

Local Whittle Estimation for Multivariate Stationary Fractionally Cointegrated Systems

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Abstract

This chapter proposes a semiparametric estimator for fractionally cointegrated systems where the values of the memory parameter (d) lie between 0 and $\frac{1}{2}$ by optimising a local Whittle function in the frequency domain. The proposed local Whittle estimator (LWE) is used to jointly estimate the memory, cointegrating and phase parameters. To derive this estimator, a general shape of the spectral density matrix first noted in Davidson and Hashimzade (2008) is utilised to cover multivariate jointly dependent long memory time series. A Monte Carlo study exhibits the performance of the LWE for different sample sizes. Finally, three different empirically relevant examples are presented to examine the existence of stationary fractional cointegration relationships.

Regional Heterogeneity in the Long Run Determination of US Housing Prices

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Abstract

Considering separate cointegrated VAR models for the 100 largest Metropolitan Statistical Areas in the US over the period 1983q1-2010q2, this paper investigates the spatial heterogeneity in the long run determination of housing prices. Particular attention is devoted to the importance of subprime lending in driving subnational housing prices during the recent housing boom. Based on individual system based tests for the absence of cointegration for every single area in the sample, we find that there are substantial regional differences in the long run response to changes in income, housing supply and interest rates across regional markets. This suggests that a panel analysis is too restrictive, and that it is imperative to consider separate regional models to understand why the evolution of housing prices differ so markedly across space over a housing cycle. Secondly, we find a diverse role of subprime lending across local areas during the recent boom, with a much larger impact in coastal areas and in areas where the supply of housing is restricted. In building the econometric models for the different areas, we make use of the impulse indicator saturation algorithm, which is an integrated part of Autometrics. This helps us to control for intermittent structural breaks and data contamination, and for almost all areas, the VAR models that form the starting point for our analysis of regional differences in the long run determination of housing prices are well specified once we have controlled for breaks using a tight significance level of 0.01%.

Volatility and Firm Specific News Arrival

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Abstract

Starting with the advent of the event study methodology, the puzzle of how public information relates to changes in asset prices has unraveled gradually. Using a sample of 28 large US companies, we investigate how more than 3 million firm specific news items are related to firm specific stock return volatility. We specify a return generating process in conformance with the mixture of distributions hypothesis, where stock return volatility has a public and a private information processing component. Following public information arrival, prices incorporate public information contemporaneously while private processing of public information generates private information that is incorporated sequentially. We refer to this model as the information processing hypothesis of return volatility and test it using time series regression. Our results are evidence that public information arrival is related to increases in volatility and volatility clustering. Even so, clustering in public information does not fully explain volatility clustering. Instead, the presence of significant lagged public information effects suggest private information, generated following the arrival of public information, plays an important role. Including indicators of public information arrival explains an incremental 5

to 20 percent of variation in the changes of firm specific return volatility. Contrary to prior financial information research, our investigation favors the view that return volatility is related to public information arrival.

Asymptotic Analysis of the Forward Search

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Abstract

The Forward Search is an iterative algorithm concerned with detection of outliers and other unsuspected structures in data. This approach has been suggested, analysed and applied for regression models in the monograph Atkinson and Riani (2000). An asymptotic analysis of the Forward Search is made. The argument involves theory for a new class of weighted and marked empirical processes, quantile process theory, and a fixed point argument to describe the iterative element of the procedure.

