

7th OxMetrics User Conference

14 – 15 September 2009

Cass Business School

106 Bunhill Row, London, EC1Y 8TZ (U.K.)

Room 2002

PROGRAMME

Monday 14 September 2009

8.30-9.00: Registration + Coffee/Tea

Session 1: Model Selection

Chairperson: Jurgen Doornik

9:00-10:30

Forecasting, Model Averaging and Model Selection

James Reade (Department of Economics, University of Oxford).

Model Selection when there are Multiple Breaks

Jennifer L. Castle, Jurgen A. Doornik and David F. Hendry

A Combined Approach of Experts and Autometrics to Forecast Daily Electricity Consumption: An Application to Spanish Data.

José Ramón Cancelo, Antoni Espasa, and **Jurgen A Doornik** (Nuffield College, Oxford)

10:30-11.00: Coffee/Tea Break

Session 2: High Frequency

Chairperson: Ana-Maria Fuertes

11:00-12:30

Predicting Realized Volatility for Electricity Prices Using Unobservable Component Models

Erik Haugom (Lillehammer University College, Norway), Sjur Westgaard (TOH-HIST, Trondheim, Norway), Gudbrand Lien (Lillehammer University College, Norway), Per Bjarte Sollibakke (Lillehammer University College, Norway).

A Note on Jumps and Price Discovery in the US Treasury Market

Ana-Maria Dumitri (Bergamo University, Italy and CEA, London, UK)

Exploiting Intra-Day Prices, Jumps and Subsampling in Daily VaR Predictions

Ana-Maria Fuertes (Cass Business School, London, UK) and **Jose Olmo** (City University, London, UK).

12.30-14.30: Lunch

Session 3: Estimation

Chairperson: Sebastien Laurent

14:30-15:30

Local kernel Density Estimation from Time Series Data.

Andrew C. Harvey and Vitaliy Oryshchenko (Faculty of Economics, University of Cambridge, UK)

Robust Estimation of CCC and DCC GARCH models

Kris Boudt, Jon Danielsson and Sébastien Laurent

15:30-16:00: Coffee/Tea Break

Session 4: New OxMetrics Development: The Discrete Choice Model.

Chairperson: Giovanni Urga

16:00-16:45

DCM 2.0: An Ox Package for Estimating Demand Systems of Discrete Choice in Economics and Marketing

Matias Eklof (Department of Economics, Uppsala University, Sweden) and Melvyn Weeks (Faculty of Economics, University of Cambridge, UK)

Session 5: OxMetrics Developments

Chairperson: Giovanni Urga

16.45-18.00: Round Table Discussion with OxMetrics Developers.

Following a 5-10 minute introduction each from Jurgen Doornik, David Hendry, Siem Jan Koopman, Sebastien Laurent, and Melvyn Weeks the main aim of the round table is to provide a forum for an exchange of suggestions and ideas for future developments of the software.

19.00: CONFERENCE DINNER

Tuesday 15 September 2009

Session 6: Testing

Chairperson: Lorenzo Trapani

09:00-10:30

Testing the Invariance of Expectations Models of Inflation

Jennifer L. Castle, Jurgen A. Doornik, David F. Hendry and Ragnar Nymoen

A Robust Version of the KPSS Test Based on Ranks

Matteo M Pelagatti (Università degli Studi di Milano-Bicocca) and Pranab K Sen (University of North Carolina)

Cointegration versus Spurious Regression and Heterogeneity in Large Panels

Lorenzo Trapani (Cass Business School, London, UK)

10:30-11.00: Coffee/Tea Break

Session 7: Factors/Unobservable Components

Chairperson: Siem Jan Koopman

11:00-12:00

Dynamic Econometric Models and Errors in Variables

Andrew Harvey (Faculty of Economics, Cambridge University, UK)

Dynamic Factor Analysis by Maximum Likelihood

Borus Jungbacker (VU University Amsterdam), **Siem Jan Koopman** (VU University Amsterdam)
and Michel van der Wel (Erasmus University Rotterdam, ERIM, CREATES)

12.00: LUNCH/END OF CONFERENCE.

Giovanni Urga

Tuesday, 11 August 2009

ABSTRACTS

Forecasting, Model Averaging and Model Selection

James Reade (Department of Economics, University of Oxford).

