GMM을 이용한 Vasicek형태의 일요인 이자율 모형의 추정

GMM Estimation of Vasicek Types One Factor Interest Rate Models

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I. Introduction
II. Models
III. Estimation Method
IV. Empirical Results
V. Conclusion

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I. Introduction

The main purpose of this paper is to compare performance of Vasicek types of one factor interest rate models by using cross sectional data. Consequently we compare models under the so called risk neutral measure. The most similar research to ours is Chan et al (1992). Chan et al (1992) compare a large family of several one factor models including the Vasicek and CIR model. They, however, compare model by using the time series data, namely under physical probability measure. Actually, one cannot apply the estimated parameters from the physical probability for pricing a bond and bond derivatives. Hence the approach of Chan et al (1992) cannot compare models in the performance wise.

Interest rate modelling is a very important tool for finance, especially in pricing bond and its derivatives such as a bond option, and managing interest rate risk (Lee, 1996). It is well known that Vasicek (1977) and CIR (1985) are the major interest rate models for achieving such purposes. Shortcomings in pure Vasicek and CIR, however, are well documented. Among those researches, Das, Foresi (1996) show that the two models can not fit the kurtosis and skewness of interest rate changes well.

To overcome poor fitting ability for such market stylized fact, one can incorporate the possibility that, in addition to diffusion, the underlying interest rate jump. Jump models that incorporate Brownian uncertainty as well as potential jump changes have been applied in pricing bond and its derivative (Koo Bonyul, 2006). Ahn, Thompson (1988) and Das, Foresi (1996) applied the large jump, Poisson process for modelling the fixed-income securities. Recently, the small jump models or Levy process models have been used for modeling interest rate. Eberlein, Raible (1999) is maybe the first rigorous application of Levy process to HJM interest rate. Rhee et al (2010) applies the $\alpha$-stable Levy process for modelling short rate (Oh, 1999).