a debtor can only receive repayment award conditional on full debt repayment, which could result in unfavored consequences due to moral hazard. A creditor should therefore avoid offering repayment award to, or attempting to lower default threshold on, a debtor. Granting more forgiveness is, however, beneficial always. Overall, a strong GDP growth is still the most effective solution to lower long-run sovereign yields. Reexamining the argument of Krugman (1988) verifies that extra financing is indeed inferior to forgiveness. The forecasting errors in our model are only at fractions of those produced by other related studies, as our unscented Kalman filter procedure is free of potential econometric problems. Our model of default threshold for sovereign debt is more tractable than existing works in literature, especially in the calibration of sovereign yields under various debt load levels, economic cycles, time to maturity and forecasting capability. Our model can be applied in the operation of risk management, as well as portfolio investments, for investors of sovereign debt instruments.

**Keywords:** Forgiveness, default threshold, default risks, sovereign debt, government bonds, fixed income, barrier option, Kalman filter.

**JEL codes:** C14, D81, D87, F34, G01, G11, G12

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