INTERNATIONAL MONETARY FUND

Joint Vienna Institute / Institute for Capacity Development

Course on Advanced Macroeconomic Forecasting (JV15.14)

Vienna, Austria

May 25–29, 2015

READING LIST

Lecture 1: Structural Vector Autoregression

DESCRIPTION

This lecture covers the use of structural vector autoregressive regression (SVAR) models as a tool for analyzing the effects of policy shocks and forecasting. The morning session will review the theoretical background. The lecture will present the link between the reduced form VAR and the SVAR and different approaches to identification: short-term and long-term restrictions, as well as the sign restrictions. The afternoon session will work through several hands-on exercises using EViews. These exercises aim at replicating classic papers in the area, specifically: Sims 1992, Eichenbaum 1992, Bernanke and Mihov 1995, Blanchard-Perotti, 2002, Blanchard-Quah 1989, and Fry and Pagan, 2011.
Participants are expected to be familiar with the basic VAR approach and are advised to explore the first 3 articles before the lecture.

REFERENCES

Blanchard, O. and D. Quah (1989). "The Dynamic Effects of Aggregate Demand and Supply Disturbances." *American Economic Review* pp. 655-73.
 http://www.jstor.org/stable/1827924

Fry, R. and A. Pagan (2011). "Sign Restrictions in Structural Vector Autoregressions: A Critical Review." *Journal of Economic Literature*, 49 pp. 938-60.
http://www.aeaweb.org/articles.php?doi=10.1257/jel.49.4.938

Sims, C. (1992). "Interpreting the Macroeconomic Time Series Facts: the Effects of Monetary Policy," *European Economic Review*, pp.975-1000.
http://www.sciencedirect.com/science/article/pii/001429219290041T

Supplementary:

Bernanke, B. and I. Mihov (1995). "Measuring Monetary Policy," NBER WP/5145.
http://www.nber.org/papers/w5145

Blanchard, O. and R. Perotti (2002), "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output." *The Quarterly Journal of Economics*, pp. 1329-68. http://www.jstor.org/stable/4132480

Eichenbaum, M (1992). Comments on "Interpreting the Macroeconomic Time Series Facts: the Effects of Monetary Policy." *European Economic Review*, pp.1001-11.
http://www.sciencedirect.com/science/article/pii/001429219290042U

Enders, W. (2010). *Applied Econometric Time Series*. Wiley, 3rd edition.

Favero, C. (2001). *Applied Macroeconometrics*. Oxford University Press.

Gali, J. (1992). "How Well Does the IS-LM Model Fit Postwar Data?" *Quarterly Journal of Economics* 107, 709–735. http://www.jstor.org/stable/2118487

Hamilton, J. (1994). *Time Series Analysis.* Princeton University Press, New Jersey, Chapters 10 and 11.

Lutkepol (2007). "Econometric Analysis with Vector Autoregressive Models," European University Institute WP Eco 2007/11.
http://cadmus.iue.it/dspace/bitstream/1814/6918/1/ECO-2007-11.pdf

Stock and Watson (2001). "Vector Autoregressions," *Journal of Economic Perspectives*, 15(4) pp. 101–15. http://www.jstor.org/stable/2696519

Lecture 2: Working With I(1) Variables

DESCRIPTION

This lecture will focus on estimating and forecasting linear regression equations involving I(1) (non-stationary) variables. The morning session will cover the theoretical background of non-stationary econometrics, comparing in particular estimating techniques for non-co integrated and co-integrated forecasting systems using the maximum likelihood approach. The afternoon session will involve working through several hands-on exercises using EViews, including a number of model simulation exercises using non-stationary processes.

REFERENCES

Martin, V. L., A. S. Hurn and D. Harris (2013), "Econometric Modelling with Time Series: Specification, Estimation and Testing", Chapters 16–18, pp. 612–749.

Hamilton, J. D. (1994) "Time Series Analysis," Princeton University Press, Chapters 15–19, pp. 435–629.

Lecture 3: Forecasting with Bayesian Techniques

DESCRIPTION

This lecture will focus on how to use Bayesian Vector Autoregressive (BVAR) models for forecasting macroeconomic time series. The morning session will cover the theoretical background of Bayesian econometrics, as well as practical aspects in time series analysis such as how to select priors and compare forecasting performance. The afternoon session will involve working through several hands-on exercises using EViews.

