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# Economic modelling without the NAIRU: introducing hysteresis in an agent-based framework

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## Résumé

Mainstream models suppose that in the long run the economy reaches a stationary state, where the key variables are fully independent of path followed by the system in the short and medium runs. As a consequence, demand factors have no long-lasting influence and only supply-side factors matter. This is the case in the the DSGE models as well as in the "matching models" meant to represent functioning of the "labour market". Unemployment reaches the NAIRU in the long-run and the latter is only influenced by supply-side factors, that is, Friedman's  $z$  variables: unemployment protection legislation, flexibility, the replacement ratio, etc. The economic policy consequences are that only "structural reforms" can reduce unemployment in the long run. The current "internal devaluation" policies led in most of European countries is a direct illustration of the damages causes by NAIRUvianism.

And yet, the empirical evidence supporting the existence of the NAIRU is, at best, weak (Stanley, 2004; Storm & Naastepad, 2012). If the NAIRU does not exist, there is no such thing as a long-run independent of short-run fluctuations and demand and the system becomes path-dependent. In the presence of genuine hysteresis, the changing equilibria will depend on the history of the system, that is, on the history of past shocks - there is no such thing as a stable stationary state. The dynamics of the system takes place in what Robinson calls "historical time": the most important steps taken towards the future will change the future, and there is no such thing as a NAIRU.

Another important effort in the "struggle to escape" stationary sate DSGE-like models has been led by researchers working on Post-Keynesian agent-based models with bounded rationality and endogenous money (Seppacher, 2011). There are multiple common features between agent-based models and hysteretic models: agents are heterogeneous, their rationality is bounded, the macroeconomic behaviour differs from the behaviour of its parts, ... Yet, to our knowledge, these two kinds of research have never been combined up to the present stage.

The main contribution of this paper is to bridge this gap by introducing hysteresis in a Post-Keynesian, stock-flow consistent agent-based model. We use Jamel (Java Agent-based MacroEconomic Laboratory), the cross-platform macroeconomic simulator developed by Pascal Seppacher (2011), to study the macroeconomic consequences of introducing hysteresis at the microeconomic level. In our model, firms adjust their demand for labour discontinuously on the basis of the current demand addressed to them (as represented by their current stock level): if the demand reaches a certain threshold, the firm hires an employee, and if it goes

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below another threshold it fires an employee. All firms are heterogeneous because the various thresholds for the various jobs fully differ from one firm to another, and from one job to another.

We compare the macroeconomic results obtained in the presence of firms discontinuously adjusting their labour demand with the baseline scenario, where firms adjust their employment level continuously. We examine the consequences of the presence of hysteresis on the macroeconomic dynamics of the dynamic path followed by the model, and in particular on the changes in prices, wages, inflation growth and unemployment over time. In our model, there is no reason why the key variables, and in particular unemployment, should go back to any NAIRU-like pre-determined equilibrium. We draw the economic policies consequences.

**Mots-Clés:** agent, based modelling, path dependency, hysteresis, economic policies