

## **LUCA EDUARDO FIERRO**

### **Office Contact Information**

Sant'Anna School of Advanced Studies - Pisa  
Piazza Martiri della Libertà, 33  
Pisa, 56127, Italy

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### **Research Field**

Macroeconomics, Income & Wealth Inequality, Monetary Economics, Ecological Economics, Technological Change, Agent-Based Modeling

### **Academic Positions**

Postdoctoral Research Fellow, Sant'Anna School of Advanced Studies, 2021- current  
Postdoctoral Research Fellow, Marche Polytechnic University, 2020-2021

### **Visiting Positions**

Visiting Researcher, International Institute of Applied System Analysis (IIASA), 2023  
Visiting Ph.D. student, University of Oxford, Mathematical Institute and INET Oxford, 2018

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### **Doctoral Studies**

Ph.D., Economics, Università Politecnica delle Marche, 2020  
Dissertation: "*Three Essays in Agent-Based Macroeconomics*"  
Supervisors: Prof. Alberto Russo and Dr. Alessandro Caiani

### **Postgraduate Studies**

M.A., Political Economy, Kingston University, with distinction, 2016  
Dissertation: "*Modeling the Missing Macro Link*"  
Supervisor: Dr. Devrim Yilmaz

M.Sc., Economics, University of Bologna, 2017  
Dissertation: "*Private Debt and Crises: a SVAR approach to Minsky's Financial Instability Hypothesis*"  
Supervisor: Prof. Roberto Golinelli

### **Undergraduate studies**

B.Sc. Economics, University of Bologna, 2012

### **Summer Schools**

The Oxford Summer School in Economic Networks, University of Oxford, 2017  
Applied SFC and Agent-Based Macro Modeling Summer School, University Paris XIII, 2017  
6th FMM International Summer School, 2017

### **Scholarships**

Ph.D. Scholarship, Università Politecnica delle Marche, 2016-2019  
Ph.D. Scholarship, Università di Genova (Rejected), 2016  
Ph.D. fee waiver, New School for Social Research (Rejected), 2016  
ER.GO Scholarship for Master's Degree Abroad, 2015

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## **Invited Talks and Conferences**

DISES seminar series, Ancona, 2023

ABM4Policy, Pisa, 2022

26h FMM conference, Berlin, 2022

34th Annual EAEPE conference, Naples, 2022

CSI seminar series (invited talk), University of Strasbourg - BETA economics, 2022

WEHIA19, London, 2019

New Analytical Tools and Techniques for Economic Policy Making, OECD Paris, 2019

30th Annual EAEPE Conference, Nice, 2018

## **Teaching Experience**

Agent-Based Modeling (Ph.D.), Marche Polytechnic University, 2020-current

Growth and Development of the Italian Economy (undergrad), Marche Polytechnic University, 2020-2021

Macroeconomics (undergrad), Marche Polytechnic University, 2017-2018, TA

Macroeconomics (undergrad), Kingston University, 2016, TA

Macroeconomics (undergrad), University of Bologna, 2013, TA

## **Referee Activity**

Structural Change and Economic Dynamics, Journal of Economic Interaction and Coordination, Italian Economic Journal, The Economic and Labour Relations Review

## **Other Research Experiences**

Research Assistant to Prof. Engelbert Stockhammer, Kingston University.

INET funded project: “*Income Distribution, Asset Prices, and Aggregate Demand Formation, 1850-2010. A Post-Keynesian Approach to Historical Macroeconomic Data*”, 2016

## **Programming and Softwares Skills**

R (good command), MATLAB (good command), Gretl (intermediate), JAVA (good command), C++ (good command), Wolfram Mathematica (intermediate), Dynare (basic), LATEX (good command).

