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Program of 2nd Gretl Conference

WEDNESDAY, 15 JUNE

- 20.00 Meeting point: Copernicus Monument, Old Market Square
- 20.15 "Welcome to Toruń" Reception, Krajina Piva Pub, New Market Square 3
We are pleased to invite all the attendants for a reception. Menu: traditional polish refreshments (or/and dishes), excellent polish beers.

THURSDAY, 16 JUNE

9.00 – 10.00 Registration, Collegium Maximum, Plac Rapackiego 1

10.00 – 10.15 Official Opening

10.15 – 11.45 INVITED SESSION, Chair: Ignacio Díaz-Emparanza

- 10.15 – 11.00 **Jacek Osiewalski**, *General Hybrid MSV-MGARCH Models of Multivariate Volatility – Bayesian Analysis*
- 11.00 – 11.45 **Allin Cottrell**, *Extending gretl: Addons and Bundles*

11.45 – 12.00 Refreshment Break

12.00 – 13.00 CONTRIBUTED SESSION I, Chair: Jacek Osiewalski

- 12.00 – 12.20 **Lee C. Adkins**, *Monte Carlo Experiments Using gretl: a Primer*
- 12.20 – 12.40 **Riccardo "Jack" Lucchetti, Claudia Pigini**, *Conditional Moment Tests for Normality in Bivariate Limited Dependent Variable Models: a Monte Carlo Study*
- 12.40 – 13.00 **Federico Lampis, Ignacio Díaz-Emparanza, M^aPaz Moral**, *An Algorithm to Estimate a SETAR Model in Gretl*

13.00 – 13.10 Photo Session

13.15 – 14.15 Lunch

14.30 – 15.30 CONTRIBUTED SESSION II, Chair: Allin Cottrell

- 14.30 – 14.50 **A. Talha Yalta, Sven Schreiber**, *Random Number Generation in gretl*
- 14.50 – 15.10 **Marcin Fałdziński, Magdalena Osińska, Tomasz Zdanowicz**, *Granger Causality in Variance – Implementation of Cheung-Ng and Hong Procedures in gretl*
- 15.10 – 15.30 **Jacek Szandula**, *Generating Variables with a Given Correlation Matrix – the Proposition of a gretl New Function*

15.30 – 15.45 Refreshment Break

15.45 – 16.30 CONTRIBUTED SESSION III, Chair: Riccardo "Jack" Lucchetti

- 15.45 – 16.10 **Giulio Palomba, Luca Riccetti**, *Portfolio Frontiers with Restrictions to Tracking Error Volatility and Value at Risk*
- 16.10 – 16.30 **Krzysztof Pytka**, *Determinants of Involuntary Job Termination in the Polish Labor Market*

17.00 – 19.00 Sightseeing of City of Toruń with professional tour guide

20.00 Dinner – Spichrz Restaurant, Mostowa 1

FRIDAY, 17 JUNE**9.00 – 10.30 CONTRIBUTED SESSION IV, Chair: Lee C. Adkins**

- 9.00 – 9.20 **Yangbo Du, John E. Parsons**, *Capacity Factor Risk at Nuclear Power Plants*
- 9.20 – 9.45 **Sven Schreiber**, *The Estimation Uncertainty of Permanent-Transitory Decompositions in Cointegrated Systems*
- 9.40 – 10.00 **Grzegorz Konat**, *Trade-Led Economic Growth or Growth-Driven Foreign Trade? Toda and Yamamoto Granger Causality Tests for Spain*
- 10.00 – 10.20 **Jacek Leśkow, Oskar Knapik**, *Using Open Source Statistical Software R for Nonstationary Time Series*

10.30 – 10.45 Refreshment Break

10.45 – 11.45 DEVELOPER MEETING

11.45 – 12.45 WORKSHOP on writing functions in gretl's scripting language

12.45 – 13.00 Closing the Conference

13.00 Lunch

Abstracts

Jacek Osiewalski, Krzysztof Osiewalski

Cracow University of Economics (Poland)

