

Conference on Structural Breaks and Monetary Policy

Book of Abstracts

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List of papers

Improving the power of structural break tests in dynamic regression models

E. Andreou (*University of Cyprus*).

Abstract: A large family of widely used tests for structural breaks for dynamic regression models is consistent and has good local asymptotic properties for given fixed values in the relevant set of alternative hypotheses. In finite samples, however, the power functions of these tests can be non-monotone and even reach a zero value as the alternative considered is further away from the null value. The objective of this paper is to propose methods to improve the power of these tests and the estimation of the long-run variance involved in these test statistics. The methods yield tests that are consistent and retain their asymptotic distribution under the null of no structural change and have improved rates of divergence under the alternative.

Are policy counterfactuals based on structural VARs reliable?

L. Benati (*European Central Bank*).

Abstract: Based on standard New Keynesian models I show that policy counterfactuals based on the theoretical structural VAR representations of the models fail to reliably capture the impact of changes in the parameters of the Taylor rule on the (reduced-form) properties of the economy. Based on estimated models for the Great Inflation and the most recent period, I show that, as a practical matter, the problem appears to be non-negligible. These results imply that the outcomes of SVAR-based policy counterfactuals should be regarded with caution, as their informativeness for the specific issue at hand - e.g., understanding the role played by monetary policy in exacerbating the Great Depression, causing the Great Inflation, or fostering the Great Moderation - is, in principle, open to question. Finally, I argue that SVAR-based policy counterfactuals suffer from a crucial logical shortcoming: given that their reliability crucially depends on unknown structural characteristics of the underlying data generation process, such reliability cannot simply be assumed, and can instead only be ascertained with a reasonable degree of confidence by estimating structural (DSGE) models.

Keywords: Lucas critique, structural VARs, policy counterfactuals, DSGE models, Taylor rules, monetary policy, Great Depression, Great Inflation Great Moderation.

Estimation and Inference in Unstable NLS Models

O. Boldea (*Tilburg University*), A. R. Hall

Abstract: In this paper, we extend Bai and Perron's (1998, *Econometrica*, pp. 47- 78) method for detecting multiple breaks to nonlinear models. To that end, we consider a nonlinear model that can be estimated via nonlinear least squares (NLS) and features a limited number of parameter shifts occurring at unknown dates. In our framework, the break-dates are estimated simultaneously with the parameters via minimization of the residual sum of squares. Using new uniform convergence results for partial sums, we derive the asymptotic distributions of both break-point and parameter estimates and propose several instability tests. We provide simulations that indicate good finite sample properties of our procedure. Additionally, we use our methods to test for misspecification of smooth-transition models in the context of an asymmetric US federal funds rate reaction function and conclude that there is strong evidence of sudden change as well as smooth behavior.

Testing the Invariance of Expectations Models of Inflation

J. L. Castle (*Univeristy of Oxford*), J. A. Doornik, D. F. Hendry, R. Nymoen

Abstract: The new-Keynesian Phillips curve (NKPC) includes expected future inflation to explain current inflation. Such models are estimated after replacing the expected value by the future outcome, using Instrumental Variables or Generalized Method of Moments. However, the underlying theory does not allow for various non-stationarities although crises, breaks and regime shifts are relatively common. We investigate the consequences for NKPC estimation of breaks in data processes analytically and by simulation, then apply the new technique of impulse-indicator saturation to salient published studies. The coefficient of the future value becomes insignificant in both USA and Euro-area NKPCs after modeling breaks.

JEL classifications: C5, E3

Keywords: New-Keynesian Phillips curve; Inflation expectations; Structural breaks; Impulse indicator saturation; Testing invariance

(Un)Predictability and Macroeconomic Stability

A. D'Agostino, D. Giannone (*ECARES and CEPR*), P. Surico

Abstract: The ability of popular statistical methods, the Federal Reserve Greenbook and the Survey of Professional Forecasters to improve upon naive forecasts of inflation and real activity has declined significantly in U.S. data moving from the pre- to the post-1985 sample. The decline is larger for institutional forecasters and models based on large information sets. In the most recent period, there is evidence of predictability for inflation only one month ahead, and for unemployment rate and nonfarm payrolls at most horizons. Counterfactual analyses suggest that a change in the estimated coefficients has been relatively more important than a change in the estimated error variances to explain these findings.

