March 18th, 2023

National Bureau of Economic Research
1050 Massachusetts Ave.
Cambridge, MA 02138

Dear Professors,

I am writing to apply to the Graduate Student Workshop on Heterogeneous-Agent Macroeconomics. I learnt about this incredible opportunity through NBER Twitter's account and I was encouraged to apply by my professors at Bocconi University, where I am a PhD student in Economics. I believe participating to the workshop would enrich my skills and techniques and improve my research.
By the end of April 2023, I will have completed all the PhD courses and I will start working on my 2nd year paper: the workshop represents the perfect chance to better prepare myself for starting my career as a macroeconomics researcher.

I have always been very keen on numerical techniques and during my academic studies I tried to focus on the estimation and computation of dynamic models. My passion for dynamic programming dates back to my exchange program at KU Leuven where I followed courses in dynamic methods and optimization, taught by leading scholars in the Industrial Organization literature. For my Master's thesis, I used those computational techniques to solve a macro model with uninsurable idiosyncratic income risk and incomplete markets to assess the impact of the pandemic on earnings and wage inequality. To deepen my knowledge of the topics and methods of modern Macroeconomics I successfully completed all the available PhD level Macroeconomics courses at Bocconi. I strongly believe that my dedication to the coursework has given me all the necessary skills, including knowledge of the standard 3-equation New Keynesian model, for active and effective participation in such an advanced workshop.

Currently, my experience as a research assistant is helping me to understand all the practical problems related to solving complex macroeconomic models. With Basile Grassi, I am working on a model with multiple sectors and a vertical structure, in which the decision of a firm can influence the choices of other sectors' firms depending on their position along the supply chain. With Stefano Rossi, I am expanding my knowledge of macro-finance designing and solving a more stylized macroeconomic model which features Epstein-Zin preferences. The objective of this research project is to study the impact of VAT taxes on dividends payout policies by firms. In both projects, my contribution is mainly on the solution and numerical computation of such models, using both projection and perturbation methods.

During my studies, I always played basketball at a professional level and I continued playing in a team throughout my first working experience at the European Central Bank. This strongly contributed to my personal development, teaching me commitment and the value of communication, when collaborating with both my teammates and my colleagues. If I had the honor of being admitted, I would love to bring to the class my "team-player" attitude to better communicate, actively discuss, help and share ideas with my peers.

I would like to thank you for your time and consideration,

Piero De Dominicis
piero.dedominicis@phd.unibocconi.it
+39 3407677880
Via Giovanni Pezzotti 55, Milano, Italy
Reference: Basile Grassi
basile.grassi@gmail.com

Piero De Dominicis

piero.dedominicis@phd.unibocconi.it | +39 3407677880 | via Giovanni Pezzotti 55, Milan, Italy

Working Experience

Research Assistant July 2022 - Present
Bocconi University *Milan, Italy*

- Prof. Basile Grassi (since July 2022)
- Prof. Stefano Rossi (since February 2023)

Teaching Assistant Fall/Spring 2022-2023
Bocconi University *Milan, Italy*

- Financial Macroeconomics, Bachelor (Prof. Luigi Iovino)
- Econometrics, Bachelor (Prof. Massimiliano Marcellino)
- Macroeconomics, Bachelor (Prof. Fausto Panunzi/Francesco Scervini)

Research Analyst in Market Operations Feb 2021 – Aug 2021
European Central Bank *Frankfurt, Germany*

Trainee in Market Operations Feb 2020 – Jan 2021
European Central Bank *Frankfurt, Germany*

Economist (Analyst) Summer Internship July 2019 - Aug 2019
ADA Economics *London, UK*

Education

PhD in Economics and Finance Sept 2021 – Present
Bocconi University *Milan, Italy*

- **Research Interests**: Macroeconomics, Structural Econometrics, Labor Economics, Industrial Organization, Discrete Choice Models, Numerical Methods, Input-Output Networks
- GPA 1^{st} year: A- ; GPA 2^{nd} year: A

Master of Science in Economics Aug 2018 – June 2020
NOVA University *Lisbon, Portugal*

- GPA: 18/20; Master's Thesis Grade 20/20
- *Routinization and Covid-19: a comparison between the United States and Portugal* with Prof. Pedro Brinca
- Exchange semester at KU Leuven, Belgium

Bachelor in Economics and Business Sept 2015 – July 2018
LUISS University *Rome, Italy*

- Final grade: 108/110
- *Different methods for pricing barrier options* with Prof. Sara Biagini

Technical Skills

Languages : Italian, English (C2), French (B1), Portuguese (A2)

Programming : Python (Excellent), Matlab (Excellent), Julia (Good), Dynare (Good) , Stata (Good), R (Good), Tableau (Good), Latex (Excellent), SQL (Good), Bash/Unix (Good)

Awards and Scholarships

- LUISS Sport Scholarship (2015-2018): full scholarship for sports merit covering tuition fees, accommodation and cost of living
- Bocconi Sport Athlete Scholarship (2021-): selected for being part of the C Gold basketball team of the university
- Nomination Prize Jose Lopes: finalist among the best 5 economics thesis on Portuguese economy for 2018-2020 in the Banco de Portugal competition for Prémio José da Silva Lopes
- PhD Fellowship: 4 years PhD fellowship at Bocconi University