General Hybrid MSV-MGARCH Models of Multivariate Volatility – Bayesian Analysis

J.Osiewalski and A.Pajor (2007), J.Osiewalski (2009), J.Osiewalski and A.Pajor (2009) introduced the so-called hybrid multivariate stochastic variance – GARCH models (hybrid MSV-MGARCH models), where the conditional covariance matrix is a product of a univariate latent process and a matrix with a simple MGARCH structure (Engle’s DCC, scalar BEKK). The aim was to parsimoniously describe volatility of a large group of assets. The proposed hybrid models, similarly as other specifications from the MSV class, require the Bayesian approach equipped with efficient MCMC simulation tools. The numerical effort should pay – the hybrid models seem particularly useful due to their good fit and ability to jointly cope with as many as 50 assets.

However, one latent process may be insufficient in the case of a highly heterogenous portfolio. In this study we propose a general hybrid MSV-MGARCH structure that uses as many latent processes as there are relatively homogenous groups of assets. We present full Bayesian inference for such models and suggest MCMC simulation strategy. The proposed approach is used to jointly model volatility on very different markets. We formally compare joint modelling to individual modelling of volatility on each market.

Allin Cottrell

Wake Forest University (United States of America)

Extending gretl: Addons and Bundles

The case is made that future extension of gretl’s capabilities must rely in large part on contributions in the form of "addon" function packages written in gretl’s scripting language. A mechanism is proposed whereby such extensions can be integrated as seamlessly as possible into the gretl core. Considerations of quality control, user-friendliness and internationalization are addressed.

Lee C. Adkins

Oklahoma State University (United States of America)

Monte Carlo Experiments Using gretl: a Primer

Monte Carlo simulations are a very powerful way to demonstrate the basic sampling properties of various statistics in econometrics. The free software package gretl makes these methods accessible to a wide audience of students and practitioners. In this paper I will discuss the basic principles of Monte Carlo simulations and demonstrate how easy they are to do in gretl. Examples include linear regression, confidence intervals, the size and power of t-tests, lagged dependent variable models, heteroskedastic and autocorrelated regression models, instrumental variables estimators, and binary choice models. Scripts for all examples are available from the website <http://learneconometrics.com/pdf/MCgretl/>.

Riccardo "Jack" Lucchetti, Claudia Pigni

Università Politecnica delle Marche (Italy)

Conditional Moment Tests for Normality in Bivariate Limited Dependent Variable Models: a Monte Carlo Study

In this paper, we run a Monte Carlo analysis of the finite-sample performance of an Information Matrix Test for censored model put forward by Smith (1985) and we use the bivariate probit model as an example.

Approximating the finite-sample distribution of this test statistic by its asymptotic distribution can lead to very misleading results: its size is severely distorted even in samples that common practice would judge to be perfectly adequate for asymptotics. This is especially true when the correlation coefficient is far from zero.

Power properties of the test statistic are investigated by using bivariate $t_{(6)}$ and $\chi^2_{(1)}$ alternatives.

Federico Lampis, Ignacio Díaz-Emparanza, M^aPaz Moral

University Carlos III of Madrid (Spain); University of the Basque Country (Spain); University of the Basque Country (Spain)

An Algorithm to Estimate a SETAR Model in *gretl*

The main goal of this paper deals with estimating a Self-Exciting Threshold Autoregressive Models (SETAR) using Gretl. Despite the success of the nonlinear time series models and its extended use in econometrics, the mayor commercial softwares have not implemented yet standard procedures to estimate these models. In general, in the literature exists a great variety of codes for the different kind of models proposed but it's difficult to find standardized procedures. SETAR models are the more simple nonlinear time series models and at the same time they are relatively simple to specify, estimate, and interpret. In this paper we describe the implementation of a script to estimate a SETAR model in Gretl, and apply it to some of the most studied time series in nonlinear econometrics: the US GNP and the Canadian Lynx data.

