

**Discussion on “A Multi-country approach to
forecasting output growth using PMIs”**

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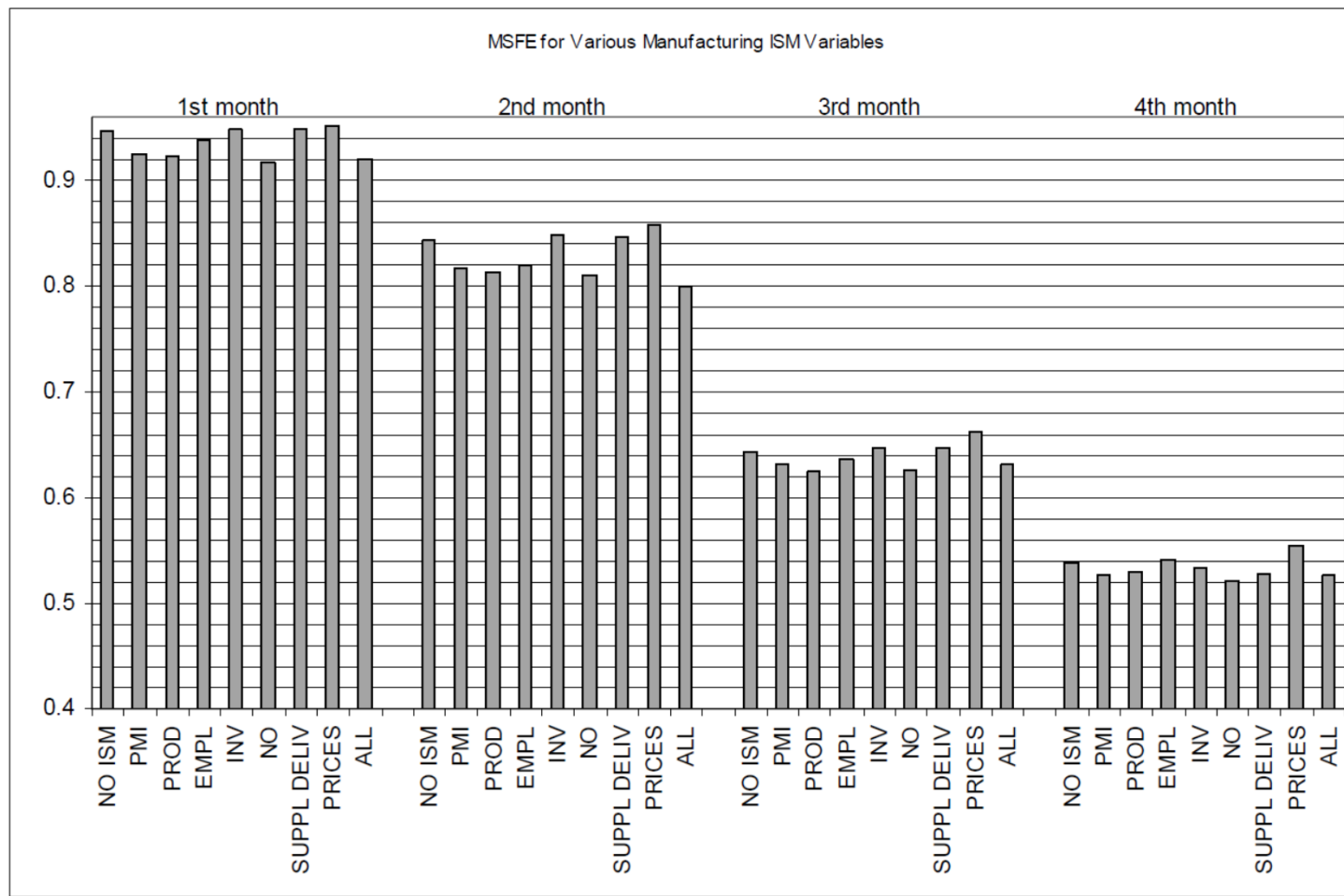
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- This is impressive work covering practically all current approaches to macro forecasting in a data rich environment.
- This paper proposes augmenting the GVAR with additional proxy equations for the unobserved factors and establishes that augmentation of the GVAR system can produce forecasts that converge to infeasible optimal forecasts as the panel dimensions expand at similar rates. This is a very useful result for practical applications – simple but not simple-minded.

