

摘要

連續時間模型在現代的財務領域的應用廣泛，尤其是隨機過程的使用，對於表達一序列資料的動態行為相當方便。其中均數回歸(mean-reverting)或稱均質反轉的模型的應用更是財務領域中相當重要的一環。本文主要的目的在探討均數回歸模型中的參數估計問題，由 Jun Yu (2012) 為出發點，其指出使用一般最小平方方法(ordinary least squares ; OLS)估計 Ornstein-Uhlenbeck process(O-U process)的均數回歸參數時將會產生上方偏誤(up-ward bias)，且當均數回歸參數(reversion parameter)越遠離零時，其偏誤的形勢越劇烈。

本篇文章在放寬參數假設後，嘗試以其他方法估計均數回歸參數。最初先以 Euler method 和 local linearization 等離散化(discretization)模型方法估計參數，並且加入 Ait-Sahalia (1999,2002) 對隨機過程機率分配展開的參數估計方法，之後考慮解決參數估計的偏誤問題，以 Indirect Inference 法重新估計。最後以綜合比較各種估計方法的效率性並以三十天期商業本票做為無風險利率進行債券選擇權的實證研究。

關鍵字：OU process、均數回歸係數

Abstract

Continuous-time models are widely used in modern financial research, especially the stochastic processes; it's a convenient way to describe the dynamic behavior of sequence of data. The mean-reverting model is the one of most important application in stochastic processes. The aim of this paper to investigate the parametric estimation problem in mean-reverting model. Based on Jun Yu (2012) , he argue that using ordinary least squares method to estimate the mean-reversion parameter in O-U process will result in an up-ward bias, and the bias is more severe when mean-reversion parameter is far away from zero.

This paper tries to relax the parametric assumption in O-U process in Jun Yu (2012) and uses variety ways to re-estimate the mean-reversion parameter in O-U process. At first, we use Euler scheme, local linearization, and method of Ait-Sahalia (1999,2002) to illustrate the bias problem, then consider Indirect Inference to solve the bias problem in mean-reversion parameter. Finally, we use 30-days commercial paper as a proxy for short-term interest rate and price bond options.