Abstract:

This paper explores forecasting using model selection and model averaging and attempts to draw conclusion both in the context of stationarity and non-stationarity. Model averaging tends to be viewed as a polar opposite of model selection; often the motivation for averaging is to avoid the pitfalls of selecting models. However, selection cannot be avoided since every possible model cannot be averaged over, and nor would it be sensible to. In fact, despite bold claims about averaging as opposed to selection, the most popular model averaging algorithms incorporate quite judicious selection procedures to reduce the model pool. Furthermore, despite advances in the theory and practice of model selection for averaging (e.g. Hendry and Krolzig, 2005), similar progress for forecasting has been more difficult, owing primarily to the difficulties caused by structural break non-stationarity. In this paper we use simulation to assess Bayesian Model Averaging (BMA) and Autometrics Model Selection (AMS) as tools for forecasting. It is found that decisions about the retention of borderline-significant variables are costly for forecasting, and that this affects any forecast technique that incorporates selection. Despite very different selection procedures, in the stationary case the implications for BMA and AMS are very similar. This finding is somewhat altered in the case of structural breaks, and the paper discusses methods by which to improve forecasts in this context. The main conclusion of the paper is that regardless of whether one forecasts using model averaging, model selection remains integral to successful forecasting.

Model Selection when there are Multiple Breaks

Jennifer L. Castle, Jurgen A. Doornik and David F. Hendry

Abstract:

We consider selecting an econometric model when there is uncertainty over both the choice of variables and the occurrence and timing of multiple location shifts. The theory of general-to-simple (Gets) selection is outlined and its efficacy demonstrated in a new set of simulation experiments first for a constant model in orthogonal variables, where only one decision is required to select irrespective of the number of regressors (less than the sample size). That generalizes to including an impulse indicator for every observation in the set of candidate regressors (impulse saturation), as analyzed by Hendry, Johansen and Santos (2008) and Johansen and Nielsen (2009). Monte Carlo experiments show its capability of detecting up to 20 shifts in 100 observations.

A Combined Approach of Experts and Autometrics to Forecast Daily Electricity Consumption: An Application to Spanish Data.

José Ramón Cancelo, Antoni Espasa, and **Jurgen A Doornik** (Nuffield College, Oxford)

Abstract:

The aim of the paper is to explore whether Autometrics can be useful to build models for electricity consumption. Of particular interest is to investigate whether the interaction between Autometrics and experts could improve on the results from either single approach. The initial focus is on forecasting daily average electricity consumption. The daily data has very intricate seasonal patterns as well as a complex non-linear and dynamic response to meteorological variables.

Predicting Realized Volatility for Electricity Prices Using Unobservable Component Models

Erik Haugom (Lillehammer University College, Norway), Sjur Westgaard (TOH-HIST, Trondheim, Norway), Gudbrand Lien (Lillehammer University College, Norway), Per Bjarte Sollibakke (Lillehammer University College, Norway).

Abstract:

The introduction of market-based principles in electricity markets around the world has increased the risk for power producers and marketers substantially. That is, one of the most prominent consequences of deregulating the electricity sector is the strong increase in the fluctuations of the prices. Since electricity is a ‘commodity’ that is non-storable in nature, these fluctuations can reach extreme levels even on a daily basis, and are usually far above the levels observed in other financial – and commodity markets. In order to manage the risk associated with production, trading and investment decisions, actors need techniques that are able to capture the properties of the prices correctly. One aspect that is of special importance in this matter is how the price fluctuations change over time, and if there is any consistency in these changes (seasonality), which again make it possible to make predictions of the volatility. Previous research on volatility modeling of electricity prices has shown evidence of such clustering. This research has usually utilized historical data for daily returns and often the popular GARCH-type framework is applied. However, these typically used approaches do not reflect the intraday price dynamics. Since electricity prices are determined for each hour of the day it would be possible to calculate the intraday variability using the concepts of realized volatility (RV) and bipower variation (within the theory of quadratic variation). Findings from studies in other markets (i.e. finance) have indicated promising results when making predictions based on these measures compared with the popular GARCH approach. Hence, the purpose of this paper is to examine whether non-parametric volatility measures is able to outperform techniques using daily historical data (GARCH) when making out-of-sample predictions on Nord Pool spot price data. Forecasts of the non-parametric volatility measures (RV) are obtained by utilizing dynamic regression and unobserved components models with time-varying parameters. Our very preliminary results indicate that these latter approaches are able to produce more accurate volatility forecasts than the traditional GARCH-type models.