JEL classifications: E37, E47, C22, C53

Keywords: forecasting models, Fed Greenbook, Survey of Professional Forecasts

Fortune or virtue: Time-variant volatilities versus parameter drifting

J. Fernández-Villaverde, P. Guerrón-Quintana (*Federal Reserve Bank of Philadelphia*), J. F. Rubio-Ramírez

Abstract: This paper compares the role of stochastic volatility versus changes in monetary policy rules in accounting for the time-varying volatility of U.S. aggregate data. Of special interest to us is understanding the sources of the great moderation of business cycle fluctuations that the U.S. economy experienced between 1984 and 2007. To explore this issue, we build a medium-scale dynamic stochastic general equilibrium (DSGE) model with both stochastic volatility and parameter drifting in the Taylor rule and we estimate it non-linearly using U.S. data and Bayesian methods. Methodologically, we show how to confront such a rich model with the data by exploiting the structure of the high-order approximation to the decision rules that characterize the equilibrium of the economy. Our main empirical findings are: 1) even after con-

trolling for stochastic volatility (and there is a fair amount of it), there is overwhelming evidence of changes in monetary policy during the analyzed period; 2) however, these changes in monetary policy mattered little for the great moderation; 3) most of the great performance of the U.S. economy during the 1990s was a result of good shocks; and 4) the response of monetary policy to inflation under Burns, Miller, and Greenspan was similar, while it was much higher under Volcker.

JEL classifications: E10, E30, C11

Keywords: DSGE models, Stochastic volatility, Parameter drifting, Bayesian methods

On the estimation of the break point given a change in persistence

A. Halunga (*University of Exeter*), D. R. Osborn

Abstract: This paper studies estimation of the date of change in the persistence of a series, from $I(0)$ to $I(1)$ or vice versa. Analytical results are established for estimators previously proposed in the literature, and shows the important role played by estimation of the mean in this context. Although proposed ratio estimators are consistent when no mean is required, estimation of the mean is shown to render them inconsistent and they have non-degenerate asymptotic distributions with upper bound given by the true break date. The analysis also sheds light on their differing properties at the end-points of the search interval. Monte Carlo simulations illustrate the importance of these effects in finite samples. The estimator of Leybourne, Taylor and Kim (*Journal of Time Series Analysis*, 2006) is recommended, since it is consistent and has the best finite sample properties overall.

The Meta Taylor Rule

K. Lee (*University of Nottingham*), J. Morley, K. Shields

Abstract: This paper provides a characterisation of U.S. monetary policy grounded within an organising Taylor rule framework. The characterisation uses a flexible and pragmatic modelling approach which accommodates uncertainties on the duration of policy regimes and on the specification of the rule in addition to the parameter and stochastic uncertainties of standard Taylor rule analyses. The approach involves estimation and inference based on Taylor rules

obtained through standard linear regression methods but combined using Bayesian model averaging techniques. Employing data that was available in real time, the estimated version of the meta Taylor rule provides a simple but compelling characterisation of monetary policy decisions in the U.S. over the last forty years.

