Comments on:
A Credit and Banking Model for Emerging Markets and an Application to the Philippines
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Congratulations to the authors and BSP for completing this paper, further developing your DSGE model with the inclusion of financial frictions and banking sector for emerging markets and its application to the Philippines.

In general, the model has followed recent methods and techniques common in DSGE modelling with financial friction, in particular the adoption (and modification) of BGG and Gerali et.al.

The model can comprehensively simulate monetary and especially macroprudential policy, including shocks on bank capital, cash reserve requirement (CRR), and statutory liquidity ratio (SLR). In general, the impulse responses from such policies are already well mannered.

I really enjoyed reading this paper. Allow me to give a brief summary on the main points of your paper, followed by some comments.
• The authors argued that the real side of the economy is closely linked to the disturbances in the financial sector, as evident from the global financial crisis.

• **Need to model the supply of credit** to understand business cycle fluctuations, in particular to study the transmission of shocks originating from credit markets.
  → develop a DSGE model with macro-financial linkages and an active banking sector.

• **The model wishes to simulate and analyze:**
  – the effect of conventional and non-standard monetary policy tools
  – the role of banks in propagation of macroeconomic shocks
  – the effects of a tightening of credit conditions

• **Incorporate specific feature of emerging markets** that tend to be bank dominated and prone to surges in capital flows.
  – Allow rigidities in the pass through of policy or money market rates to retail rates.
  – Surges in portfolio flows and liquidity affect firms’ net worth or leverage (“external” finance premium and demand side “financial accelerator” effects)
  – Bank capital and financial stability concerns could impact the supply of credit
  – Incorporate non-conventional monetary policy tools: (i) the use of CRR; and (ii) the use of SLR.
• Capturing interaction between the financial sector and the real economy in the DSGE model:
  – the financial accelerator channel, between the balance sheet of the firms (borrowers) and the real economy; and
  – the banking sector channel, creates a feedback loop between the real and the financial side of the economy through the bank’s balance sheet.

• **Coverage:** only considers the balance sheet effects for firms. Household debt in the Philippines is relatively low compared to corporate debt. Firms finance the majority of their investment using retained earnings and bank finances, as well as a growing portion of capital market financing and foreign debt financing.

• **Main findings:**
  – Financial frictions amplifies the magnitude and the persistence of transitory shocks.
  – Market power of the monopolistic banking sector amplifies the business cycle. However when interest rates are sticky, banking system attenuate the response to shocks.
  – The tightening of credit markets (a persistent negative shock to bank capital) can have substantive effects on the economy.
  – Using non-monetary tools, there is a larger contraction in output and consumption as compared to conventional monetary policy contraction.
This paper follows Gerali et al. (2010) to introduce the banking sector in a model with financial frictions.

- Gerali closed the model by assuming that banks have access to unlimited finance at the policy rate (supposedly from the central bank).
- Interbank market in Gerali operates with wholesale bank as the distributor of funds to loan branch, and collector of funds from deposit branch, pinning down wholesale deposit rate to the policy rate, and adjusting wholesale loan rate by considering capital adequacy ratio.

Hence, extension from Gerali worth noted in this paper is on the addition of interbank borrowing operations other than that specified in Gerali.

However, the mechanism for the interbank market is not described in details. In particular:

- The agent who lends in the interbank market is not specified. Wholesale bank only borrows from the interbank market (as is evident from the maximization problem).
- Further question arises with regard to the clearing of the interbank market.
- As a suggestion for future development, incorporating probability of default (frictions) in the interbank market may provide a mechanism to simulate the effect of financial crisis, which in turn will increase interbank loan rate, and eventually will be transmitted to the real sector.
• Entrepreneurs combine labor hired from households with capital purchased from the capital producers, to produce intermediate goods in a perfectly competitive setting.
• Entrepreneur could borrow from domestic loan and abroad loans to finance capital needed.
• However, the proportion of domestic loan and foreign loan are fixed, and there are no mechanism to reflect the dynamics of each loan, except as an aggregated total loan.

