

Theory and practice of forecasting with large data sets

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Abstract: The course seeks to introduce static factor models or dynamic factors models that can be cast in a static framework. It is primarily theoretical in nature but the main arguments are illustrated with many empirical examples drawn from a rich variety of data sets. A key issue is the efficacy of factor models in forecasting when compared with less data-rich methods, including looking at the consistency of factor estimates of the ‘true’ factor space especially when there is strong evidence of structural instability. Emphasis in the course is also placed on looking at applications of factor models, for example, in monetary policy, and exchange and interest rate pass-through – in other words, in a range of real-world macroeconomic policy applications.

1. Introducing factor models

Detailed introduction to factor models

Bai, J. and S. Ng (2008). Recent developments in large dimensional factor analysis. Mimeo.

Breitung, J. and S. Eickmeier (2005). Dynamic factor models, Deutsche Bundesbank Discussion Paper 38/2005.

Boivin, J. and S. Ng (2005). Understanding and comparing factor based forecasts, *International Journal of Central Banking*, **1**, 117–152.

Boivin, J. and S. Ng, S. (2006). Are more data always better for factor analysis? *Journal of Econometrics*, **132**, 169–194.

Stock, J.H. and M.W. Watson (1998). Diffusion indexes. NBER Working Paper No. W6702

2. Applications to forecasting in large data sets

Discussion of specific applications in forecasting, with country-specific references

Artis, M.J., A. Banerjee and M. Marcellino (2005). Factor forecasts for the UK. *Journal of Forecasting*, **24**, 279-298.

Banerjee, A. and M. Marcellino (2005). Are there any reliable leading indicators for US Inflation and GDP Growth? *International Journal of Forecasting*, **22**, 137-151.

Banerjee, A., M. Marcellino and I. Masten (2005). Leading indicators for Euro-area inflation and GDP growth. *Oxford Bulletin of Economics and Statistics*, **67**, 785-813.

Stock, J.H. and M.W. Watson (2002). Macroeconomic forecasting using diffusion indexes, *Journal of Business and Economic Statistics*, **20**, 147–162.

3. Application to data sets with structural change

Continuing theme of 2. above but with more specific focus on where the time dimension is modest and where there is structural change

Banerjee, A., M. Marcellino and I. Masten (2008). Forecasting macroeconomic variables using diffusion indexes in short samples with structural change. Forthcoming in *Forecasting in the Presence of Structural Breaks and Model Uncertainty*, edited by D. Rapach and M. Wohar, Elsevier.

Banerjee, A., M. Marcellino and I. Masten (2006). Forecasting macroeconomic variables for the new member states. In M.J. Artis, A. Banerjee and M. Marcellino (eds.) *The Central and Eastern European Countries and the European Union*, Cambridge University Press, Cambridge, Chapter 4, 108-134.

Stock, J.H. and M.W. Watson (2007). Forecasting in dynamic factor models subject to structural instability. Mimeo.

4. Factor models in macroeconomic analysis

Bernanke, B. and J. Boivin (2003). Monetary policy in a data rich environment, *Journal of Monetary Economics*, **50**, 525–546.

Bernanke, B., J. Boivin and P.S. Elias (2005). Measuring the effects of monetary policy: A factor-augmented vector autoregressive (FAVAR) approach. *The Quarterly Journal of Economics*, **120**, 387-422.

Favero, C., M. Marcellino. and F. Neglia (2005). Principal components at work: the empirical analysis of monetary policy with large datasets, *Journal of Applied Econometrics*, **20**, 603–620.

Stock, J. H. and M.W. Watson (2005). Implications of dynamic factor models for VAR analysis, NBER WP 11467.