A. Talha Yalta, Sven Schreiber

TOBB University of Economics and Technology (Turkey); Macroeconomic Policy Institute, Goethe University (Germany)

Random Number Generation in *gretl*

The increasing popularity and complexity of random number intensive methods such as simulation and bootstrapping requires researchers to have a good grasp of random number generation in general, and the specific generators that they employ in particular. Here, we discuss the random number generation options, their specifications, and their implementations in *gretl* (GNU regression, econometrics and time-series library). We also assess the performance and the reliability of *gretl* in this department by conducting extensive empirical testing using the TestU01 library. Our results show that the available alternatives are soundly implemented and should be sufficient for most econometric applications.

Marcin Fałdziński, Magdalena Osińska, Tomasz Zdanowicz

Nicolaus Copernicus University (Poland)

Granger Causality in Variance – Implementation of Cheung-Ng and Hong Procedures in *gretl*

The concept of Granger causality in mean is widely known and very popular in many computer packages. Usually it is based on VAR model and uses the Wald variant of the test, which is the most robust of all variants. However it requires a large number of observations to be efficiently applied. One of the alternative tests is that proposed by Pierce and Haugh in 1977. Its advantage consists in the fact that it does not require the model to be estimated before testing and therefore is more efficient for smaller samples (less than 100). In 1996 Cheung

and Ng applied the Pierce and Haugh's idea to Granger causality in variance concept and developed a new testing procedure.

The analysed test was modified in 2001 by Hong, who indicated that equal weights for the cross-correlation coefficient for each value of m might be improper, particularly in the cases of the alternatives where cross-correlations values decrease to zero. He proposed to apply a spectral window weights and standardization of the expression ChN .

Both procedures allow testing for Granger causality between financial time series, which exhibit strong conditional variance (GARCH) pattern. Osińska (2008) showed that Cheung and Ng as well as Hong tests preserve their size and power for GARCH processes with t-Student error distribution if the number of degrees of freedom is at least equal to 8. We propose implementation of the following testing procedures: Pierce and Haugh's for causality in mean as well as Cheung and Ng's and Hong's for causality in variance in Gretl, using directly its script language. We expect to create a package of functions in Gretl.

Some applications of newly created Gretl procedure for financial time series data will be shown. We will examine how much Chinese financial markets influence the other in the global world.

Jacek Szandula

Wroclaw University of Economics (Poland)

Generating Variables with a Given Correlation Matrix – the Proposition of a *gretl* New Function

The aim of the paper is to present a GRETTL function that generates random variables with a given correlation matrix. The function employs algorithm proposed by Gnitecka (1999). Performance of this algorithm is compared to other solutions proposed in the literature. Additional function for checking whether a given matrix can be a correlation one is also prescribed.

Giulio Palomba, Luca Riccetti

Università Politecnica delle Marche (Italy)

Portfolio Frontiers with Restrictions to Tracking Error Volatility and Value at Risk

Manager often are given the task of restricting their activity by maintaining both the value-at-risk (VaR) and the tracking error volatility (TEV) under control. Sometimes, these constraints can not be simultaneously fulfilled because the desired level of the VaR is independent from the benchmark portfolio. The possibility of managing these restrictions surely affects the portfolio performances and produces a wide variety of scenarios regarding the portfolio frontiers in the (σ_P, μ_P) space. This paper aims to analyse all the interactions between portfolio frontiers when restrictions upon TEV and VaR are imposed. A new portfolio frontier is also introduced.

Krzysztof Pytka

Warsaw School of Economics (Poland)

Determinants of Involuntary Job Termination in the Polish Labor Market

The aim of the article is to identify determinants of involuntary job termination in the Polish labor market. In the analysis a range of various count data models were considered. Due to prospective usability in job-search model calibration a set of covariates were constrained only to the individual specific. In result, we ascertained that because of existing unobserved heterogeneity and an excess number of zeros a zero-inflated Negbin model is the best to describe a number of the job dismissals.

