Affine and quadratic interest rate models: A theoretical and empirical comparison
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Abstract

Affine interest rate models are becoming increasingly popular due to their analytical and computational tractability. Affine processes have an explicit closed-form log bond price formula which is a linear function of the initial value of the underlying process. Quadratic processes are, to some extent, an extension of affine models and have similar properties as affine models. This thesis compares these affine and quadratic models on a theoretical and an empirical level. For the theoretical level, this thesis explains the mathematics of affine and quadratic interest rate models. To properly compare the different classes of models, it constructs a similar framework as the well-known affine framework to describe the mathematics of quadratic models. Besides the zero-coupon bond formulas, for both affine and quadratic models analytical forms for derivatives of the short rate (such as call and put options) are provided using admissible parameters and Riccati equations. Also, using the analytical bond prices, an empirical comparison is performed where some computational examples are discussed.