

JUN YI PENG ZHOU

CONTACT INFORMATION

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Date of Birth: January 16, 1991
Nationality: Spanish

RESEARCH INTEREST

Time Series Econometric, Macro-Econometric, Non-linear Process.

EDUCATION

PhD in Economics, Universidad Carlos III de Madrid, Spain, 2015-2019
MRes in Economic Analysis, Universidad Carlos III de Madrid, Spain, 2013-2015
BSc in Business, Universidad Carlos III de Madrid, Spain, 2009-2013

RESEARCH

Threshold Stochastic Unit Root Models, with Jesus Gonzalo and Raquel Montesinos

- In this study, we introduce a new class of stochastic unit-root (*STUR*) processes, where a threshold variable drives the randomness of the autoregressive unit root, thereby allowing us to explain the existence of unit roots. This new model, namely the threshold autoregressive stochastic unit root (*TARSUR*) process, is strictly stationary, but if we do not consider the threshold effect, it can mislead to conclude that the process has a unit root. The *TARSUR* models are not only an alternative to fixed unit root models but present interpretation, estimation and testing advantages with respect to the existent *STUR* models. This study analyzes the properties of the *TARSUR* models and proposes two simple tests to identify this type of processes. The first test will allow us to detect the presence of unit roots, which can be fixed or stochastic, and the asymptotic distribution (AD) of this test presents a distribution discontinuity depending if the unit root is fixed or stochastic. The second test we propose is a simple *t*-statistic (or the supremum of a sequence of *t*-statistics) for testing the null hypothesis of a fixed unit root versus a stochastic unit root hypothesis. It is shown that its asymptotic distribution (AD) depends if the threshold value is identified under the null hypothesis or not. When the threshold parameter is known, the AD is a standard normal distribution, while in the case of an unknown threshold value, the AD is a functional of Brownian Bridge. A Monte Carlo simulation shows that the proposed tests behave very well in finite sample, and the Dickey-Fuller test cannot easily distinguish between exact unit roots and threshold stochastic unit roots. The study concludes with applications to U.S. stock prices, U.S. house prices, U.S. interest rates, and USD/Pound exchange rates.

Multiple Long Run Equilibria Through Cointegration Eyes

- Cointegration has succeeded in capturing the unique long-run linear equilibrium. Specific non-linearities have been incorporated into cointegrated models but always assuming the existence of a single equilibrium. In this study, we explore the possibility of different long-run equilibria depending on the state of the world (i.e., good and bad times, optimism and pessimism, frictional coordination) in a threshold framework. Starting from the present-value model (PVM) with different discount factors and depending on the state of the economy,

we show that this type of PVM implies threshold cointegrated with different long-run equilibria. We present the estimation and inference theory. The study completes two applications where the variables are not linearly cointegrated but threshold cointegrated.

Quasi-Error Correction Model

- Cointegration captures single long-run equilibrium relationships between economic variables and the error correction model (ECM) is the mechanism in which the equilibrium is maintained. In this study, we introduce the quasi-error correction model (QECM), derived from the cointegration relation with threshold effects, where each regime represents a different equilibrium relation between the variables. In contrast to the linear ECM, the QECM has a regressor which captures the switching between equilibria. This regressor will pose a problem similar to the non-linear error correction models, where the model cannot be balanced using the traditional definitions of integration. We present the estimation and the inference theory and finish with an empirical application for U.S. interest rate of instruments with different maturities.

**TEACHING
EXPERIENCE**

Teacher Assistant, Ph.D. level

- Econometric III 2016 - 2019
(English, Prof. Jesús Gonzalo, Jesús M. Carro and Ricardo Mora)

Teacher Assistant, Master level

- Econometric II 2015 - 2019
(English, Prof. Álvaro Escribano)

Teacher Assistant, Undergraduate level

- Econometric Techniques 2014 - 2019
(Spanish, Prof. Jesús Gonzalo)

CONFERENCES 2019
& SEMINARS

- *Seminars:* IX Workshop in Time Series Econometrics, UC3M Ph.D. Workshop.

2018

- *Seminars:* UC3M Ph.D. Workshop, LSE-Cambridge-UC3M Econometrics Ph.D. Students Workshop, ENTER Jamboree Toulouse.

2017

- *Conferences:* Computational and Financial Econometrics (CFE) in London
- *Seminars:* UC3M Ph.D. Workshop, VII Workshop in Time Series Econometrics, ENTER Jamboree LSE (Discussant)

2016

- *Seminars:* VI Workshop in Time Series Econometrics, UC3M Ph.D. Workshop

2015

- *Seminars:* The Macroeconomics of Credit and Asset Bubbles Barcelona CREI Macroeconomics Summer School

SCHOLARSHIP Spanish FPI scholarship, Spain, 2015-2019

Graduate Program Scholarship, UC3M, Spain, 2014-2015

COMPUTER Matlab, Python, Eviews, L^AT_EX, Microsoft Office
SKILLS

LANGUAGES Spanish (Native), English(Fluent), Chinese(Basic)