Validation of Agent-Based Models in Economics and Finance

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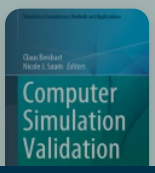

Computer Simulation Validation

and (iii) parameter space exploration. Finally, we discuss open issues in the field of ABM validation and estimation. In particular, we argue that more research efforts should be devoted toward advancing hypothesis testing in ABM, with specific emphasis on model stationarity and ergodicity.

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calibration approach proposed by Werker and Brenner (2004); Brenner and Werker (2007) and the history friendly models developed by Malerba et al. (1999).

3. In that there is a major departure with respect to neoclassical models, where the (representative) agent has axiomatic preferences and maximizes some smooth objective function with an easily computable bliss point.

4. This is also one of the critiques that is usually addressed to ACE. Since ABMs do not stick to some generally accepted axiomatic rule of behavior, they introduce discretionary choices that the modeler shall take. We will see how practitioners have coped with this issue in Sect. 31.4.2.1. A possible solution to discipline the construction phase of an ABMs has been put forward by Grimm

9. See also Secchi and Seri (2017) on the issue of selecting the number of times a computational model should be run.

10. Level 0 models can be somehow accepted if their aim is merely exploratory rather than descriptive.

11. See, for example, Dosi et al. (2010, 2013, 2015, 2016a) for replication of business cycle and growth stylized facts; Dosi et al. (2017a) for accounting of labor-market micro and macro regularities; Popoyan et al. (2017) for the reproduction of many credit and interbank market properties; Lamperti et al. (2018a, b) for capturing coevolution of economic fundamentals with energy and emission quantities; Pellizzari and Dal Forno (2007); Leal et al. (2016) for

17. For other interesting approaches on pattern-based validation see Barde (2016b) and Marks (2018).

18. VAR-LiNGAM stands for Vector Autoregressive Linear Non-Gaussian Acyclic Model.

19. Coupling NOLH with kriging meta- modeling has been frequently used to approximate the output of computer simulation models (see, for example, McKay et al. 1979; Salle and Yıldızoğlu 2014; Bargigli et al. 2016).

20. The interested reader might want to look at Thiele et al. (2014) for a cookbook guiding model exploration and sensitivity and Grimm et al. (2005) for a pattern-oriented approach at model building and evaluation.

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