Using Newspapers for Tracking the Business Cycle: A comparative study for Germany and Switzerland

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Abstract

On the basis of key word searches in newspaper articles several versions of the Recession-word Index (RWI) are constructed for Germany and Switzerland. We use these indices in order to track the business cycle dynamics in these two countries. Our main findings are the following. First, we show that augmenting benchmark autoregressive models with the RWI generally leads to improvement in accuracy of one-step ahead forecasts of GDP growth compared to those obtained by a benchmark model. Second, the accuracy of out-of-sample forecasts obtained with models augmented with the RWI is comparable to that of models augmented with established economic indicators in both countries, such as the Ifo Business Climate Index and the ZEW Indicator of Economic Sentiment for Germany, and the KOF Economic Barometer and the Purchasing Managers Index in manufacturing for Switzerland. Third, we show that the RWI-based forecasts are more accurate than the consensus forecasts (published by Consensus Economics Inc.) for Switzerland, whereas we reach the opposite conclusion for Germany. In fact, the accuracy of the consensus forecasts of GDP growth for Germany appears to be superior to that of any other indicator considered in our study. These results are robust to changes in estimation/forecast samples, the use of rolling vs. expanding estimation windows, and the inclusion of a web-based recession indicator extracted from Google Trends into a set of the competing models.

Conditional Correlation Models of Autoregressive Conditional Heteroskedasticity with Nonstationary GARCH Equations

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Abstract

In this paper we investigate the effects of careful modelling the long-run dynamics of the volatilities of stock market returns on the conditional correlation structure. To this end we allow the individual unconditional variances in Conditional Correlation GARCH models to change smoothly over time by incorporating a nonstationary component in the variance equations. The modelling technique to determine the parametric structure of this time-varying component

is based on a sequence of specification Lagrange multiplier-type tests derived in Amado and Teräsvirta (2011). The variance equations combine the long-run and the short-run dynamic behaviour of the volatilities. The structure of the conditional correlation matrix is assumed to be either time independent or to vary over time. We apply our model to pairs of seven daily stock returns belonging to the S&P 500 composite index and traded at the New York Stock Exchange. The results suggest that accounting for deterministic changes in the unconditional variances considerably improves the fit of the multivariate Conditional Correlation GARCH models to the data. The effect of careful specification of the variance equations on the estimated correlations is variable: in some cases rather small, in others more discernible. In addition, we find that portfolio volatility-timing strategies based on time-varying unconditional variances often outperforms the unmodelled longrun variances strategy in the out-of-sample. As a by-product, we generalize news impact surfaces to the situation in which both the GARCH equations and the conditional correlations contain a deterministic component that is a function of time.

Price Discovery and Instantaneous Effects Among Cross Listed Stocks

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Abstract

This paper investigates instantaneous and long-run linkages between common and preferred shares traded at both domestic and foreign markets. I develop a market microstructure model in which the dynamics of the different share prices react to three common factors, namely, the efficient price, the efficient exchange rate, and the efficient voting premium. I show how to identify the structural innovations so as to differentiate instantaneous and long-run effects. First, I obtain dynamic measures of price discovery that quantify how prices traded at different venues respond to shocks on the common factors. Second, I am able to test whether shocks in the efficient exchange rate change the value of the firm. Third, I test whether shocks on the efficient voting premium have a permanent effect on preferred shares. I implement an empirical application using high-frequency data on six Brazilian large companies. I find that, in the long-run, a depreciation of the Brazilian currency leads to a depreciation of the value of the firm that exceeds the expected arbitrage adjustment. In addition, a positive shock on the voting premium yields a positive impact on the value of the firm. My price discovery analysis also reveals that one trading day suffices to impound new information on all share prices, regardless of the venue they trade at.

