



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?

- Smets and Wouters (2003), Edge, Kiley & Laforge (2006), Adolfson, Andersson, Lindé, Villani & Vredin (2006), Adolfson, Lindé & Villani (2007);



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 1st-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?