## **Languages**

Italian (native), English (fluent), German (beginner)

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## **Publications**

“*Automation, Job Polarisation, and Structural Change*”, (with A. Caiani and A. Russo). *Journal of Economic Behavior & Organization*, 2022

<https://www.sciencedirect.com/science/article/abs/pii/S0167268122001846>

### **ABSTRACT:**

The increasing automation of tasks traditionally performed by labour is reshaping the relationship between skills and tasks of workers, unevenly affecting labour demand for low, middle, and high-skill occupations. To investigate the economy-wide response to automation, we designed a multi-sector Agent-Based Macroeconomic model accounting for workers' heterogeneity in skills and tasks. The model features endogenous *skill-biased* technical change and heterogeneous consumption preferences for goods and *personal* services across workers of different skill types. Following available empirical evidence, we model automation as a manufacturing-specific, productivity-enhancing, and skill-biased technological process. We show how automation can trigger a structural change process from manufactory to personal services, which

eventually increases the share of high and low- skilled occupations while reducing the share of middle- skilled ones. Following the literature, we label these dynamics as *job polarisation* throughout the paper. Finally, we study how labour market policies can feedback on the model dynamics. In our framework, a minimum wage policy (i) slows down the structural change process, (ii) boosts aggregate productivity, and (iii) accelerates the automation process, strengthening productivity growth within the manufacturing sector.

### **Working Papers**

“*Inequality-Constrained Monetary Policy in a Financialized Economy*” (with F. Giri and A. Russo)  
Under review at the *Journal of Economic Behavior & Organization*, wp is available [here](#)

#### **ABSTRACT:**

We study how income inequality affects monetary policy through the inequality-household debt channel. We design a minimal macro Agent-Based model that replicates several stylized facts, including two novel ones: falling aggregate saving rate and decreasing bankruptcies during the household’s debt boom phase. When inequality meets financial liberalization, a leaning against-the-wind strategy can preserve financial stability at the cost of high unemployment, whereas an accommodative strategy, i.e. lowering the policy rate, can dampen the fall of aggregate demand at the cost of larger leverage. We conclude that inequality may constrain the central bank, even when it is not explicitly targeted.

“*Addressing the Lucas’ Critique in ABMs: the Expectations Formation Problem*”. **Draft available upon request**

In this paper, I will tackle the Lucas’ critique for a specific class of macroeconomic models, known as Agent-Based Models (ABMs hereafter). In particular, I will study if in ABMs it is possible to achieve collective rationality, i.e. aggregate unbiased expectations, despite the impossibility of using rational expectations *a la* Muth. In order to do so, I will experiment with various expectation formation mechanisms coupled with social learning. Results suggest that, under certain conditions, it is possible to achieve unbiased expectations at the aggregate level and that a simple genetic algorithm can sensibly improve agents’ forecasting performances. Moreover, I impose several policy shocks in order to study whether and in which conditions agents adjust to changes in the environment. I found that in general, policies can have an immediatedestabilizing effect, reflected by a spike in the aggregate forecasting error, however, the shock is quickly absorbed as the aggregate expectation error quickly recovers toward zero. This is particularly true when agents learn using the genetic algorithm, suggesting that flexible rules allow agents to cope better with policyshocks and therefore to be somehow *more* immune to the Lucas’ critique.

Such a result is a step forward in the search for a benchmark expectational rule in the ABM literature, moreover, it represents a major departure with respect to the existing literature on the subject.

### **Works in Progress**

“*Macroeconomic Transition Risks in a Hybrid Agent-Based Integrated Assessment Model*” (with S. Reissl, A. Roventini, M. Tavoni, D. Laurent, J. Emmerling, E. Campiglio, F. Lamperti)

“*Make the Pain Go Away: Persistence of Climate Damages in an Agent-Based Integrated Assessment Model*” (with S. Reissl, F. Lamperti, J. Emmerling, M. Tavoni, and A. Roventini)

“*Unaware FED Reactions to Rising Income Inequality: a SVAR Approach*” (with F. Giri , R. Lucchetti, and A. Russo)

“*Whispering in the FED’s Ear, Evidence from Twitter*” (with M. Loproite, M. Puliga, and A. Russo, )

“*DSK-SFC - a Stock-Flow-Consistent Agent-Based Integrated Assessment Model*“ (with F. Lamperti and S. Reissl)

“*Socio-Political Feasibility Assessment of Different Climate Change Mitigation Policy Scenarios. An Opinion Dynamics Model*” (with T. Lackner and P. Mellacher)

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## **Referees**

### **Prof. Andrea Roventini**

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### **Prof. Francesco Lamperti**

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### **Prof. Alberto Russo**

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### **Prof. Mauro Gallegati**

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