Modelling Residential Electricity Demand in Europe with Autometrics

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Abstract

With the 2020 energy policy framework and the Energy Roadmap 2050, the EU set out ambitious decarbonisation targets that are expected to deliver a more sustainable and secure energy system. Reducing residential electricity demand could contribute to greenhouse gases emissions abatement. An accurate model of the determinants of residential electricity demand is therefore of key importance for EU policy makers to evaluate the impact that alternative policy instruments would have on consumers' behaviour. This paper attempts to explain the determinants of residential electricity demand for Austria, Belgium, France, Germany, Italy, Spain, Switzerland, the Netherlands and the UK, using data for 1978-2009. These countries are amongst Europe's largest economies and their electricity sectors produce about the 20% of total CO₂ emissions in Europe. The general unrestricted error correction mechanism with structural breaks is employed to specify a stable relationship between electricity demand and its determinants. The novelty of this paper is that potential instability factors are modelled using the Impulse Indicator Saturation framework and its related extensions, and the demand functions are estimated with the search algorithm *Autometrics*. The results provide consistent estimates of price and income elasticities, highlighting that electricity is a normal good for European households and that its demand is inelastic to price. Moreover, it emerges that improved technical efficiency of appliances has determined a reduction in electricity consumption for many countries (*ceteris paribus*). The findings suggest that a policy based exclusively on increasing energy taxes would reduce consumption and hence CO₂ emissions only marginally. Therefore, to meet the long-term decarbonisation objectives, the EU decision makers should continue to promote energy efficiency measures and demand side management.

On the Identification of Fractionally Cointegrated Models with the $\mathcal{F}(d)$ Condition

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Abstract

This paper discusses an identification problem in the fractionally cointegrated system of Johansen (2008) and Johansen and Nielsen (2012). This identification problem arises when the lag structure is over-specified, such that several equivalent models exist with different degrees of fractional integration and cointegration. We study the nature of these multiple solutions and we provide a sufficient condition that allows to correctly identify the fractional order of the system. We named such condition as $\mathcal{F}(d)$, in analogy to the $I(1)$ condition in the well-known VECM model to rule out the presence of $I(2)$ trends. The assessment of the $\mathcal{F}(d)$ condition in the empirical analysis is relevant for the determination of the fractional orders as well as the lag structure.

Frequentist Evaluation of Small DSGE Models

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Abstract

This paper proposes a new evaluation approach of the class of small-scale 'hybrid' New Keynesian Dynamic Stochastic General Equilibrium (NK-DSGE) models typically used in monetary policy and business cycle analysis. The novelty of our method is that the empirical assessment of the NK-DSGE model is based on a conditional sequence of likelihood-based tests conducted in a Vector Autoregressive (VAR) system in which both the low and high frequency implications of the model are addressed in a coherent framework. The idea is that if the low frequency behaviour of the original time series of the model can be approximated by unit roots, stationarity must be imposed by removing the stochastic trends. This means that with respect to the original variables, the solution of the NK-DSGE model is a VAR that embodies a set of recoverable unit roots/cointegration restrictions, in addition to the cross-equation restrictions implied by the rational expectations hypothesis. The procedure is based on the sequence 'LR1→LR2→LR3', where LR1 is the cointegration rank test, LR2 the cointegration matrix test and LR3 the cross-equation restrictions test: LR2 is computed conditional on LR1 and LR3 is computed conditional on LR2. The type-I errors of the three tests are set consistently with a prefixed overall nominal significance level and the NK-DSGE model is not rejected if no rejection occurs. We investigate the empirical size properties of the proposed testing strategy by a Monte Carlo experiment and illustrate the usefulness of our approach by estimating a monetary business cycle NK-DSGE model using U.S. quarterly data.

The Nonlinear Iterative Least Squares (NL-ILS) Estimator: An Application to Volatility Models

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Abstract

The paper proposes a new robust estimator for GARCH-type models: the non-linear iterative least squares (NL-ILS). This estimator is especially useful on specifications where errors have some degree of dependence over time or when the conditional variance is misspecified. I illustrate the NL-ILS estimator by providing algorithms that consider the GARCH(1,1), weak-GARCH(1,1), GARCH(1,1)-in-mean and RealGARCH(1,1)-in-mean models. I establish the consistency and asymptotic distribution of the NL-ILS estimator, in the case of the GARCH(1,1) model under assumptions that are compatible with the QMLE estimator. The consistency result is extended to the weak-GARCH(1,1) model and a further extension of the asymptotic results to the GARCH(1,1)-in-mean case is also discussed. A Monte Carlo study provides evidences that the NL-ILS estimator is consistent and outperforms the MLE benchmark in a variety of specifications. Moreover, when the conditional variance is misspecified, the MLE estimator delivers biased estimates of the parameters in the mean equation, whereas the NL-ILS estimator does not. The empirical

application investigates the risk premium on the CRSP, S&P500 and S&P100 indices. I document the risk premium parameter to be significant only for the CRSP index when using the robust NL-ILS estimator. The paper argues that this comes from the wider composition of the CRPS index, resembling the market more accurately, when compared to the S&P500 and S&P100 indices. This finding holds on daily, weekly and monthly frequencies and it is corroborated by a series of robustness checks.

