EMM ESTIMATION OF SHORT-RATE MODELS

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1. Introduction

Estimation of diffusion models of the term-structure of interest rate based on discretely sampled data has proven to be difficult. This is mainly because transition densities of most diffusion models are unknown. This renders their log-likelihoods to have no closed-form expressions, and, thus, maximum likelihood (ML) estimation of these models with its optimal statistical properties are infeasible. Recently, a number of methods have been developed to approximate the unknown densities. This includes generalized method of moments of Hansen and Scheinkman (1995), simulated methods of moments of Duffie and Singleton (1993) and Gourieroux, Monfort and Renault (1993), efficient method of moments of Gallant and Tauchen (1995,1996, 1998, 2001a, 2001b), Markov Chain Monte Carlo of Jacquier, Polson and Rossi (1994) and Eraker (2001), the methods based on empirical characteristic functions of Singleton (2001) and Jiang and Knight (2002), simulated maximum likelihood of Pedersen (1995), Santa-Clara (1995) and Durham and Gallant (2002), and approximate likelihood a pproach of Ait-Sahalia (2002a, 2002b), Ait-Sahalia and Kimmel (2002), and Egorov, Li and Xu (2003).

In this paper, we use efficient method of moments (EMM) to estimate a number of one and two-factor diffusion models of the short rate. The estimation is peformed on weekly recorded observations of Canadian three-month Treasury bill rate or the period January 3, 1962 to November 15, 2003 for a total of 2178 observations. Specification tests are conducted to pick up the best model for the data at hand.