

Price formation, income inequality and macroeconomic performance as coevolutionary phenomena in an agent-based model

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The pricing decision of the firms is crucial to them and the whole economy. Microeconomically, it determines the competitiveness of goods sold by companies and their profit. Macroeconomically, it directly affects the functional income distribution and the inflation rate, and indirectly affects the whole economy. Structural post-keynesian models usually assume that firms follow a markup pricing strategy. The markup either is given exogenously or evolves given the bargaining power of firms and workers. Micro-data and surveys identified that pricing behavior is marked by heterogeneity among firms and sectors and that it depends on the interaction among many different agents. Workers and consumers, but also the interaction within the firms. The objective of the present paper is to observe if some pricing behavior of the firms becomes dominant in the model or if heterogeneity is among the firm's pricing strategies. Also, we tested if economic policies can change the strategies distribution among the firm's population.

We developed a stock-flow consistent PK-ABM model to study how heterogeneity in pricing strategies evolves. The model has the usual agents found in the macroeconomic ABM literature: a consumer goods sector, a capital goods sector, a financial sector, households that consume and sell their workforce, a capitalist sector that receives dividends and interests, and a government. The novelty of our model is that firms may follow different pricing strategies and continually revise their behavioral parameters using an evolutionary switching protocol. We assume that firms have limited information about the market conditions and continuously adapt their pricing strategies searching to increase their profit rate. We assume that firms can adopt four different pricing strategies: a cost-based rule with a fixed markup, a cost-based rule with a flexible markup sensible to demand, a cost-based rule with a flexible markup sensible to the market-share or to follow the competitors' pricing. The heuristics were modeled considering the post-keynesian pricing literature, the pricing models adopted in ABM models and empirically regularities observed in micro-data and surveys with firms managers.

Firms are also free choose how sticky are their prices and continuously revise their behavioral parameters. Therefore, the behavioral parameters of the firms are endogenous and, in consequence, their markup and prices. Given that these results affect the inflation dynamics and the real value of wages, it turns out that the macroeconomic results are endogenous and result from a co-evolutionary interaction of macro and micro variables.

The parameters of the baseline model are estimated by matching the statistical moments of the model variables with reasonable results that can be found and economic time-series. Although the model allows that all the firms can converge to adopt one unique pricing strategy, the simulations results shows that the heterogeneity in pricing heuristics among the firms is a persistent emergent phenomenon. We also discuss the macroeconomic results and how sensitive they are to changes in the model parameters. Finally, we tested if monetary and fiscal policies affect the distribution of strategies among the firms through changes if the policy parameters of the model.

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