JEL classifications: C32, D84, E32

Keywords: Taylor rule, real-time policy, model uncertainty, US interest rates

Identifying Unorthodox Monetary Policy and Measuring Its Impact on Asset Returns

P. Guerrón-Quintana, James M. Nason (*Federal Reserve Bank of Philadelphia*)

Abstract: Orthodox monetary policy works on the interest rate of a short-term private asset to change the relative price of that asset to the liability issued by a central bank. When the fed funds rate cannot be, say, lowered further using these open market operations (OMOs), the Fed may still be able to achieve its monetary policy goals by engaging in large scale Treasury transactions. The Fed has employed large scale asset purchases (LSAPs) on several occasions since the financial crisis that began in July 2007. During the crisis, LSAPs became part of the Fed's monetary policy toolkit because of the need to provide liquidity to a wide array of financial markets, to allocate credit to specific financial markets, and to provide economic stimulus with the fed funds rate near its zero lower bound. The latter LSAP is also referred to as a program of quantitative easing (QE) to denote that monetary policy is operating on the margin of the stock of Treasury securities the Fed holds in its portfolio rather than the fed funds rate because it is close to its zero lower bound. Our ongoing research uses the TVP-SV-VAR(1) to gauge the impact of the Fed's QE programs on other asset returns as well as to reassess the robustness of the emerging literature that evaluates the success of these policy initiatives.

JEL classifications: C32, E43, E44, E52, F31, G12

Keywords: Quantitative easing, asset returns, time-varying parameters, stochastic volatility, vector autoregression, particle filter

Forecasting in the presence of recent structural change

J. Eklund, G. Kapetanios, S. Price (*Bank of England and City University, London*),

Abstract: We examine how to forecast after a recent break. We consider monitoring for change and then combining forecasts from models that do and do not use data before the change; and robust methods, namely rolling regressions, forecast averaging over different windows and exponentially weighted moving average (EWMA) forecasting. We derive analytical results for the performance of the robust methods relative to a full-sample recursive benchmark. For a location model subject to stochastic breaks the relative MSFE ranking is EWMA \downarrow rolling regression \downarrow forecast averaging. No clear ranking emerges under deterministic breaks. In Monte Carlo experiments forecast averaging improves performance in many cases with little penalty where there are small or infrequent changes. Similar results emerge when we examine a large number of UK and US macroeconomic series.

JEL classifications: C100, C590

Keywords: monitoring, recent structural change, forecast combination, robust forecasts

Determinants of the EONIA spread and the financial crisis

C. Soares, P. M. M. Rodrigues (*Bank of Portugal*)

Abstract: The financial markets turmoil of 2007-09 impacted on the overnight segment, which is the first step of monetary policy implementation. We model the volatility of the EONIA spread as an EGARCH. However, the nature of the EGARCH considered will be different in the period before the fixed rate full allotment policy of the ECB (2004 - 2008) where we follow the approach of Hamilton (1996) and in the period afterwards (2008 - 2009) where a conventional EGARCH seems sufficient to capture the behaviour of volatility. The results suggest a greater difficulty during the turmoil for the ECB to steer the level of the EONIA spread relative to the main reference rate. The liquidity effect has been reduced since 2007 and in particular since the full allotment policy at the refinancing operations. On the other hand, the liquidity policy and especially the provision of long-term liquidity followed was effective in reducing market volatility. Liquidity provision conditions were also found to have influenced the EONIA spread only

since the financial market turmoil. Fine-tuning operations contributed to stabilize money market conditions, especially during the turmoil. The EGARCH parameter estimates also suggest a structural change in the behaviour of the EONIA spread in reaction to shocks.

JEL classifications: E43, E52, G21

Keywords: money market, EONIA, monetary policy implementation, financial markets turmoil

Breaks in US Monetary Policy: An Information Criteria Approach to Inference with Endogenous Regressors

A. R. Hall, D. R. Osborn, N. Sakkas (*University of Manchester*)

Abstract: The presence and implications of breaks in US monetary policy are investigated through a "structural" equation that allows for the endogeneity of inflation and unemployment gap forecasts. The analysis establishes the consistency, for both the number of breaks and their locations within the sample, when inference is conducted through an information criteria approach with an appropriately specified penalty function. When breaks are taken into consideration in the reduced form equations for inflation and unemployment forecasts produced within the US Fed, we find that US monetary policy changes in 1980 and 1986/7. However, despite further changes in the reduced form coefficients, no break in the US monetary policy rule is detected after 1987.

JEL classifications: C13, C26, E52

Keywords: US monetary policy, structural breaks, information criteria