The Co-integrated Vector Autoregression with Errors-in-Variables

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Abstract

The co-integrated vector autoregression is extended to allow variables to be observed with classical measurement errors (ME). For estimation, the model is parametrized as a time invariant state-space form, and an accelerated expectationmaximization algorithm is derived. A simulation study shows that, (i) The finitesample properties of the ML estimates and reduced rank test statistics are excellent. (ii) Neglected measurement errors will generally distort unit root inference due to a moving average component in the residuals. (iii) The moving average component may - in principle - be approximated by a long autoregression, but a pure autoregression cannot identify the autoregressive structure of the latent process, and the adjustment coefficients are estimated with a substantial asymptotic bias. An application to the zero-coupon yield-curve is given.

Out-of-Sample Testing Price Discovery in Commodity Markets: the Case of Soybeans

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Abstract

Price discovery, a central function of futures markets, has been usually tested in-sample by studying the common stochastic trend between spot and futures prices. However, uncovering the fundamental value depends on supply and demand determinants and also on monetary, financial and exchange rate variables. To evaluate futures as anticipatory prices, we develop a forecast approach to out-of-sample test price discovery in a multivariate framework. We apply it to the soybean market. Results indicate futures prices as the best available “predictors” of future spot prices. However, this finding holds only on average and not for every forecasted period. Moreover, using impulse indicator saturation we empirically detect highly significant time-varying biases. Futures prices have been less helpful for price discovery during the financial crisis started in 2008.

Co-features in Finance: Co-arrivals and Co-jumps

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Abstract

In this paper, we introduce the notions of co-arrivals and co-jumps within the co-features methodology and propose testing procedures to evaluate their existence. Co-arrivals correspond to the linear combination of return series without arrivals and co-jumps to the linear combination without jumps. We distinguish local (jumps as rare events) from global (large number of jumps) co-arrivals and co-jumps, and since large share of jumps is idiosyncratic, we define weak global co-arrivals and weak global co-jumps. We evaluate the empirical validity of the proposed framework using assets from the Dow Jones 30 Index over 01/01/2010 to 30/06/2012.

Numerical Evaluation of the Gauss Hypergeometric Function by Power Summations

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Abstract

Numerical evaluation of the Gauss hypergeometric function ${}_2F_1(a, b; c; z)$, with complex parameters a, b, c and complex argument z is notoriously difficult. Carrying out the summation that defines the function may fail, even for moderate values of z . Formulae are available to transform the effective argument in the series, potentially leading to a numerically successful summation. Unfortunately, these transformations have a singularity when $b - a$ or $c - a - b$ is an integer, and suffer numerical instability near that. This singularity has to be removed analytically after collecting powers in z .

The contributions in this paper are fourfold. First, analytical expressions are provided that remove the singularity from Bühring (1987)'s $1/(z - z_0)$ transformation. This is more difficult, because the singularity occurs twice, and it is necessary to collect powers of z_0 , as well as z . The resulting expression has a three-term recursion, like the original. Next, improved expressions are derived for the cases that have been addressed before. We study a transformation that converges outside $|z - 0.32| > 0.32$ for $\Re z > 0$, which is tighter than the $|z - 0.5| > 0.5$ which is normally considered. Finally, we derive an improved algorithm for the numerical evaluation of ${}_2F_1$.