- They empirically investigate the information content of PMIs for nowcasting and forecasting output growth across 48 countries using a variety of data-rich methods. They find that the augmented GVAR tends to outperform the standard GVAR model. They also find that PMIs substantially improve nowcasts of growth for horizon $h = 0$ (but not for higher horizons) - gaining about 23% reduction in the RMSE compared to models without PMI data.

- Lahiri and Monokroussos (IJF 2013) found the following result on the marginal effect of PMIs in nowcasting US GDP growth using real time data and with nearly 200 other monthly indicators, cf. Giannone, et al (JME 2008). .

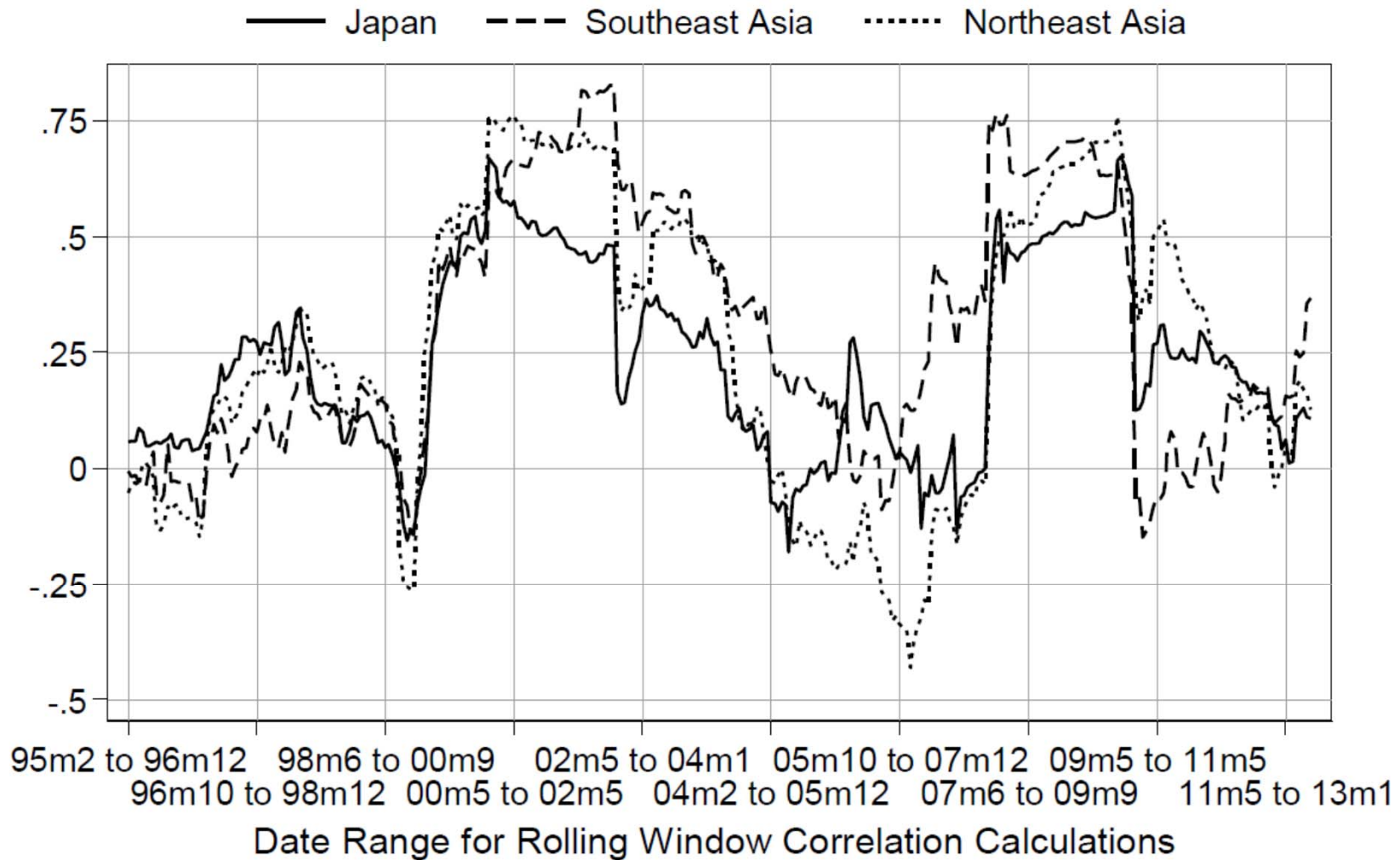


- The current application is complicated due to the fact that different countries have different announcement schedules for GDP, and hence the PMI's will have different lead values. This is a result of the fact that they use revised growth due to unavailability of real time GDP values in most countries.
- Thus, the effect of PMI that the authors are getting is larger in reality. Also, the PMI matters because of its publication schedule (first working day of the month) and not due to having independent information value. The unemployment numbers come out in another week and the IP is announced in two more weeks every month. So it not surprising that PMI does not affect beyond one quarter.