A Note on Jumps and Price Discovery in the US Treasury Market

Ana-Maria Dumitri (Bergamo University, Italy and CEA, London, UK)

Abstract:

We detect and estimate jumps in the US Treasury 2-, 5-, 10- and 30-year bonds both on a daily basis, by using the standard Barndorff-Nielsen and Shephard (2006) procedure, as well as the Lee and Mykland (2008) test, corrected for periodicity in the local volatility estimates. We find that bonds jump and co-jump mostly as a result of macroeconomic news announcements, which is in line with other empirical literature. We examine the price discovery process around jump times. We find that orderflow information preceding jumps is informative on the future jump. Moreover, we show that some jumps are caused by illiquidity on sell side.

Exploiting Intra-Day Prices, Jumps and Subsampling in Daily VaR Predictions

Ana-Maria Fuertes (Cass Business School, London, UK) and **Jose Olmo** (City University, London, UK).

Abstract: This paper illustrates empirically the importance of exploiting high frequency based volatility measures and, relatedly, of acknowledging jumps in returns from the point of view of assessing risk exposure. For this purpose, it compares several VaR models in a univariate context for 14 large NYSE stocks. The benchmark is the standard ARMA-GARCH process augmented by two nonparametric estimators, realized variance and realized bipower variation, which differ in that the former can reflect jumps whereas the latter does not. The loss function used for the comparison of forecasts is the economic one implicit in VaR backtesting. A novel unconditional

coverage testing approach is used which is robust to estimation and model risk. We find that neglecting jumps may result in significant risk overestimation and autocorrelation in the sequence of VaR exceptions. Nevertheless, the VaR predictive ability of GARCH is not improved upon by exploiting intraday price information nor by assuming a fat-tailed distribution relative to the standard normal assumption commonly adopted by practitioners.

Local kernel Density Estimation from Time Series Data.

Andrew C. Harvey and Vitaliy Oryshchenko (Faculty of Economics, University of Cambridge, UK)

Abstract:

A probability density function, or the corresponding cumulative distribution function, may be estimated nonparametrically by using a kernel and weighting the observations using schemes derived from time series modelling. The parameters may be estimated by maximum likelihood and diagnostic checks may be carried out directly on residuals given by the predictive cumulative distribution function. The issue of bandwidth selection is investigated. Since tracking the distribution is only viable if it changes relatively slowly, the technique may need to be combined with filter for scale and/or location. The methods are applied to data on General Motors, NASDAQ and the Hong Kong stock market index.

Robust Estimation of CCC and DCC GARCH models

Kris Boudt, Jon Danielsson and Sébastien Laurent

Abstract:

The use of CCC and DCC models has now become standard in the financial econometrics literatures. Their estimation is usually done in two or three steps by Gaussian quasi-maximum likelihood. We show that this method is very sensitive to outliers in the data. We propose to use robust estimators for both models. The Monte Carlo study and empirical application document the good robustness properties of this estimation method.

DCM 2.0: An Ox Package for Estimating Demand Systems of Discrete Choice in Economics and Marketing

Matias Eklof (Department of Economics, Uppsala University, Sweden) and Melvyn Weeks (Faculty of Economics, University of Cambridge, UK)

Abstract:

DCM v2 (Discrete Choice Models) is a package, written in Ox, for estimating a class of discrete choice models. DCM represents an important development for both the OxMetrics and, more generally, microeconomic computing environment in making available a broad range of discrete choice models, including standard binary response models, with notable extensions including conditional mixed logit, mixed probit, multinomial probit, and random coefficient ordered choice models. Developed as a derived class of ModelBase, users may access the functions within DCM by either writing Ox programs which create and use an object of the DCM class, or use the program in an interactive fashion. New developments in v2 include a contraction mapping that facilitates the estimation of highly disaggregate models over a choice set with thousands of choices. Endogeneity of attributes is handled via an inversion procedure that casts the endogeneity problem within a linear model. We demonstrate the capabilities of DCM by using a number of applications from both the discrete choice literature. This document will serve as a manual for DCM

