Global Projection Model for a Small Open Economy (GPM+)

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Roadmap

- GPM seen as a Process
- Ingredients of the forecasting process
- The model behind GPM+
- Next steps
- Application to Mexico

GPM seen as a Process

- Develop of a consistent approach to:
  - economic monitoring,
  - forecasting and possibly to policy analysis (FPAS)
- Communication tool to help in:
  - Improving policy dialogue within the team
  - Engaging in a more fruitful policy dialogue with authorities

Ingredients of the forecasting process

- Economic Consistency
- Economic Engineering

Consistency is key in Monitoring and Policy Evaluation

– Internal: Economic structure provides vital guidance for policy analysis

- Models help to illustrate our judgment (theory plus data)
  - ‘all models are wrong, some are useful’. George Box

– External : Trade and Financial linkages of superb importance

– Dynamic: Provide discipline over time

Careful thought should be put into designing a FPAS. We envisage ***the engineering aspect of the FPAS*** to contain:

1. Conjectural analysis (backasting and nowcasting).
   ~ 2 quarters

2. Policy Evaluation for the short-run (forecasting).
   ~ 6 to 10 quarters

3. Policy evaluation for the medium and long-run.
   ~ 10+ quarters

1. STFS (suite of short term indicators to pin down initial conditions for GPM)

2. GPM and GPM+ (model based projection to pin down the medium term)

3. G20Mod and GIMF

Model Evaluation is an Essential Element of the GPM project

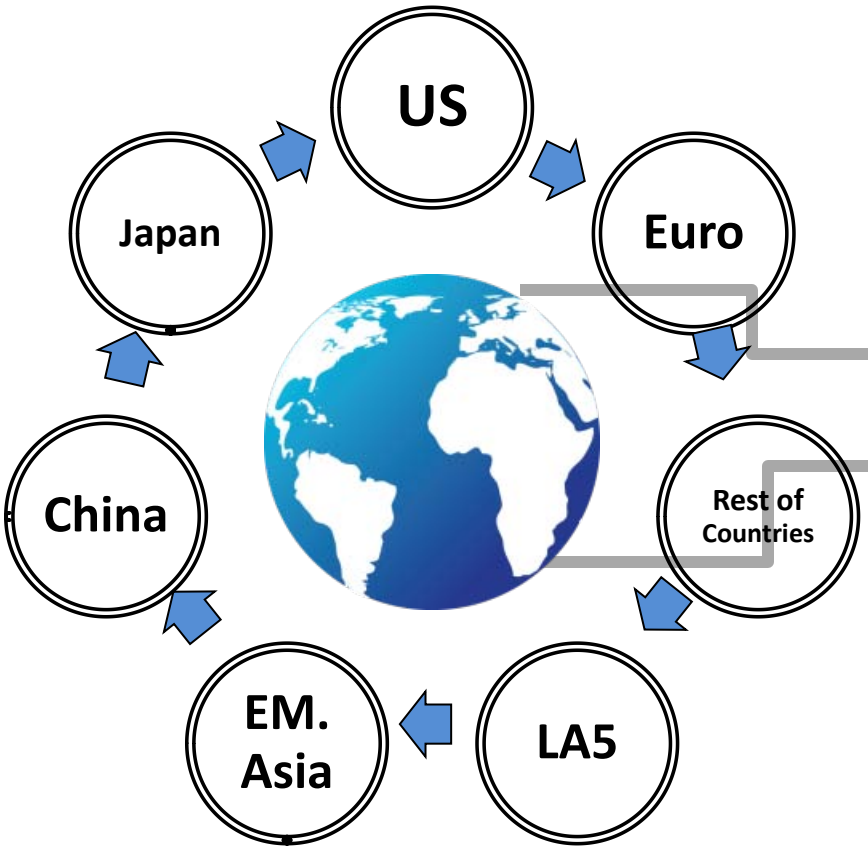
- Statistical vs. Economic Evaluation
  - Economic = evaluation of moments with economic interpretation
    - Stylized facts relative to model implications (Episodic studies and shock decomposition)
    - IRFs that make sense
  - Statistical
    - tests of over identifying restrictions
    - prediction errors of the model
- A good model
  - A tool with internal consistency that helps focus policy discussion around interpretation of economic causality ("stories")

Useful principles required to build a model

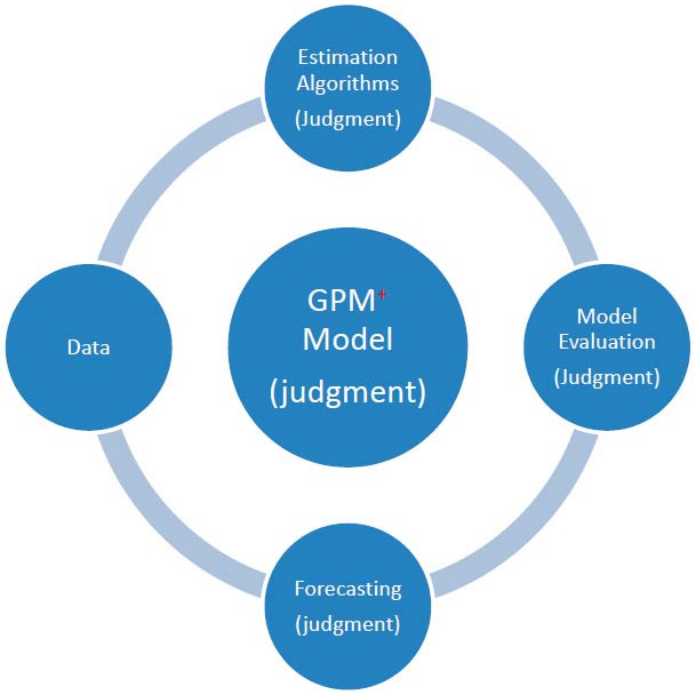
1. Build deeper structural DSGE models for research and policy analysis, but be pragmatic in developing a core projection model for forecasting and policy analysis
2. Recognize the important role of judgment
3. Recognize uncertainty explicitly but try not to suffer from uncertainty paralysis