REFERENCES

Del Negro, Marco, and Frank Schorfheide, 2004, "Priors from General Equilibrium Models for VARs," *International Economic Review*, Vol. 45, No. 2, pp. 643–73.
http://dx.doi.org/10.1111/j.1468-2354.2004.00139.x

Giannone, Domenico, Michele Lenza, and Giorgio Primiceri, 2015, "Prior Selection for Vector Autoregressions," The Review of Economics and Statistics, May 2015, 97(2): 436-451.

Koop, Gary, and Dimitris Korobilis, 2009, "Bayesian Multivariate Time Series Methods for Empirical Macroeconomics," *Foundations and Trends® in Econometrics*, Vol. 3, No. 4, pp. 267–358.
http://personal.strath.ac.uk/gary.koop/koop_korobilis_Foundations_and_Trends_2010.pdf

Supplementary:

Litterman, Robert B., 1986, "Forecasting with Bayesian Vector Autoregressions—Five Years of Experience," *Journal of Business & Economic Statistics*, Vol. 4, No. 1, pp. 25–38.
http://dm-edms.imf.org/cyberdocs/4977295

Lecture 4: Combination Forecasts

DESCRIPTION

Theoretical results and empirical evidence suggest that combining forecasts from different sources yields more precise forecasts than using a single model. This lecture will review the techniques available to combine forecasts from different sources, with the aim of improving forecasting accuracy. The morning session will survey the theoretical underpinnings of forecast averaging, specific weighting schemes (both parametric and non-parametric) and the practical aspects in implementing them. The afternoon session will involve working through several hands-on exercises using EViews.

REFERENCES

Granger, Clive W.J., and Ramu Ramanathan, 1984, "Improved Methods of Combining Forecasts," *Journal of Forecasting*, Vol. 3, Issue 2, pp. 197–204.
http://onlinelibrary.wiley.com.libproxy-imf.imf.org/doi/10.1002/for.3980030207/pdf

Stock, James H., and Mark W. Watson, 2004, "Combination Forecasts of Output Growth in a Seven-Country Data Set," *Journal of Forecasting*, Vol. 23, Issue 6, pp. 405–30.
http://onlinelibrary.wiley.com.libproxy-imf.imf.org/doi/10.1002/for.928/pdf

———, 2006, "Forecasting with Many Predictors," in *Handbook of Economic Forecasting*, Volume I, ed. by Graham Elliott, Clive W.J. Granger, and Allan Timmermann (Amsterdam: Elsevier), Chapter 10.
http://www.sciencedirect.com.libproxy-imf.imf.org/science/handbooks/15740706

Timmermann, Allan, 2006, "Forecast Combinations," in *Handbook of Economic Forecasting*, Volume I, ed. by Graham Elliott, Clive W.J. Granger, and Allan Timmermann (Amsterdam: Elsevier), Chapter 4.
http://www.sciencedirect.com.libproxy-imf.imf.org/science/handbooks/15740706

Lecture 5: Using the Kalman Filter

DESCRIPTION

This lecture reviews the state space representation and the Kalman filter. The state space representation is a way to describe the law of motion of unobservable (latent) variables and their linkage with actual observations or signals. The Kalman filter is a computational algorithm that uses conditional means and expectations to obtain exact (from a statistical point of view) finite sample linear predictions of unobserved latent variables, given observed variables. Maximum Likelihood Estimation (MLE) and Bayesian methods are often used to estimate such models and draw statistical inferences. The workshop provides three examples demonstrating the use of the state space representation and the Kalman filter: (a) forecasting business cycle conditions in real time; (b) estimating potential output and the natural rate of interest; and (c) forecasting the term structure of government bond yields.

REFERENCES

Aruoba, S.B., Diebold, F.X. and Scotti, C. (2009), "Real-Time Measurement of Business Conditions," *Journal of Business and Economic Statistics* 27:4 (October 2009), pp. 417–27.

Diebold, F. X. and Canlin Li (2006), "Forecasting the Term Structure of Government Bond Yields," *Journal of Econometrics* 130, pp. 337–364.

Laubach, T., and J. C. Williams (2003). "Measuring the Natural Rate of Interest," *Review of Economics and Statistics,* vol. 85, no. 4, pp. 1063–1070.