Extra Courses

- Computational Macroeconomics Summer School (by Prof. Wouter G. den Haan and Pontus Rendahl) - online, July 2022
- Quantitative Economics Workshop, CREST Paris, September 2022
- Optimal Transport and Economics Applications, Masterclass (by Prof. Alfred Galichon) - online, January 2023

Other Activities

Played Basketball for many years in different teams:

- Teramo Basket: youth teams, until 2011/12
- Roseto Sharks: DNB (Serie B) and youth team, 2012/13-2013/14; DNA/A2 Silver 2014/2015
- AS LUISS basket: Serie B, 2015/16 - 2017/18
- NOVA University team 2018-2019
- KU Leuven University team 2019-2020
- Bocconi Pelicans: Serie C Gold 2021 – ongoing

PhD Courses in Macroeconomics

1st year courses in Macroeconomics:

- Macroeconomics 1 (*Davide Debortoli*): Solow, neoclassical growth and OLG models; deterministic and stochastic dynamic programming, consumption theory, investment theory, asset pricing.
- Macroeconomics 2 (*Antonella Trigari*): dynamic stochastic general equilibrium, RBC theory, search and matching models of the labor market.
- Macroeconomics 3 (*Marco Maffezzoli*): aggregation theory, income fluctuations, Bewley-type models, Krusell-Smith model, numerical methods.
- Macroeconomics 4 (*Luigi Iovino*): New-Keynesian model, financial frictions (e.g. Kiyotaki, Moore 1997; Brunnermeier Sannikov 2014; Holmstrom Tirole 1998).

2nd year courses in Macroeconomics:

- Advanced Macroeconomics 1 (*Nicola Pavoni*): models of limited commitment and optimal dynamic mechanism; recursive contracts, global games and beauty contest; macro models with news, noise, uncertainty and confidence shocks; behavioral macroeconomics.
- Advanced Macroeconomics 2 (*Basile Grassi*): empirical evidence of firm heterogeneity; heterogeneous firm models (Lucas 1978, Hopenhayn 1992, Melitz 2003); misallocation; firm heterogeneity and network; concentration, markup and market power.
- Advanced Macroeconomics 3 (*Carlo Ambrogio Favero*): VARs and CVARs in macroeconomics and finance; models for the term structure, consumption and asset price fluctuations, long-run risk; present value models for the stock market; the econometric analysis of fiscal policy.
- Advanced Macroeconomics 4 (*Luigi Bocola*): macroeconomics models with frictional financial markets (e.g. Gertler, Karadi 2010); financial amplification; evidence on the macroeconomic costs of financial crises; production networks and financial markets; trade credit, households' borrowing constraints.
- Advanced Topics in Asset Pricing (*Massimiliano Mariano Croce*): macro-finance models with Epstein-Zin recursive preferences; term structure of equity returns in an economy with production; the equity risk premium in a model with recursive preferences and production (e.g. Bansal-Yaron 2004, Croce 2006, Colacito-Croce 2012).

Research and Motivation

I am mainly interested in macroeconomic phenomena that are influenced by heterogeneity in household behavior. With my research, I would like to combine tools from the Empirical Industrial Organization literature with the more modern approaches to estimate and calibrate macroeconomic models with heterogeneities. I want to use the abundance of available micro-data in combination with macroeconomic theory to achieve better and richer calibration and estimation of Heterogeneous-Agent models.

I want to focus on a specific type of micro heterogeneity, that is individual skills heterogeneity. A more recent literature is highlighting the importance of considering the multidimensionality of human capital when studying wage and earnings dynamics. With my research, I want to combine Structural Econometrics, to better estimate and provide sensible micro foundation for this heterogeneity, with Macroeconomics, to then study the consequences for aggregate variables dynamics, such as earnings and wage growth. Some of the questions I would try to answer using Structural Econometrics are: how do individuals accumulate skills depending on the tasks they perform on the job? How does demand for different skills affect households' labor supply decision? Then I would use Macroeconomics models to qualitatively and quantitatively assess the outcome of different policies. For example, what are the unintended consequences of targeting an optimal unemployment rate in the presence of multidimensional skills heterogeneity? How does the distribution of skills impact different workers categories given certain policies? What are the consequences for wage and earnings inequality?

I also would like to investigate the pass-through of firm-specific shocks to workers when production is organized as an intricated input-output network. The existing literature has been focusing on the propagation and amplification of supply shocks when there are distortions at sectoral level. Building upon this literature, I want to study how supply shocks are responsible for employment and wages fluctuation by embedding dynamic household's decision into this complex input-output structure.

Among all the interesting topics of the Workshop, I am eager to properly learn the theory and the practical implementation of the Sequence-Space Jacobian method to solve macro models with heterogeneous agents when choices are discrete. A model with multidimensional skills can be cumbersome to compute if variations in the labor supply could occur both at the intensive and extensive margins, due to the non-linearities arising from the labor supply decision of the household. The Workshop would be a unique opportunity for allowing me to pursue my research agenda on the aforementioned topics. It is very hard to learn computational techniques to tackle macro problems, and it is even harder to learn how to solve models with richer micro heterogeneity.

I am looking for opportunities to widen my academic knowledge and views, meet new and diverse people and collaborate with the greatest students and Professors worldwide. This Workshop represents a unique opportunity for my development as a researcher, allowing me to interact with top Macroeconomics Scholars in the world. My desire to participate in this fantastic Workshop also relies on the possibility of becoming part, even if only for a few days, of a challenging and intellectually stimulating environment such as NBER.

Thank you for your time and attention,
Piero De Dominicis