

# Comments on the paper ‘Optimal inflation target: insights from an agent-based model’

The paper investigates the role of inflation targets in an expectations-augmented version of ABM by Gualdi et al. (2015). The paper clearly stands within the emerging literature on monetary policies in ABMs (see e.g. Salle et al., 2013b,a; Anufriev et al., 2013; Dosi et al., 2015). Similar exercises are very welcome and I totally agree with the authors on the importance to provide alternatives to DSGE models.

Major comments:

- **Expectations rules and learning:** One of the main advantages of ABMs is the possibility to introduce heterogeneity in expectations and realistic learning mechanisms. These are the route taken, for instance, respectively in Anufriev et al. (2013) and Salle et al. (2013b). The paper instead uses a single fixed heuristic, homogeneous across agents. Although, as argued by the authors, this may be a reasonably good first approximation, it becomes important to explore the robustness of the results under different expectations settings. In a realistic scenario, the credibility of the CB (the parameter  $\tau^*$ ) is endogenous and dependent on past information (see e.g. Salle et al., 2013a). Moreover, in the paper past inflation enters in the expectations formula by assuming a naive forecasting heuristic. It would be equally interesting to compare the results assuming different prediction rules (Anufriev et al., 2013). My feeling is that policy conclusions are highly sensitive to the specification of expectations.

Of course, a more realistic characterization of expectations can be left for future extension. However, in this paper I would at least provide a detailed sensitivity analysis for the parameter  $\tau^*$  in both the HIHO and LILO scenarios. This will strengthen the transparency of the model. Are low inflation targets still detrimental under various degrees of CB’s credibility?

- **The economic intuition:** The main result from the model is that low inflation targets are often detrimental for the economic system. More discussion on the underlying economic intuitions is needed. For instance, it is not clear why there is a non-monotonic behaviour of unemployment in the LILO scenario. Why, within certain ranges, higher targets do not reduce unemployment?

- **The terminology:** The authors define  $\rho^*$  as the ‘natural’ interest rate. However, differently from DSGE models, here the natural interest rate is simply an exogenous parameter, it bears no relation to economic fundamentals. For the sake of clarity, I would either use an alternative definition or briefly discuss the differences with the notion embedded in DSGE models.

Similarly, the paper refers to ‘optimal’ inflation targeting. This may misleadingly suggest the existence of an invariant strategy to maximize some well-behaved welfare function. To my mind, the paper is more about the effectiveness of inflation targeting in reducing unemployment. In fact, there is no reference to an optimal value for  $\pi^*$ . Probably the term ‘effectiveness’, rather than ‘optimality’, may be more appropriate.

Finally, I find the definition of ‘native’ state a bit misleading. What the paper describes is a state in which the CB does not act to pursue the targeted inflation rate. The term native would instead suggest the absence of a CB. On the contrary, in the state described, agents expectations are affected by the CB target ( $\tau^* > 0$ ). A clarification on this point would be helpful.

- **Validation:** In ABMs, policy experiments are typically carried out in areas of the parameter space for which the model is validated, i.e. it replicates some empirical regularities and the main variables display plausible variables. As the emphasis of the paper is on policy implications I would devote more space to explore the empirical robustness of the model in the HIHO and LILO scenarios. For instance, in the baseline HIHO setting the unemployment rate is 85%. Is it common for a CB to kick in at such high unemployment levels? Notice that answering similar questions does not imply any form of direct calibration.

Minor comments:

- What happens if a firm default? Is the number of firms fixed? If so, how are new firms initialized? It would be more clear either to explain it directly or to make a reference to previous models.
- I would describe in the appendix how  $p^d$  and  $p^l$  are determined (although already present in Gualdi et al., 2015). The transmission mechanism of monetary policies is an important part of the model and is not directly deducible from the pseudo-code.
- Use larger labels in figures 1, 2, 3 and 4. The superscript \* is not readable.
- The superscript *EMA* for  $\tau^{EMA}$  is a bit misleading. It may seem that the parameter is itself computed as a moving average.

## References

- Anufriev, M., Assenza, T., Hommes, C., and Massaro, D. (2013). Interest rate rules and macroeconomic stability under heterogeneous expectations. *Macroeconomic Dynamics*, 17(8):1574–1604.
- Dosi, G., Fagiolo, G., Napoletano, M., Roventini, A., and Treibich, T. (2015). Fiscal and monetary policies in complex evolving economies. *Journal of Economic Dynamics and Control*, 52:166–189.
- Gualdi, S., Tarzia, M., Zamponi, F., and Bouchaud, J.-P. (2015). Tipping points in macroeconomic agent-based models. *Journal of Economic Dynamics and Control*, 50:29–61.
- Salle, I., S en egas, M.-A., Yildizoglu, M., et al. (2013a). How transparent about its inflation target should a central bank be? an agent-based model assessment. *Cahiers du GREThA*, (2013-24):1–41.
- Salle, I., Yildizođlu, M., and S en egas, M.-A. (2013b). Inflation targeting in a learning economy: An abm perspective. *Economic Modelling*, 34:114–128.