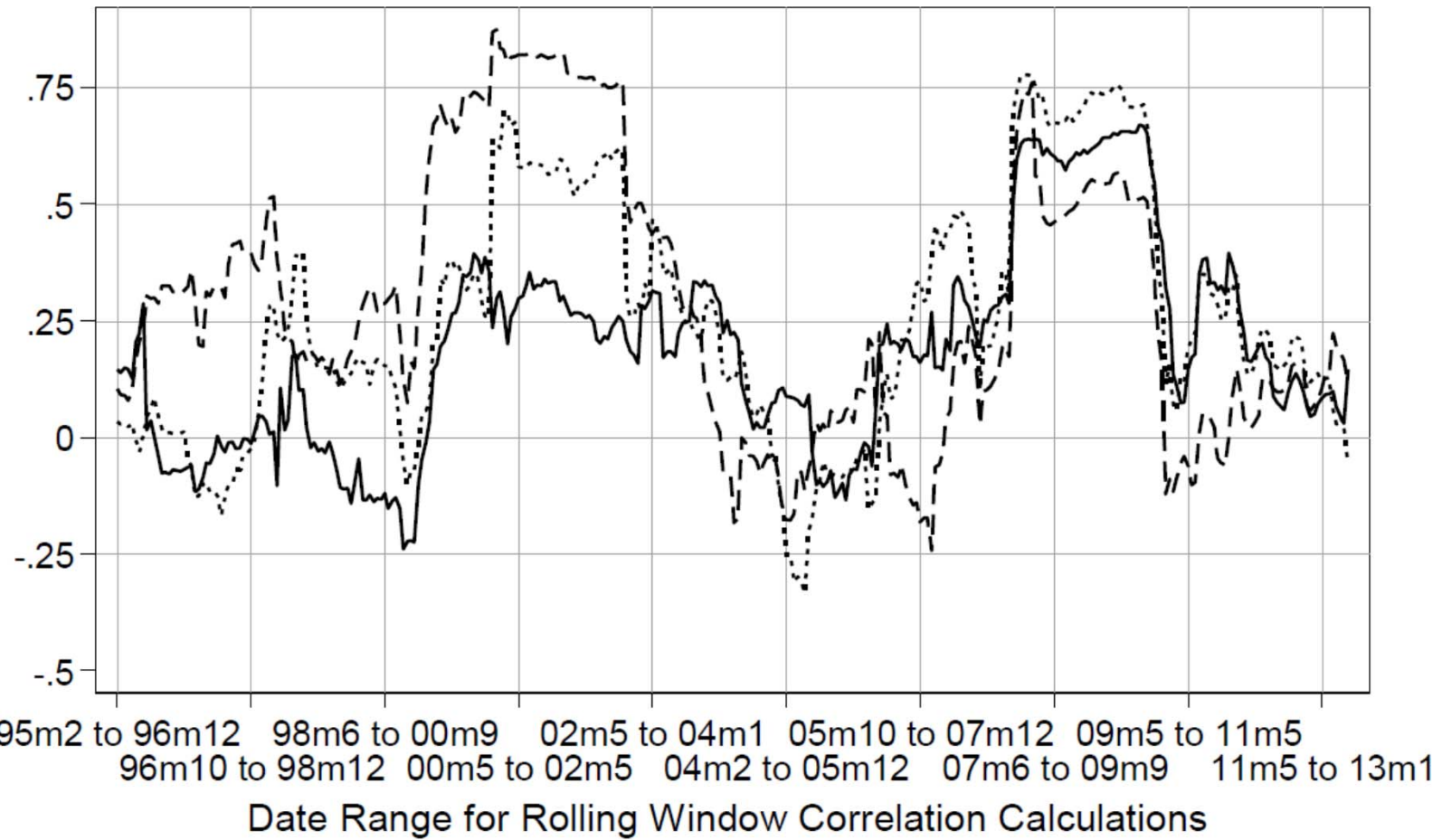
- Also, data on PMI are available only for 34 countries and for Services only for 10 or so. How these missing data were handled is not clear.
- RMSFEs are reported for many of the procedures including averages over 64 models and rolling windows. No attempt to compute their associated uncertainties from recent literature (Leamer 1978, Buckland 1995, Hansen 2010, etc.). Simply speaking, the uncertainties associated with alternative models should be factored in the forecast uncertainty. With so many models much of which are overlapping, this may be intractable.

