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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

- Abstract: In this paper, we introduce a new class of stochastic unit root ($STUR$) processes, where a threshold variable drives the randomness of the autoregressive unit root allowing us to explain the existence of unit roots. This new model, the threshold autoregressive stochastic unit root ($TARSUR$) process is strictly stationary, but if we do not consider the threshold effect can mislead to conclude that the process has a unit root. $TARSUR$ models are not only an alternative to fix unit root model but present interpretation, estimation and testing advantages with respect to the existent $STUR$ models. The paper analyzes the properties of the $TARSUR$ models and proposes two simple tests to identify these type of process. The first test will allow us to detect the presence of unit roots, which can be fixed or stochastic, the asymptotic distribution (AD) of this test will present a distribution discontinuity depending if the unit root is fixed or stochastic. The second test we propose 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 it's 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 Bridges. 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 root and a threshold stochastic unit roots. The paper 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 been very successful in Economics to capture 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 paper, we open the door to the possibility of different long-run equilibria

depending on the state of the world ("good" and "bad" times, optimism and pessimism, frictional coordination, etc.) this is done in a threshold framework. Starting from a Present Value Model (PVM) with different discount factors 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, together with a representation theorem that produces a quasi-error correction model (QECM). In this QECM variables adjust toward a particular equilibrium when they are in a particular regime (like in the linear case), but they do not adjust while they are changing regimes. The paper finishes with two applications where variables are not linearly cointegrated, but they are 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.

Threshold Cointegration Kink Model

- The objective of this study is to analyze the presence of multiple cointegration relation via a continuous threshold cointegration framework where the non-linearity arises from introducing state-dependent behavior in the long-run equilibrium relationship. A continuous threshold model (or regression kink model) is a threshold regression constrained to be everywhere continuous with a kink at a known or unknown threshold. The introduction of a regression kink in the long-run equilibrium relationships captures different relations between non-stationary variables depending on the value of the regressor of interest. This characteristic is important because it will allow, for example, the Present Value Model to show different cointegration relations between prices and dividends depending on the size of the dividend. Also, it will allow us to test and explain phenomena like excess of volatility in stock prices due to the overreaction of the price to dividends.

TEACHING EXPERIENCE	Teacher Assistant, Ph.D. level

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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 & SEMINARS

2019
- *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 SKILLS

Matlab, Python, Eviews, LaTeX, Microsoft Office

LANGUAGES

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