Testing the Invariance of Expectations Models of Inflation

Jennifer L. Castle, Jurgen A. Doornik, **David F. Hendry** and Ragnar Nymoen

Abstract:

The new-Keynesian Phillips curve (NKPC) includes expected future inflation as a major feed-forward variable to explain current inflation. Models of this type are regularly estimated by replacing the expected value by the actual future outcome, then using Instrumental Variables (IV) or Generalized Method of Moments (GMM) methods to estimate the parameters. However, the underlying theory does not allow for various forms of non-stationarity in the data--despite the fact that crises, breaks and regimes shifts are relatively common. We investigate the consequences for NKPC estimation of breaks in data processes using the new technique of impulse saturation, and apply the resulting methods to salient published studies to check their viability.

A Robust Version of the KPSS Test Based on Ranks

Matteo M Pelagatti (Università degli Studi di Milano-Bicocca) and Pranab K Sen (University of North Carolina)

Abstract:

This paper proposes a test of the null hypothesis of stationarity that is robust to the presence of fat-tailed errors. The test statistic is a modified version of the KPSS statistic, in which ranks substitute the original observations. The rank KPSS statistic has the same limiting distribution as the standard KPSS statistic under the null, but no moment conditions are necessary. In finite samples our test shows very good size properties with as few as 50 observations and comparisons with respect to the KPSS statistic show a slight loss of power under Gaussian tails, but considerable improvements when tails get fatter. Our statistic turns out to be a valid alternative to the original KPSS and it outperforms the recently proposed index KPSS [de Jong, R.M., Amsler, C., Schmidt, P., 2007. A robust version of the KPSS test based on indicators. *Journal of Econometrics* 137, 311-333].

Cointegration versus Spurious Regression and Heterogeneity in Large Panels

Lorenzo Trapani (Cass Business School, London, UK)

Abstract

This paper provides an estimation and testing framework to identify the source(s) of spuriousness in a large nonstationary panel. This can be determined by two non mutually exclusive causes: neglecting the presence of heterogeneity when pooling and genuine presence of I(1) errors in some of the units. The paper proposes two tests that the researcher should carry out after testing for the null of cointegration: one test for the null of homogeneity (and thus presence of spuriousness due to some of the units being genuinely spurious regressions) and one for the null of genuine cointegration in all units of the panel (and thus spuriousness arising only from neglected heterogeneity). The results are derived using a combination of two estimators (one consistent, one inconsistent) of the variance of the estimated pooled slopes. Two consistent estimators, for the degree of heterogeneity and for the fraction of spurious regressions, are also studied.

Dynamic Econometric Models and Errors in Variables

Andrew Harvey (Faculty of Economics, Cambridge University, UK)

Abstract:

An investigation is made into the impact and treatment of errors in variables in dynamic regression models, both in the unobserved component and autoregressive distributed lag (ADL) forms. The lag structures typically used in econometrics are critically examined and an attempt is made to determine whether, in the light of unobserved component models, they are correctly interpreting the dynamics as adjustment processes. The STAMP8 package is used to build a

model with stochastic trend and seasonal components, together with explanatory variables and interventions, to account for the volume of rail travel in Great Britain. The methodology is contrasted with other approaches to dynamic regression.

Dynamic Factor Analysis by Maximum Likelihood

Borus Jungbacker (VU University Amsterdam), **Siem Jan Koopman** (VU University Amsterdam) and Michel van der Wel (Erasmus University Rotterdam, ERIM, CREATES)

Abstract:

A new approach to dynamic factor analysis by imposing smoothness restrictions on the factor loadings is proposed. A statistical procedure based on Wald tests that can be used to find a suitable set of such restrictions is presented. These developments are presented in the context of maximum likelihood estimation. The empirical illustration concerns term structure models but the methodology is also applicable in other settings. An empirical study using a data set of unsmoothed Fama-Bliss zero yields for US treasuries of different maturities is performed. The general dynamic factor model with and without smooth loadings is considered in this study together with models that are associated with Nelson-Siegel and arbitrage-free frameworks. These existing models can be regarded as special cases of the dynamic factor model with restrictions on the model parameters. Statistical hypothesis tests are performed in order to verify whether the restrictions imposed by the models are supported by the data. The main conclusion is that smoothness restrictions can be imposed on the loadings of dynamic factor models for the term structure of US interest rates.