



Università
Ca' Foscari
Venezia

PROJECT ACRONYM AND TITLE: At the frontier of agent-based modelling: a new data driven framework for policy design toward sustainable and resilient economies.

FUNDING PROGRAMME: PRIN 2020

HOST DEPARTMENT: Department of Economics

SCIENTIFIC RESPONSIBLE: Andrea Teglio

FINANCIAL DATA:

Project total costs	Overall funding assigned to UNIVE
€508.347,00	€ 82.500,00

ABSTRACT:

In this project, we propose a novel data-driven modelling approach to evaluate economic policies, with an empirical focus on Italy and with an application to climate change mitigation policies. It builds upon the idea of combining the flexible, realistic, and disaggregated structure of agent-based models with the coherent and consistent data framework provided by the Social Accounting Matrix. To do that we need to address several challenges both on the modelling and on the data representation side. Concerning modelling, we need to face the challenge of letting the model dynamically interact with data. On the data side, we have to integrate and harmonize several data sources in a framework that can serve and guide the development of the model. We identify the key for succeeding in a continuous and bidirectional feedback between data analysis and model building. In particular, we propose a novel approach in structuring data, called multi-agent Social Accounting Matrix (MASAM). It consists in a new data framework where the national social accounting matrix is linked with a set of granular information on firms and households, in terms of both stocks and flows, and where financial and environmental aspects are described. This detailed data structure dynamically interacts with the model via advanced estimation, data assimilation, and validation techniques drawn from the statistical learning domain. The main test-bed for evaluating the performance of the model will be its out-of-sample forecasting accuracy of macroeconomic variables of interest. Indeed, the predictive performance of the model will be continuously assessed. In this way, we plan to promptly intervene, spotting and correcting the inconsistencies that arise. A large body of theoretical investigation will be devoted to understanding the proper level of disaggregation that the model needs to provide accurate forecasts. Once a correctly calibrated model with high predictive accuracy is available, we can perform stress-tests on the resilience of the Italian economy to various shocks, providing accurate quantitative predictions on the outcomes of different sets of policies in the short-medium run. At the same time, we will be able to provide realistic scenario analyses, simulating the behavior of the economy over longer time horizons. Given the relevance and the global concern on the topic, we apply our framework to economic policies aimed at tackling climate change. In particular, we will investigate the consequences of fiscal and monetary policy reforms, aimed at mitigating the environmental effects of economic activity on the Italian economy. We believe that our effort toward the development of a consistent data-driven framework for agent-based modelling may constitute an important contribution to both scientific debate and policy making, especially considering the fundamental challenges the world is facing.

PARTNERSHIP:

1	Università degli studi di Macerata	Macerata (IT)	Coordinator
2	Università "Ca' Foscari" VENEZIA	Venezia (IT)	Partner
3	Università degli studi di GENOVA	Genova (IT)	Partner
4	Scuola Superiore di Studi Universitari e Perfezionamento Sant'Anna	Pisa (IT)	Partner