



Modelling structural breaks, long memory and stock market volatility: an overview

Anindya Banerjee^a, Giovanni Urga^{b,*}

^a*Department of Economics, European University Institute, Villa San Paolo, Via della Piazzuola 43, 50133 Firenze, Italy*

^b*Faculty of Finance, Cass Business School, London, 106, Bunhill Row, London, EC1Y 8TZ, UK*

Available online 13 November 2004

Abstract

The main aim of this volume is to present key recent developments in the fields of modelling structural breaks, and the analysis of long memory and stock market volatility.

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JEL classification: C22

Keywords: Structural breaks; Long memory; Volatility

1. Introduction

This special annals-issue of the Journal of Econometrics contains a collection of papers from the conference on “Long Memory, Structural Breaks and Stock Market Volatility”, organized by us in London at the Cass Business School from the 5th to the 7th of December 2002.

Modelling strong persistence in time series has constituted a major research agenda in the econometrics literature for a number of years. One approach has been to look at the long-memory properties of time series and to study mechanisms which generate series having these properties, such as the various forms of fractionally

*Corresponding author. Tel.: +44 20 7040 8698; fax: +44 20 7040 8881.

E-mail addresses: anindya.banerjee@iue.it (A. Banerjee), g.urga@city.ac.uk (G. Urga).

integrated, autoregressive moving average and non-linear models. In the macro-econometrics literature, attention has focused more on looking at the properties of stochastic processes with unit roots. Unit root processes can be viewed as a specific form of long memory. A significant strand of the debate has also considered the properties of tests for unit root, cointegration or long memory in the presence of structural breaks. It has been shown that persistence tests are severely compromised, in terms of their size and power properties, in series which display breaks, particularly in their deterministic components, because these processes give the impression of persistence. These issues all have wider reach and the interface between the literatures on unit roots, structural breaks and long memory is often important.

Our editorial introduction is in two parts and consists of discussing the developments in the literatures on structural breaks and long memory, with specific applications. Our goal is to obtain an overall sense of the main frameworks under which research in these areas has so far been conducted. The papers in this volume, belonging to each area, are then placed within these frameworks and their contributions are discussed. The invited keynote address by Nobel Laureate Professor Clive Granger proposes some key areas for further developments in the literature.

Although based on considering a vast number of papers, our approach in writing this introduction is necessarily selective. However, during the course of preparation of this volume, a key resource for econometricians has been the compilation of an archive contained in a CD-Rom (available freely from us upon request) of the majority of recently published papers in these areas. Details of papers not included in this introduction may thus be consulted with ease.

2. Structural breaks

A rich literature on the econometrics of structural breaks has developed in recent years, and an earlier annals volume of this journal published in 1996 entitled *Recent Developments in the Econometrics of Structural Change* (edited by Jean-Marie Dufour and Eric Ghysels, 1996) surveyed some of the significant developments in the field of structural change at that time.

Any description of the ‘problem’ of dealing with structural breaks (and, more generally, structural change) in estimation and inference may be organised in several different ways, in order to encompass the cases characterized by considering linear or non-linear models, stationary or non-stationary regressors, known or unknown point of break, multiple breaks or single break, estimation in single-equation or systems, or any of these in combination.

In the following sections we describe three papers which help to illustrate some of the issues involved. As background, we start with a brief description of the debate on whether macroeconomic time series are characterized by breaks in their deterministic components, which developed in response to Nelson and Plosser’s (1982) powerful critique which argued in favour of unit roots in many of these series.

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