Side event on Nowcasting and Forecasting for SDG monitoring
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Forecasting and nowcasting at EAPD

Julian Slotman
Associate Economic Affairs Officer
UN/DESA - Economic Analysis and Policy Division - Global Economic Monitoring Branch

Outline

- Introduction
  - Economic forecasting and scenario analysis at EAPD/GEMB
  - What makes a good model?
- EAPD nowcasting procedure description
  - Identify determinants (desk study)
  - Estimate (MIDAS)
  - Combine (Kalman)
  - Assess (visual, expert analysis)
- Discussion

Introduction

EAPD/Global Economic Monitoring Branch: What do we do?

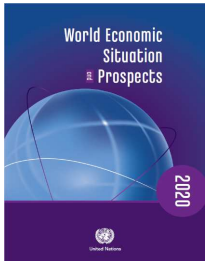
Monitor global economic developments and prospects at the country level (179 countries).

⇒ Two global economic forecasts each year (WEFM) and monthly briefings

Assess policy options from a sustainable development perspective, including social and environmental dimensions (satellite models)

⇒ Scenarios (WEFM)

Our macroeconomic forecasts and analyses are reflected in several UN publications:



Global Economic Monitoring Branch: The forecasting approach

- Monitoring and analysis of global economic conditions (by region, 7 staff)
- World Economic Forecasting Model (WEFM)
- Project LINK (100 economists from 60 countries and IMF, World Bank and OECD)
- Collaboration with 5 UN Regional Commissions, UNCTAD, ILO, UNWTO (Regional experts)

$\Rightarrow$ Data analysis + Model + “Expert” judgement

Global Economic Monitoring Branch: WEFM Model Overview

- Used for UN economic forecasts in ***World Economic Situation and Prospects***
- EViews-based macroeconomic model
- 179 individual country models with global linkages that reconcile export and import volumes and prices
- Simple framework that nonetheless captures country-specific behaviour
- Designed for both **forecasting** and **scenario** studies
- *EAPD can provide WEFM files to external users with modeling expertise on request*

Global Economic Monitoring Branch: WEFM short-term forecasting tool

- Designed to supplement WEFM
- Methodology developed to strengthen the rigor and consistency of UN short-term forecasting for key macro indicators (GDP, inflation, unemployment, …)
- Useful for monitoring countries with limited data
- Methodology is easily adapted to monitor SDG indicators
- But successful application relies on research to identify correlated high-frequency series
- *EAPD can provide a template set of files that run in EViews*

What makes a good forecast?

- Good data
- Good model
- Good judgement

EAPD nowcasting procedure

Nowcasting procedure

1. Identify target variable of interest
2. Identify higher-frequency series that have data extending beyond target series endpoint
3. Estimate series of equations using mixed frequency techniques
4. Combine forecasts using Kalman filter
5. Assess
6. Choose final models and produce forecast

Mixed-frequency data sampling estimation (MIDAS)

- Data sampled at different frequencies can be used in the same regression
- Useful when dependent variable is sampled at a lower frequency than 1 or more regressors

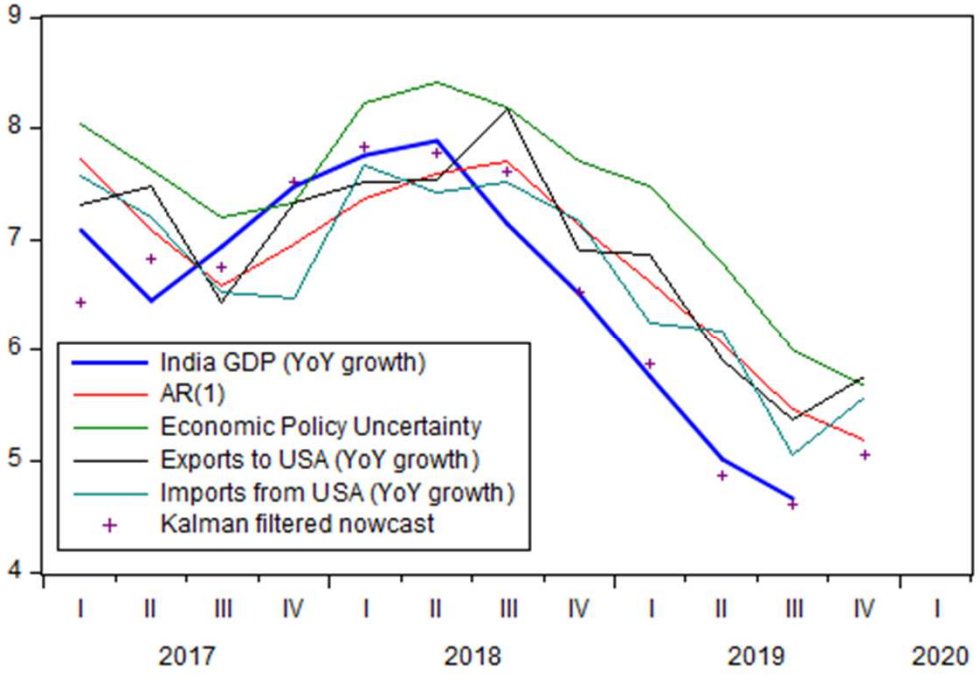
Kalman filter for forecast averaging

- Kalman Filter/Time Varying Coefficients model, regresses fitted values from estimated MIDAS equations on historical target variable
- Loosens restriction that weights on different forecast models are stationary

Example: India 2019Q4 and FY2019 GDP growth

- Monthly determinants: Economic Policy Uncertainty Index, U.S. bilateral Exports, U.S. bilateral Imports
- Methods (FQ): Kalman filtered MIDAS regressions, AR(1)
- Method (FY): MIDAS regression with Kalman filtered quarterly estimate as higher-frequency determinant

Example: India 2019Q4 and FY2019 GDP growth



Sspace: KALMAN_SS
Method: Maximum likelihood (BFGS / Marquardt steps)
Date: 01/23/20 Time: 12:04
Sample: 1970Q1 2030Q4
Included observations: 244
Valid observations: 67
Failure to improve likelihood (non-zero gradients) after 24 iterations
Coefficient covariance computed using outer product of gradients
WARNING: Singular covariance - coefficients are not unique

	Coefficient	Std. Error	z-Statistic	Prob.
C(2)	-358.5920	NA	NA	NA
C(3)	-29.09107	NA	NA	NA
C(4)	-15.34309	NA	NA	NA
C(5)	-2.588417	NA	NA	NA

	Final State	Root MSE	z-Statistic	Prob.
SV1	4.161051	0.822329	5.060078	0.0000
SV2	1.105193	0.561838	1.967101	0.0492
SV3	0.009705	0.397224	0.024431	0.9805
SV4	-1.226941	1.938857	-0.632817	0.5269

Log likelihood	-168.9437	Akaike info criterion	5.162498
Parameters	4	Schwarz criterion	5.294121
Diffuse priors	4	Hannan-Quinn criter.	5.214581

Discussion

Open questions

- How to identify useful higher-frequency indicators?
- How to report confidence/uncertainty about the nowcasts?
- How to expand this methodology to other economic and social indicators of interest?

Thank you for your attention!

More info:

www.un.org/development/desa/dpad/document_gem/global-economic-monitoring-unit/

Contact:

Slotman@un.org