

Beyond Point Forecasting: Macroeconomic Scenario Evaluation Using Multi-Recurrent Networks

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REFERENCE

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ABSTRACT

Multi-recurrent network (MRN) ensembles have been producing monthly UK CPI forecasts published by NIESR. The specific questions addressed in this research are; what happens if monetary policy moves, and does the answer depend on the current state of the economy?

This paper takes the fitted MRN ensemble beyond point forecasting and uses it to evaluate macroeconomic scenarios. Building upon Koop, Pesaran and Potter (1996), we compute state-conditional generalised responses by perturbing an observed variable at a given month, propagating the perturbation through the fitted network from that state, and comparing the resulting path with the unshocked path. In the same vein as Keating, Kelly and Valcarcel (2014), we contrast a Divisia monetary aggregate and concomitant user cost with the Monetary Policy Committees (MPC's) base rate as the indicator of monetary policy.

Three results follow.

- i) Divisia indices carry more information about the subsequent path than the MPC base rate in a state of financial crisis.
- ii) Responses are not additive: a joint shock produces a first-year average GDP response of -0.43 , against $+0.54$ for the sum of the individual shocks.
- iii) Responses are state-dependent, with the December 2008 and December 2015 states giving materially different responses from the same model specification.

Overall, results show that nonlinearity and state dependence are substantive features of the data, rather than artefacts of the estimator, and that linear approaches which impose additivity may mis-state the effect of combined policy interventions. We set out the remaining identification question and the route to a like-for-like comparison with structural econometric benchmarks in the full paper.