• Philippines’ companies finance the majority of their investment using retained earnings and bank finance, and a fair amount from capital market financing and foreign debt financing. As a result, the Philippines’ corporate sector is exposed to global financing conditions.
• If possible, this issue may be modelled by incorporating the relevant macroprudential policies, such as capital flow management or foreign private debt management.
Comments (Households)

- The authors argued that Household (HH) debt in the Philippines is relatively low compared to corporate debt and corporates still predominantly rely on bank borrowing to finance investment, hence HH debt is not modelled.
- I suggest that HH debt should still be modelled, so that we can study the effect of rationing consumption loan when they are growing to high, as Indonesia have experienced (LTV for automotive and property). Following Gerali et al (2010), this issue can be modelled by differentiating HH into patient (saving) and impatient (borrowing).
- Modeling HH into 2 groups may increase complexity. However, the advantage is that each type of HH can correspond to the bank, either saving or borrowing.
- The macroprudential policy tools commonly used for that matter is loan to value (LTV) ratio.
- Given that HH is modeled only to borrow from abroad, not from domestic, also that both domestic and foreign bonds in the entrepreneur problem are exogenously partitioned, several question arises:
  - How do you infer the interest parity condition under that mechanism?
  - Or rather, do you explicitly include any interest parity condition in your solution?
  - How do relate or explain exchange rate and terms of trade movement under that mechanism?
Comments (NKPC and Macroprudential Policy)

Related to NKPC

• Contrary to advanced countries whose NKPC are usually almost surely forward looking, NKPC for emerging market are fairly backward looking.

• Hence, I suggest that you may employ a hybrid NKPC, combining both forward and backward looking. In Indonesian case, the weight of backward looking component in the formation of inflation is still relatively high, around 0.5 – 0.6.

Related to Macroprudential Policy

• Further development may include endogeneizing macroprudential policy.

• Indonesian experience, using a small scale semi-structural DSGE model, we are able to mix monetary policy (Taylor Rule) and macroprudential policy (LTV Rule) endogenously.

• Monetary Policy – Taylor Rule

\[ i_t = \gamma_1 i_{t-1} + (1 - \gamma_1)(\bar{i}_t + \gamma_2 \hat{\pi}^{CPI}_t + \gamma_3 \hat{y}_t) + e^i_t \]

• LTV Rule

\[ \hat{ltv}_t = \mu_1 \hat{ltv}_{t-1} + (1 - \mu_1)(-\mu_2 \hat{dcr} 4_t) + e^{ltv}_t \]
Small Scale Semi Structural Model: Taylor Rule and Macroprudential Rule (Indonesian Case)

Result and Analysis:
Output Gap Shock (1%)

Note: “Existing” is an ARIMBI model without macroprudential policy
Result and Analysis:
Credit Gap Shock (5%)

Note: “Existing” is an ARIMBI model without macroprudential policy
The authors acknowledged that parameter selection for the model is a challenging task. There is no consensus on the values of some parameters, and for the banking parameters no corresponding estimates are available in the literature. Moreover, most of the parameters used in the literature are based on micro data from advanced countries.

Hence, the authors approach is three pronged:
- calibrate the parameters in the model that determine the steady state based on findings from previous studies on emerging markets and historical data for the Philippines
- use the values estimated in Anand et al (2010) to calibrate the parameters which determine the dynamic properties of the model
- calibrate to match historical averages for banking sector parameters

If possible, it would be better to combine the calibration approach with Bayesian estimation, in order to better capture the dynamics of Philippines’ economy.
• To better capture the dynamics and inner working of the financial accelerator mechanism, I suggest that in the future you may try to use the concept proposed by Zhang (2010), “Bank Capital Regulation, the Lending Channel and Business Cycles”.

• Adhering to that concept, the idiosyncratic shock threshold is divided into 2 components, namely ex-ante threshold based on bank expectations regarding the return on capital of the entrepreneur and ex-post threshold or the actual return on capital of the entrepreneur.

• The difference between the expected threshold (ex-ante) and realised threshold (ex-post) (which can be interpreted as the prediction error of the bank) will indicate the difference between expected income and realised income, which represents the portion of the cost borne by the bank.

• This way, principal (bank) is not assumed to be cost-free (in the sense that all cost are borne by agents (entrepreneur and household)). Rather, bank should bear some cost due to their prediction error.

• This will determine bank capital that functions as a buffer stock against the unexpected realization of aggregate return on capital of the entrepreneur, which will subsequently affect the capital adequacy ratio of the bank and compel the bank to manage its asset portfolio. This will eventually be transmitted to the real sector through the lending channel.
Thank You