- Simplifying the nature of common shocks may jeopardize estimation. The authors also used Consensus data to compare with PMI and found that once survey forecasts are introduced, PMI's role get minimized. We studied these data, and looked at cross country dynamic correlations of revisions of fixed target forecasts and also the nature of common shocks using FSVAR models.

- Rolling Correlations of 36 Forecast Revisions (21 Months)



— India - - - Europe United Kingdom



Based on news in GDP growth, the factors and their membership seem to be highly variable over time particularly during recessions.

Let forecast revision be $r_{i,t,h} = y_{i,t,h} - y_{i,t,h+1}$ where $y_{i,t,h}$ is the forecast for country i , target year t , and horizon h . Consider the following VAR(1) model of a vector of all countries' forecast revisions \mathbf{r} :

$$\mathbf{r}_{t,h} = \mathbf{c} + \rho \mathbf{r}_{t,h+1} + \boldsymbol{\varepsilon}_{t,h}$$

The factor part of the model is given as

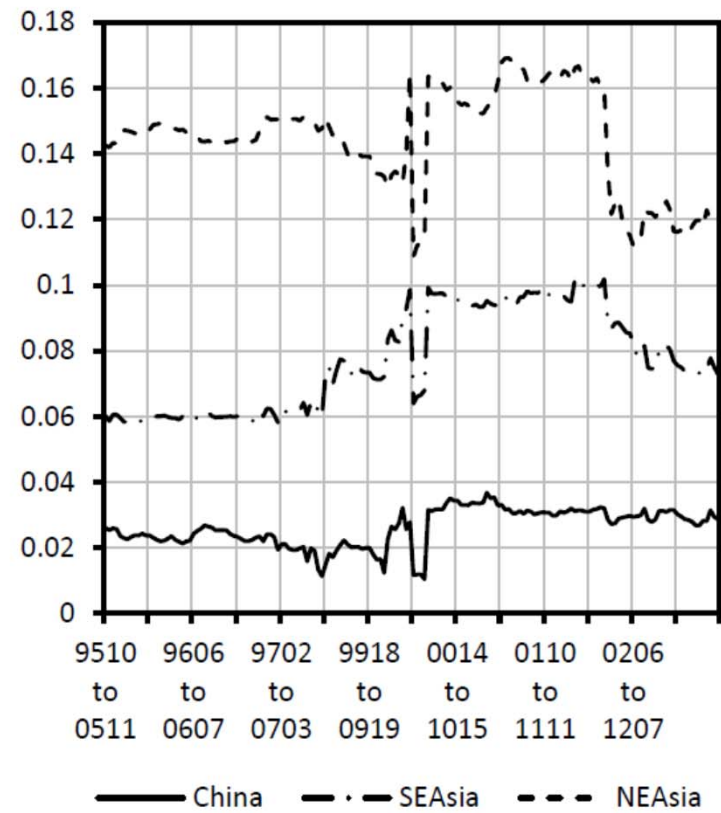
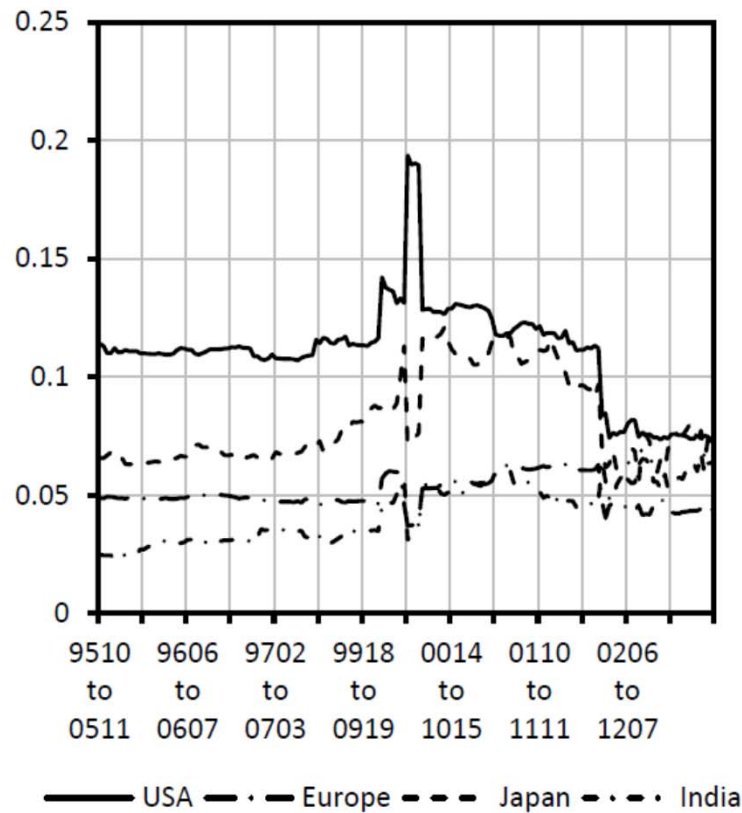
$$\boldsymbol{\varepsilon}_{t,h} = \mathbf{B} \mathbf{f}_{t,h} + \mathbf{u}_{t,h}$$

where \mathbf{B} is the factor loading matrix for factors or common international shocks $\mathbf{f}_{t,h}$. The $\mathbf{u}_{t,h}$ are country specific shocks.

