

Review of “Optimal Inflation Target: Insights from an Agent-based Model”

The authors present a stylized agent-based model to study the effects of a single mandate monetary policy and in particular of the value of inflation targets. The adopted methodology is quite interesting. In particular, the authors first consider the case of an inactive central bank (the CB rate is set equal to the so-called natural interest rate) where they show the emergence of two so-called “native states”, characterized respectively by high inflation and high output (HIHO) and low inflation and low output (LILO). These two native states emerge for particular values of the two key parameters, i.e. the natural interest rate and the ratio between hiring and firing propensities. Then they study the effects of introducing an inflation targeting monetary policy rule with different values for the inflation target. The main result is that the simulated economy reaches sufficiently low levels of unemployment only for the highest values of the inflation target in the range considered, in particular for values of the target higher than the well-known target of 2 %. According to the authors, this result essentially depends on the real interest rate, which is lower for higher values of the target and the consequent positive effect on consumption.

I think that the main strength of the paper is the methodological approach concerning the identification of the two native states of the economy. On the other hand, I think that the paper fails short in many respects, both regarding the model structure and its presentation, that need to be addressed and strongly supported before considering a possible publication. In particular, the following issues deserve further explanation:

1. The Taylor rule used by the authors is actually not the correct one, at least the one presented in Eq. 1 (pag. 202) of Taylor (1993). The key difference is that in the equation used by authors, Eq. 4 pag. 3, the stand-alone inflation term is missing. The missing term leads to lower than needed value of the CB rate and is crucial for the results, considering the narrative made by the authors based on negative interest rates on deposits. I mean, if the Taylor rule used would be the correct one, probably interest rates would never be negative... My advice to the authors is to consider the correct rule and run again all experiments accordingly.
2. The setting of interest rate on deposit, ρ^d , which I guess should mainly depend on the CB base rate, is not reported in the paper, while another reference is cited for further details. However, considering the key relevance of the dynamics of ρ^d for the correct interpretation of results (see also my previous point), I think that all the necessary details about the determination of ρ^d should be provided also here.
3. The price and wage setting mechanism looks too much ad hoc and is not supported by any literature. In particular, what is a bit disturbing is that the price setting mechanism does not consider in any way costs, contrary to much of the standard literature on mark-up price setting in agent based models, also supported by empirical research. It is true that the wage setting mechanism takes into account costs, yet indirectly, through profits; however it worth noting in this respect that wage setting, differently from price setting, is not in the full control of firms, while is more subject to bargaining to individual workers or labor unions. My advice to authors is either to strongly support their modelling choice by means of relevant behavioural literature about firms and/or empirical research either to reconsider the two mechanisms.
4. Despite the authors literally cite “firm investments” at least once, see pag. 6, “The transition is driven by a drop both in household consumption and firm investments, induced by the high yield on savings and high cost of loans.”, from the model’s description it looks like that firms do not make any investment. Actually, this is consistent with the fact that labour is the only factor of production. This is quite disturbing indeed. The model is stylized but, considering the rapid development of agent-based macro in recent years and given present agent-based macro models in the literature, I think that at least a basic form of (physical) capital investment by firms should be addressed. It is worth noting in fact the relevance of investments for the business cycle and the strong relation between investment decisions and cost of capital, i.e. interest rates. My suggestion to authors is either to strongly motivate the choice to overlook

investments and explain why they do not matter for their study either to enrich the model by considering some investment decision making by firms and related features.

Finally, I have some further minor comments:

1. Eq. 7: if the cash balance is positive, then is financial fragility set to be zero by default? Please, specify in the formula.
2. Eq 5 and Eq. 10: the superscript "ema" over the ρ^{ell} is not explained, thus it is not clear what is the difference, if any, between ρ^{ell} and $\rho^{\{\text{ell},\text{ema}\}}$
3. is the price/wage setting mechanism the only source of stochasticity in the model in? Please, clarify and say if the range of random variables has a meaningful impact on results.
4. Section III, pag. 6: why in the absence of an active CB, the implicit target inflation is $\pi^* = \rho^*$? Isn't $\Phi_{\{\pi\}} = 0$ consistent with any inflation target?
5. Why not calling HIHO, LILO,... "regimes" instead of "states". I understand the parallel with physics (e.g. liquid state, solid state, etc...), but in dynamical systems, as the model is, a state is a set of values of "state" variables, i.e. of the basic set of dynamic variables, not of parameters as in the case of the model. In this respect, "regime" is probably more appropriate in this context than "state" -
6. Please, include a table about all the parameters of the model, including the symbol, the parameter description and the value/values or range of values (with the spacing) assumed in relation to the computational experiments.

References

Taylor, John B. (1993). "Discretion versus Policy Rules in Practice". *Carnegie-Rochester Conference Series on Public Policy*. 39: 195–214. <https://web.stanford.edu/~johntayl/Papers/Discretion.PDF>