

## Referee report for

### **“The interaction between monetary and macroprudential policy: should central banks ‘lean against the wind’ to foster macro-financial stability?”**

The author develops an agent-based model to conduct simulations that are meant to explore the potential of monetary policy instruments on the one side, as opposed to macroprudential regulatory type of policies on the other side, to help stabilize the financial system and the economy.

The paper is well written, by and large in a precise and concise manner. In the following I summarize a number of comments (not sorted by relevance, anywhere between major and rather minor).

1. Against a general principle to attempt to reduce the complexity of a model down to a level that is just required for answering a research question at hand, my impression is that the model may be simplified in some respects, without losing its applicability or appeal for the concrete questions the author aims to address.
  - a. The interbank market for banks to trade excess reserves: why not having only the direct connection to the CB for funding purposes (with the CB also serving as a settlement engine for interbank firm and household payments)? My interpretation of the model setting is that the conclusions the author draws may not change from a qualitative perspective.
  - b. Does it need the government agent for the questions at hand?
2. Why are lifetime interest amounts included on the bank balance sheet’s asset side? This overstates the residual equity of the bank at the time of loan origination since only the principal loan amount is created as a deposit. When borrowers pay interest during the lifetime of the loan, then this is a continuous deposit-equity swap on the bank balance sheet, which the author may subtract from the loan+interest due stock on the asset side or not (I assume this is done?). If not, then the lifetime interest would remain on the asset side (and inflate equity) until the end of the lifetime of the loan. Bottom-line: the author shall clarify why lifetime interest is included in the first place on the asset side and how it’s handled throughout the lifetime of the loan, or consider removing it from the asset side to avoid unintended consequences for the model dynamics.
3. In Section 2.4.2 the author states that “the government brings money into the system by issuing bonds...” by “...selling them to the commercial banks”. If by “system” the author means the private sector combined with the banks, then this statement is misleading, since if banks purchase the new bonds out of their existing own funds (reserves), the issuance and purchase doesn’t imply new money creation (nor when private sector agents would purchase them via banks). So the author shall clarify: is it a *bond* (no new money creation upon issuance yet unless required for subsequent transaction purposes that can’t be covered by existing funds in the system) or a *loan* from a bank in which case indeed it is an act of money creation.
4. Concerning the PD and risk weight mechanics in Section 2.10.2: the PDs and therefore the RWs (as they are set equal by the author) appear to be *point-in-time* default probabilities that are measured online throughout the simulation. Three remarks:
  - a. Risk weights are meant to be based on through-the-cycle risk parameter inputs to be less cyclical than PiT parameters (hence for capital requirements to be less cyclical).

The use of PiT parameters may make capital requirements more cyclical than they are in reality.

- b. LGDs are not included in the model: fine, yet the author shall mention explicitly that it's a simplifying assumption to not consider any collateral of the firm loans.
- c. The way the PD/RW mechanism is built into the model does not reflect the rationale of an unexpected loss (beyond an expected loss covered by loan loss provision stocks, which are not covered in the model either).

Point a. I'd call a "major" concern since, as far as I can judge, it may have implications for the findings presented later in the paper which are anchored around risk-based capital ratios. Point b. (LGDs) is a minor point, only worth mentioning though. Point c. is worth explaining, though here not worth designing the model differently (an alternative in principle would be to build the Basel risk formulas directly into the model).

5. Concerning firm bankruptcies (section 2.9): some quick info would be useful about how some outstanding debt of defaulting firms is handled. I assume it's just written off fully from the loan stock and residual equity of the bank, given a 100% LGD assumption in the absence of collateral or recourse to future income flows of the later re-activated firms.
6. The use of Scala to implement the model is mentioned in footnote 22 quite late in the paper. This could be said earlier.
7. It would be useful to include a link (also content-wise) to Annex B in the main text.
8. Page 8, beg. of section 2.4.2: What does the author mean by "overdraft economy"?
9. In section 4.3 the author calls banks "intermediaries". I would avoid this terminology since it doesn't quite square with the money creation view (despite banks also serving as intermediaries even in the money creation world, through bond purchases, but still).
10. The author may consider adding some additional references related to ABMs with monetary policy and/or macroprudential policy assessment focus, endogenous cycles in general, and money creation aspects. Consider e.g. Li et al. (2017), Ryoo (2016), importantly of course Minsky (1986), Ryoo and Skott (2016), Gualdi et al. (2017) and some numerous papers by Werner, starting for example with Werner (2016).

## References

Gualdi, S., Tarzia, M., Zamponi, F. and J.-P. Bouchaud (2017): "Monetary policy and dark corners in a stylized agent-based", *Journal of Economic Interaction and Coordination*, Vol. 12(3), pp. 507-537.

Li, B., Wanting, X., Chen, L. and Y. Wang (2017): "The impact of the liquidity coverage ratio on money creation: A stock-flow based dynamic approach", *Economic Modelling*, Vol. 67, pp. 193-202.

Minsky, H.P. (1986): "Stabilizing an Unstable Economy", McGraw-Hill.

Ryoo, S. (2016): "Household debt and housing bubbles: a Minskian approach to boom-bust cycles", *Journal of Evolutionary Economics*, Vol. 26(5), pp. 971-1006.

Ryoo, S. and P. Skott (2016): "Fiscal and monetary policy rules in an unstable economy", *Metroeconomica*.

Werner, R.A. (2016): "A lost century in economics: Three theories of banking and the conclusive evidence", *International Review of Financial Analysis*, Vol. 46, pp. 361-379.