The Financialization of Commodities: Evidence from High-Frequency Data

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Abstract

We explore the transaction records for a broad range of commodities and analyze implications of the financialization of commodities over the last decade. We use newly developed methods for the measurement of covolatility from high-frequency data and focus on analysing the changing dynamic structure in the markets by modeling the correlation and beta on the S&P500 over time. We employ a dynamic conditional correlation model on daily data to compare with existing literature and complement this method by exploiting recent developments in financial econometrics that rely on intraday data. We show that the financialization of commodities has not conclusively driven volatilities upwards, as often claimed, but increased the co-variation with equities thus driving correlations and betas up. We highlight model differences emphasizing the gain from utilizing high-frequency data. Finally, we study the changing diversification potential in commodities.

Testing for I(2) Trends When the Signal to Noise Ratio is Small

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Abstract

Engel and Hamilton (1990) found that the random walk model was strongly rejected in favor of a segmented-trends model for nominal exchange rates. Shocks to a segmented-trends process display a greater degree of persistence because they have a long-lasting impact on both the level and first difference of the variable, whereas shocks to a random walk series are persistent only in the levels. Like a segmented-trends process, an I(2) type process has a tendency to generate longer-lasting swings than an I(1) type processes. Accordingly real exchange data are frequently found to be well described by an I(2) process but only based on a multivariate trace test. In contrast numerous Dickey-Fuller unit root tests find real exchange data to be at most I(1). In this paper we demonstrate by simulations that this is due to the low power of the univariate DF tests to detect a second unit root when the shocks to the drift term of the

differenced process are small compared to the shocks to the differenced process itself, i.e. when the signal-to-noise ratio is small. An application to German-US real exchange data illustrates.

Improving Phillips Curve-based Forecasts through Economic Constraints

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Abstract

Forecasting inflation is a challenging task, where Phillips Curve-based models often fail to improve upon univariate benchmarks. While economic theory suggests sign restriction on Phillips Curve relations, forecasting models are typically estimated without any restrictions. In this paper we explore the usefulness of imposing economic constraints on coefficients in Phillips Curve-based forecasting models. Constraints are imposed using hard-thresholding, standard bootstrap averaging (bagging), and an asymptotic shrinkage representation of bagging. We impose the constraints in regressions where the coefficients can be interpreted economically, and combine the resulting forecasts. For forecasting US inflation we consider a Phillips Curve using different measure of real activity and employment. The forecasting performance is compared to univariate models and forecast combinations. Across forecast horizons we find that bagging with economic constraints consistently leads to more accurate forecasts than unconstrained models.

Nowcasting French GDP in Real-Time from Survey Opinions: Information or Forecast Combinations?

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Abstract

This paper investigates the predictive accuracy of two alternative forecasting strategies, namely the forecast and information combinations. Theoretically, there should be no role for forecast combinations in a world where information sets can be instantaneously and costlessly combined. However, following some recent works which claim that this result holds in population but not necessarily in small samples, our paper questions this postulate empirically in a real-time and mixed-frequency framework. An application to the quarterly growth rate of French GDP reveals that, given a set of predictive models involving coincident indicators, a simple average of individual forecasts outperforms the individual forecasts, as long as no individual model encompasses the others. Furthermore, the simple average of individual forecasts outperforms, or it is statistically equivalent to, more sophisticated forecast combination schemes. However, when a predictive encompassing model is obtained by combining information sets, this model outperforms the most accurate forecast combination strategy.

Dimension Reduction in Large Time-Varying VARs: The DFM-VAR Model

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Abstract

We propose a new parsimonious approach to analyze and forecast large panels of macroeconomic variables. Our approach falls within the model class of Time-Varying Parameter Vector AutoRegressions (TVP-VARs) of large dimensions. Recent innovations in the literature suggest computationally efficient ways to estimate such models, where all coefficients of the VAR vary over time and are treated as factors. Our contribution is to use a Dynamic Factor Model (DFM) for these factors, and we label the corresponding model the DFM-VAR approach. In an illustration we show a small number of factors are capable of capturing a lot of the variation in the factors describing the VAR coefficients. A

comprehensive forecasting analysis shows similar performance of our lower-dimensional DFM-VAR model compared to the regular TVP-VAR model when predicting inflation, output and the Federal Funds rate.

