

JIE DAI

Sobey School of Business, Saint Mary's University, Canada

FRANCIS BOABANG

Sobey School of Business, Saint Mary's University, Canada

THE EQUIVALENCE OF THREE APPROACHES TO PRICING INTEREST-RATE DERIVATIVES

Abstract:

In the pedagogy of fixed income, there exist three alternative pricing approaches to interest-rate derivatives: 1) the approach that “calibrates” forward rates; 2) the approach that “calibrates” risk-neutral probabilities; and 3) the approach that “forms” payoff-replicating portfolio. With the different procedure involved in each method, confusion often arises among students with regard to which is the right pricing tool. In this paper, we show that they, in fact, produce the same pricing result, – whether it involves a standalone option on bond or a bond with embedded option, thus establishing the equivalence of these three methods. More specifically, we show that the “calibrated rates” method and the “risk-neutral probabilities” method are algebraically equivalent, and both are rooted in the “replicating portfolio” method whose fundamental requirements are no-arbitrage and tradability of bonds with varying maturities.

Keywords:

Interest-rate derivatives; Risk-neutral pricing; Bond portfolio replication

JEL Classification: G12