The model behind GPM+

GPM at the Global Level



GPM + within the GPM world



The model

A Stochastic Processes

A.1 Potential Output

$$\overline{Y}_{i,t} = \overline{Y}_{i,t-1} + g_{i,t}^{\overline{Y}}/4 + \varepsilon_{i,t}^{\overline{Y}} \tag{1}$$

$$g_{i,t}^{\overline{Y}} = \tau_i g_i^{\overline{Y}_{ss}} + (1-\tau_i) g_{i,t-1}^{\overline{Y}} + \varepsilon_{i,t}^{g^{\overline{Y}}} \tag{2}$$

A.2 NAIRU

$$\overline{U}_{i,t} = \overline{U}_{i,t-1} + g_{i,t}^{\overline{U}} + \varepsilon_{i,t}^{\overline{U}} \tag{3}$$

$$g_{i,t}^{\overline{U}} = (1-\alpha_{i,4}) g_{i,t-1}^{\overline{U}} + \varepsilon_{i,t}^{g^{\overline{U}}} \tag{4}$$

A.3 Equilibrium real interest rate

$$\overline{RR}_{i,t} = \rho_i \overline{RR}_{i,SS} + (1-\rho_i)\overline{RR}_{i,t-1} + \varepsilon_{i,t}^{\overline{RR}} \tag{5}$$

A.4 Equilibrium real exchange rate

$$LZ_{i,t} = 100 * log(S_{i,t} P_{us,t}/P_{i,t}) \tag{6}$$

$$\Delta LZ_{i,t} = 100 \Delta log(S_{i,t}) - (\pi_{i,t} - \pi_{us,t})/4 \tag{7}$$

$$\overline{LZ}_{i,t} = \overline{LZ}_{i,t-1} + \varepsilon_{i,t}^{\overline{LZ}} \tag{8}$$

B Behavioral equations

B.1 Output Gap

$$y_{i,t} = \beta_{i,1} y_{i,t-1} + \beta_{i,2} y_{i,t+1} - \beta_{i,3} rr_{i,t-1} + \beta_{i,4} z_{i,j,t-1} + \beta_{i,5} \sum_j \omega_{i,j,5} y_{j,t-1} + \varepsilon^y_{i,t} \tag{9}$$

B.2 Inflation

$$\pi_{i,t} = \lambda_{i,1} \pi_{i,t+1} + (1 - \lambda_{i,1}) \pi_{i,t-1} + \lambda_{i,2} y_{i,t-1} + \lambda_{i,3} \sum_j \omega_{i,j,3} (z_{i,j,t} - z_{i,j,t-1}) - \varepsilon^\pi_{i,t} \tag{10}$$

B.3 Policy Interest Rate

$$I_{i,t} = (1 - \gamma_{i,1}) \left[\overline{R}_{i,t} + \pi 4_{i,t+4} + \gamma_{i,2} (\pi 4_{i,t+3} - \overline{\pi}_{i,t+3}) + \gamma_{i,4} y_{i,t} \right] + \gamma_{i,1} I_{i,t-1} + \varepsilon^I_{i,t} \tag{11}$$

$$\overline{\pi}_{i,t} = \overline{\pi}_{i,t-1} + \varepsilon^{\overline{\pi}}_{i,t} \tag{12}$$

B.4 Uncovered Interest Parity

$$(RR_{i,t} - RR_{us,t}) = 4(LZ^e_{i,t+1} - LZ_{i,t}) + (\overline{RR}_{i,t} - \overline{RR}_{us,t}) + \varepsilon^{RR-RR_{us}}_{i,t} \tag{13}$$

$$LZ^e_{i,t+1} = \phi_i \; LZ_{i,t+1} + (1 - \phi_i) \; LZ_{i,t-1} \tag{14}$$

B.5 Unemployment Rate

$$u_{i,t} = \alpha_{i,1} u_{i,t-1} + \alpha_{i,2} y_{i,t} + \varepsilon^u_{i,t} \tag{15}$$

Next steps

- Cover more countries (Currently we have: Canada, Mexico, Brazil, Chile, Turkey, Poland, Indonesia, Singapore, Korea and Australia. Work is underway for the U.K., Norway, Sweden, Philippines, Armenia)

- Introduction of Commodities (Australia)
- Financial Linkages
  - International: Similar to GPM
  - Domestic:
    - Lending rate in output gap equation
    - New behavioral equation for the bank lending spread
    - Identity connecting policy rate and lending rate
- More disaggregate aggregate demand
- Managing of exchange rate intervention (Singapore)

Application to Mexico

1. Stylized Facts
2. Source of shocks hitting the country
3. Monetary Policy Regime