Testing for Stability in the VECM Framework: a Bootstrapping Approach

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Abstract

In this paper, we propose to model multiple structural breaks in a VECM framework. We extend the Hansen (2003) framework by removing the assumption of knowledge of the break dates through the specification of several scenarios regarding the number and the location of the breaks, and we propose a bootstrapping procedure to approximate critical values. The finite sample properties of the proposed statistic are analysed through an extensive Monte Carlo study. Finally, we study the implications of weak exogeneity on testing for breaks in the cointegrating matrix.

Bootstrap Fractional Integration Tests in Heteroskedastic ARFIMA Models

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Abstract

We propose bootstrap implementations of the asymptotic Wald, likelihood ratio and Lagrange multiplier tests for the order of integration of a fractionally integrated time series. Our main purpose in doing so is to develop tests which are robust to both conditional and unconditional heteroskedasticity of a quite general and unknown form in the shocks. We show that neither the asymptotic tests nor the analogues of these which obtain from using a standard i.i.d. bootstrap admit pivotal asymptotic null distributions in the presence of heteroskedasticity, but that the corresponding tests based on the wild bootstrap principle do. An heteroskedasticity-robust Wald test, based around a sandwich estimator of the variance, is also shown to deliver asymptotically pivotal inference under the null, and we show that it can be successfully bootstrapped using either i.i.d. resampling or the wild bootstrap. We quantify the dependence of the asymptotic size and local power of the asymptotic tests on the degree of heteroskedasticity present. An extensive Monte Carlo simulation study demonstrates that significant improvements in finite sample behaviour can be obtained by the bootstrap vis-à-vis the corresponding asymptotic tests in both heteroskedastic and homoskedastic environments. The results also suggest that a bootstrap algorithm based on model estimates obtained under the null hypothesis is preferable to one which uses unrestricted model estimates.

How Biased are U.S. Government Forecasts of the Federal Debt?

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Abstract

Government debt and its forecasts have attracted considerable attention during the recent financial crisis. The current paper analyzes potential biases in one-year-ahead forecasts of U.S. gross federal debt by the CBO, OMB, and APB over 1984–2012. Standard tests typically fail to detect biases in these forecasts. However, impulse indicator saturation (IIS) detects economically large and highly significant time-varying biases, particularly at turning points in the business cycle. Biases do not appear politically determined. IIS defines a generic procedure for examining forecast properties; it explains why standard tests fail to detect bias; and it provides a mechanism for improving forecasts.

Particle Markov chain Monte Carlo techniques of unobserved component time series models using Ox

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Abstract

This paper details Particle Markov chain Monte Carlo (PMCMC) techniques for analysis of unobserved component time series models using several economic data sets. For each of these data sets (PMCMC) algorithms are implemented in the programming language Ox. PMCMC combines the particle filter along with the Metropolis Hastings algorithm making it possible to build efficient high dimensional proposal distributions. This allows one not only to improve over standard Markov chain Monte Carlo schemes but also to make inference easy for a substantial class of time series models. The sampling methods are flexible and furthermore Ox provides a very compelling, computationally fast and efficient framework for estimation. These advantages are used to for instance extend a local level model to incorporate a stochastic volatility process with leverage or with student-t distributed errors.