Yangbo Du, John E. Parsons

Massachusetts Institute of Technology (United States of America)

Capacity Factor Risk at Nuclear Power Plants

We develop a model of the dynamic structure of capacity factor risk. It incorporates the risk that the capacity factor may vary widely from year-to-year, and also the risk that the reactor may be permanently shutdown prior to the end of its anticipated useful life. We then fit the parameters of the model to the IAEA's PRIS dataset of historical capacity factors on reactors across the globe. The estimated capacity factor risk is greatest in the first year of operation. It then quickly declines over the next couple of years, after which it is approximately constant. Whether risk is constant or increasing in later years depends significantly on the probability of a premature permanent shutdown of the reactor. Because these should be very rare events, the probability is difficult to estimate reliably from the small historical sample of observations. Our base case is parameterized with a conservatively low probability of a premature permanent shutdown which yields the approximately constant variance. Our model, combined with the global historical dataset, also yields relatively low estimates for the expected level of the capacity factor through the life of the plant. Our base case estimate is approximately 74%. Focusing on alternative subsets of the data raises the estimated mean capacity factor marginally, but not significantly, unless the sample chosen is restricted to selected countries over select years. This emphasizes the need for judgment in exploiting the historical data to project future probabilities

Sven Schreiber

Macroeconomic Policy Institute, Goethe University (Germany)

The Estimation Uncertainty of Permanent-Transitory Decompositions in Cointegrated Systems

The topic of this paper is the estimation uncertainty of the Stock-Watson and Gonzalo-Granger permanent-transitory decompositions in the framework of the cointegrated vector-autoregression. Specifically, we suggest an approach to construct the confidence interval of the transitory component in a given period (e.g. the latest observation) by conditioning on the observed data in that period. To calculate asymptotically valid confidence intervals we use the delta method and two bootstrap variants. As an illustration we analyze the uncertainty of (US) output gap estimates in a system of output, consumption, and investment.

Grzegorz Konat

Institute for Market, Consumption and Business Cycles Research and Warsaw School of Economics (Poland)

Trade-Led Economic Growth or Growth-Driven Foreign Trade? Toda and Yamamoto Granger Causality Tests for Spain

The paper presents an analysis of Granger causality between foreign trade and economic growth for Spain between 1995 and 2010. To this end, a Toda and Yamamoto approach is applied, which appears to be particularly appropriate with respect to time series analysis in vector autoregression models. In order to avoid accidental or apparent results, the survey includes additional variable representing domestic demand, and conducts tests for restricted subsample, without the period of economic crisis (2008-2010). While the results for the full range do not seem to be sufficiently reliable and do not give rise to the inference, the subsample analysis indicates a weak interdependence between economic growth and import.

Jacek Leśkow, Oskar Knapik

The Polish-American Graduate School of Business WSB-NLU, Nowy Sącz (Poland); Cracow University of Economics, Cracow (Poland)

Using Open Source Statistical Software R for Nonstationary Time Series

In recent years, there is a growing interest in modelling nonstationary time series. Periodically correlated, almost periodically correlated, cyclostationary time series and stochastic processes form important examples

of such nonstationary models. In the last 50 years such time series have been extensively studied (for details see e.g. Gardner (2006) or Leśkow (2008)). Almost periodically correlated (APC) time series have been applied in various areas like: econometrics, signal processing, communications and biology. The purpose of this research is to show modelling aspects of APC time series with the help of the open source software R. It will be shown that the APC models provide a viable way to analyze nonstationary time series and that can be used to test stationarity of time series. Important part of the paper is dedicated to various resampling techniques available for time series, like moving block bootstrap and subsampling. Finally, the methodological results will be illuminated via simulations and real data examples with the use of the open source time series analysis software.
