Discussion of
“General equilibrium model of Bank Indonesia (GEMBI) 2007”

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Overview of the paper

- **BI experience: practical DSGE modelling**
  - Oriented towards policy issues: theory & reality
  - Emerging economy features: complexity
  - Large & frequent changes in economic structure
  - Transition dynamics vs. steady state

- **Great efforts & progress**
  - Well-conceived & developed
  - Impulse responses to important shocks
  - Very interesting findings
DSGE Modeling in Central Banks

● Canonical models
  • Christiano, Eichenbaum & Evans (2005)
  • Laxton & Pesenti (2003)
  • Smets & Wouter (2003)

● Why DSGEs at central banks?
  • Better policy analysis
  • Better forecasts, or both

● Some examples
  • BEQM, MAS, NEMO, RAMSES, ToTEM
  • Many CBs have DSGE(s), some use a DSGE as benchmark
GEMBI: features I

● Six sectors (complex GEMBI)
  ➢ Household; Firms (intermediate/importers & final): agriculture; Banking; Government (FA & BI);
    External sector (ROW)
  ➢ Complex: 33 equations, 43 parameters

● Rich & interesting features
  ➢ Optimisation-based model, hybrid expectations
  ➢ General equilibrium with clear transmission
  ➢ Heterogeneous households (complex version)
  ➢ Agriculture; Commodity producers
GEMBI: features II

- **Core inflation**
  - Unconventional definition: interpreted as PPI
  - But really: less volatile component here
  - Permanent-transitory decomposition

- **Separate budget constraints for CB & FA**
  - CB balance sheet concerns can lead to indeterminacy or instability
  - Issuing CB bills without fiscal backup can lead to balance sheet constraints on policy: $B^G \neq B^{CB}$
  - Definition of fiscal rule (spending): taxation
  - Analysis of zone of indeterminacy & instability
Rigor-fit tradeoff: DSGE free lunch?

- **Theoretical rigor & goodness of fit**
  - *Theoretical consistency*: compelling story?
  - *Data coherency*: good fit?
  - Parsimony (theory) & complexity (reality): good compromise?

- **Theoretical consistency?**
  - Completely specified, economy-wide, *probabilistic* model for observed time series

- **Good fit to data & superior forecasts?**
Structural GEMBI?

● Is GEMBI model structural?
  ➢ Immune from Lucas Critique?

● Shocks & frictions: “wedgeology”
  ➢ Examples: habit formation, adjustment costs, Calvo-Yun price & wage devices, judgment
  ➢ Shocks “structural” or statistical necessity? Micro-founded frictions? Why 1\textsuperscript{st}-order AR process? Why independent source of variations in DSGE?
  ➢ Wedgeology (Hansen & Sargent 2008): adjustment for risk or uncertainty?
Taking GEMBI to data I

- **Is GEMBI model data-consistent?**
  - Beyond calibration: estimated GEMBI
  - Immune from Sims Critique?

- **Shocks & frictions: add factors**
  - Remedy for empirical failures of baseline DSGE? more interesting dynamics? Better fit?
  - Sims (2008): “add enough sources of friction and inertia … so that it can fit the complex behavior we see in data” but this “strains the credibility of the claims to complete behavioral interpretation”
  - Does the model detect structural changes?
Taking GEMBI to data II

- Bayesian estimation of GEMBI
  - Posterior too close to prior

- Usefulness - focus
  - More on medium-size estimable GEMBI
  - Less on model forecasts
  - DSGE advantage: understanding the mechanism
  - Weak identification & small samples, data quality
  - Great uncertainties with model, parameter estimates & data: other models & data analysis
Taking GEMBI to reality I

- A changing world?
  - Large, persistent shocks to commodity prices
  - Shocks from some advanced industrial economies
  - Possibility of stagflation & frequent crises, 1970s style

- **LPHI events & uncertainty:** avoid large errors
  - Uncertainty typical in EMEs (model, data, parameter)
  - Weak financial-real linkages in models
  - Pervasive nonlinearity: linearisation insufficient
  - Robust monetary policy at turning points: direction of monetary policy?
Taking GEMBI to reality II

- **Assessing GEMBI as a FPAS**
  - Impulse responses (vs. VAR empirics?)
  - Statistical fit (& forecasting performance)
  - Assessment of current state of economy
  - Usefulness for policy decisions

- **GEMBI and policymaking**
  - IT & clarity in monetary transmission
  - Shaping expectations
  - Financial stability as a goal?
  - Policymaking under uncertainty
Making GEMBI work

Do we trust our model?

- Too much is missing in any model (incl GEMBI)
- Assuming stationarity (detrending)? DSGEs often not trusted in lowest frequencies & misbehave in very high frequencies
- Credible & practical model

Use of GEMBI & communications

- How to form and substantiate model forecasts?
- Is the model too complex for decision makers?
- How to communicate model output to public?