

A computational algorithm to analyze unobserved sequential reactions of the central banks

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Abstract

Central banks of different countries are some of the largest economic players at the global scale and they are not static in their monetary policy stances. They change their policies substantially over time in response to idiosyncratic or global factors affecting the economies. A very prominent and empirically documented feature arising out of central banks' actions, is that the relative importance assigned to inflation vis-a-vis output fluctuations evolve substantially over time. We analyze the leading and lagging behavior of central banks of various countries in terms of adopting low inflationary environment vis-a-vis high weight assigned to counteract output fluctuations, in a completely data-driven way. To this end, we propose a new methodology by combining complex Hilbert principle component analysis with state-space models in the form of Kalman filter. The CHPCA mechanism is non-parametric and provides a clean identification of leading and lagging behavior in terms of phase differences of time series in the complex plane. We show that the methodology is useful to characterize the extent of coordination (or lack thereof), of monetary policy stances taken by central banks in a cross-section of developed and developing countries. In particular, the analysis suggests that US Fed led other countries central banks in the pre-crisis period in terms of pursuing low-inflationary regimes.