Robustifying and Correcting Nowcasts During Breaks: A Simulation Study

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Abstract

We conduct a Monte Carlo simulation study to test whether information about estimate breaks in variables observed contemporaneously can improve nowcasts of co-breaking that are released with a lag. We use *Autometrics* with impulse-indicator saturation to select nowcasting models and to detect breaks of two types: transitory and permanent. In a two-variable setting we let both series break at the nowcast origin and assume that one variable is observed contemporaneously, while the other with a one period lag. If the break in the first variable is detected, we use its estimate to produce robust and break-adjusted nowcasts and compare those to a conditional unadjusted model. We find that corrected nowcasts are a high risk-high reward device: it can result in almost full adjustment of the bias created by a common break, while producing biased nowcasts when the break is not common. This method should be preferred only when there is sufficient evidence of co-breaking in the series. Robust nowcasts perform better on average, resulting in unbiased predictions during permanent and transitory common breaks.

Chasing volatility: a persistent multiplicative error model with jumps

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Abstract

The volatility of financial returns is characterized by persistence and unpredictable large increments. Recent empirical studies indicate that diffusive stochastic volatility and jumps in returns are incapable of capturing the empirical features of equity index returns. Instead, it has been stressed that jumps in volatility can improve the overall fitting of stochastic volatility models. We introduce a persistent Multiplicative Error Model with jumps (MEM-J). This is an extension of the MEM by \cite{EngleGallo2006} for estimating the presence of jumps in volatility, using a realized volatility measure, as volatility proxy, depurated by the effect of price jumps. The moments and the likelihood function are obtained in closed form. A Monte Carlo simulation experiment shows the properties of the model and the finite-sample features of the maximum likelihood estimation. The empirical application focuses on a set of stock indexes. The estimation results highlight a positive and time-varying probability of jumps in volatility, which is consistent with the findings of previous studies on the topic.

Positive Semidefinite Integrated Covariance Estimation, Factorizations and Asynchronicity

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Abstract

We propose an estimator of the ex-post covariation of log-prices under asynchronicity and microstructure noise. We use a positive semi-definite factorization of the correlation matrix in order to exploit the heterogeneity in trading intensity to estimate the different parameters sequentially with as much observations as possible. The estimator is guaranteed positive semi-definite, and robust to microstructure noise, asynchronicity and jumps. We assess the finite sample properties in an extensive Monte Carlo study.

Comparative statics for real options on oil: What stylized facts to use?

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Abstract

Comparative-statics results for financial options are often assumed to hold for real options. But the effects of higher volatility need not be increased value and postponed investment. This depends on signs of correlations and what parameters are held constant. For real options, the rate-of-return shortfall may change. The CAPM is commonly used to determine this. In contrast with widespread assumptions, the empirical analysis shows that the correlation of the returns on oil and the stock market is nonpositive and not invariant to changes in volatility. For crude oil during 1993–2008, these changes are identified as three significant breaks.

Heteroskedasticity-and-Autocorrelation-Consistent Bootstrapping

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Abstract

The conventional resampling bootstrap can work very well indeed for models in which there are quantities, like residuals, that can be treated approximately as IID realisations. In other circumstances, such as with discrete-choice models, a parametric bootstrap imitates the true unknown DGP just as well as the parameters can be estimated. But in many, if not most, econometric applications, it is impossible to estimate consistently the elements of the white-noise process or processes that underlie the DGP. A common example is a regression model with heteroskedastic and/or autocorrelated disturbances, where the heteroskedasticity and autocorrelation are of unknown form. A particular version of the wild bootstrap can be shown to work very well, and, in one particular case perfectly, with many models, both univariate and multivariate, in the presence of heteroskedasticity. Nothing comparable appears to exist for handling serial correlation. I review some of the procedures that have been proposed, the block bootstrap in its various versions, the sieve bootstrap, and frequency-domain bootstraps. Recently, there has been proposed something called the dependent wild bootstrap. Here, I extend this new method, and link it to the well-known HAC covariance estimator, in much the same way as one can link the wild bootstrap to the HCCME. It works very well even with sample sizes smaller than 50, and merits considerable further study.