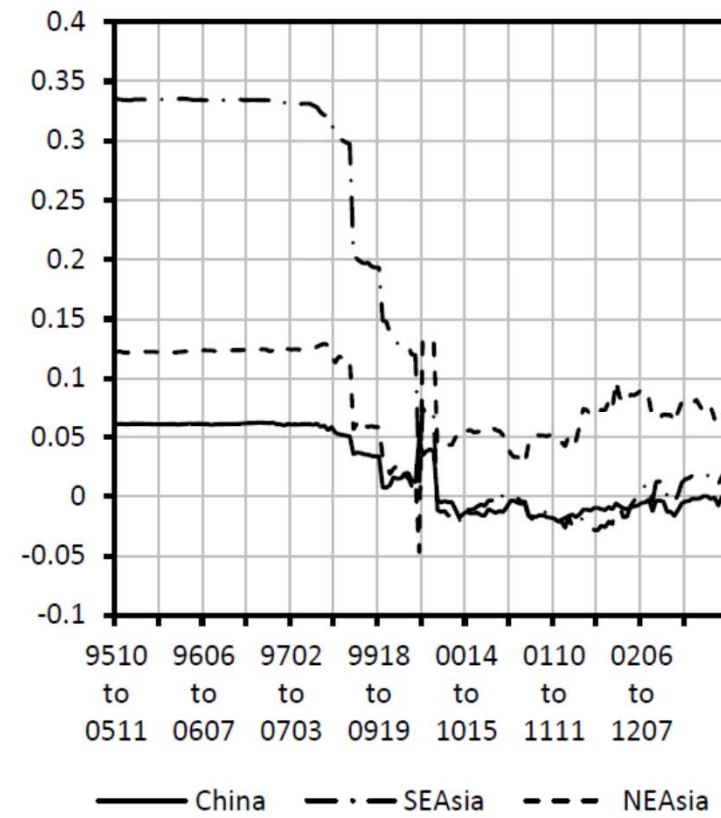
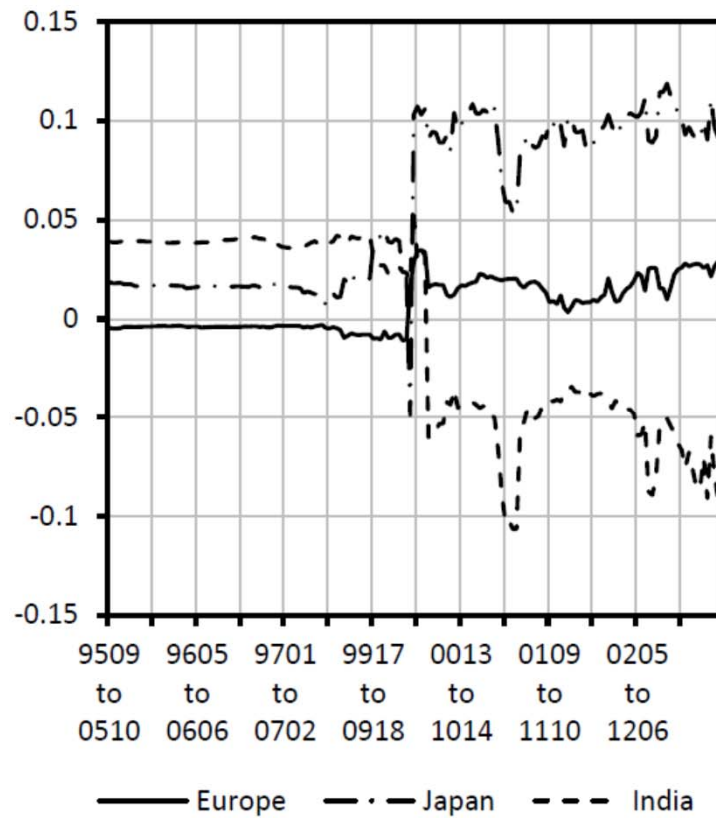
We took seven country/country groups and two common factors.

- Factor loadings from recursive estimation of FSVAR model with 2 common factors:

Factor 1



Factor 2



- My final comment is why look at world growth? Who cares about it? Rather one should look at the success of these models in forecasting growth of a particular country (say US) or a country group (say EU).
- Overall, this is a profound paper that will have a long-run impact on econometric forecasting.