A Dynamic Bivariate Poisson Model for Analysing and Forecasting Match Results in the English Premier League

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Abstract

Attack and defense strengths of football teams vary over time due to changes in the teams of players or their managers. We develop a statistical model for the analysis and forecasting of football match results which are assumed to come from a bivariate Poisson distribution with intensity coefficients that change stochastically over time. This development presents a novelty in the statistical time series analysis of match results from football or other team sports. Our treatment is based on state space and importance sampling methods which are computationally efficient. The out-of-sample performance of our methodology is verified in a betting strategy that is applied to the match outcomes from the 2010/11 and 2011/12 seasons of the English Premier League. We show that our statistical modeling framework can produce a significant positive return over the bookmaker's odds.

A Stochastic Expansion of the Huber-skip Estimator for Multiple Regression

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Abstract

The Huber-skip regression estimator proposed by Huber (1964) minimizes the sum of squares of residuals among those residuals that are bounded by a constant c : It is a special case of an M-estimator and is difficult to analyse because the derivative of the objective function is neither monotone nor absolutely continuous. In this paper we apply recent results on weighted marked empirical processes together with some martingale results, see Johansen and Nielsen (2013), to derive a stochastic approximation of the estimator. This result can then be used to derive the limit distribution for a wide class of regressor variables, which include stationary processes and some deterministic trends.

Selection Criteria in Regime Switching Conditional Volatility Models

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Abstract

A large number of nonlinear conditional heteroskedastic models have been proposed in the literature and practitioners do not have always the tools to choose the correct specification. In this article, we are interesting in knowing if usual choice criteria lead them to choose the good specification in regime switching framework. We focus on two types of models: the Logistic Smooth Transition GARCH model and the Markov-Switching GARCH models. Thanks to simulation experiments, we highlight that information criteria and loss functions can lead practitioners to do a misspecification. Indeed, depending on the Data Generating Process used in the experiment, the choice of a criteria to select a model is a difficult issue. We argue that if selection criteria lead to choose the wrong model, it's rather due to the difficulty to estimate such models with Quasi Maximum Likelihood Estimation method (QMLE).

Stochastic Trends and Seasonality in Economic Time Series: New Evidence from Bayesian Stochastic Model Specification Search

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Abstract

An important issue in modelling economic time series is whether key unobserved components representing trends, seasonality and calendar components, are deterministic or evolutive. We address it by applying a recently proposed Bayesian variable selection methodology to an encompassing linear mixed model that features, along with deterministic effects, additional random explanatory variables that account for the evolution of the underlying level, slope, seasonality and trading days. Variable selection is performed by estimating the posterior model probabilities using a suitable Gibbs sampling scheme. The paper conducts an extensive empirical application on a large and representative set of monthly time series concerning industrial production and retail turnover. We find strong support for the presence of stochastic trends in the series, either in the form of a time-varying level, or, less frequently, of a stochastic slope, or both. Seasonality is a more stable component, although in at least 60% of the cases we were able to select one or more stochastic trigonometric cycles. Most frequently the time variation is found in correspondence with the fundamental and the first harmonic cycles. An interesting and intuitively plausible finding is that the probability of estimating time-varying components increases with the sample size available. However, even for very large sample sizes we were unable to find stochastically varying calendar effects.

A Jump Diffusion Model for Volatility and Duration

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Abstract

This paper puts forward a stochastic volatility and stochastic conditional duration with cojumps (SVSDCJ) model to analyze returns and durations. In high frequency data, transactions are irregularly spaced, and the durations between transactions carry information about volatility as suggested by the market microstructure theory. Traditional measures of volatility do not utilize durations. We adopt a jump diffusion process to model the persistence of intraday volatility and conditional duration, and their interdependence. The jump component is disentangled from the continuous part of the price, volatility and conditional duration process. We develop a MCMC algorithm for the inference of irregularly spaced multivariate process with jumps. The algorithm provides smoothed estimates of the latent variables such as spot volatility, jump times and jump sizes. We apply this model to IBM data and we find meaningful relationship between volatility and conditional duration. Also, jumps play an important role in the total variation, but the jump variation is smaller than traditional measures that use returns sampled at lower frequency.