1. Cover Letter



Maria Sofia Liberati

School of Economics

University College Dublin

Belfield, Dublin 4

Ireland

mariasofialiberati31@gmail.com

+39 3662051788

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Dear Members of the Selection Committee,

I am writing to apply to the 2026 NBER Innovation Research Boot Camp. I am currently a PhD student in Economics at University College Dublin, where my dissertation focuses on the relationship between tax incentives and innovation. I am eager to deepen my expertise in economics of innovation and innovation policy, and to engage with leading scholars in the field to strengthen the conceptual and empirical foundations of my research.

The boot camp offers a unique opportunity to participate in high-level discussions in my field of interest and connect with a community of researchers working on frontier topics. I have actively sought opportunities to engage in academic dialogue in this area—such as presenting at the Bordeaux REGIS (REading Group in Innovation Studies) Summer School and attending other research-focused programs, as outlined in my curriculum vitae—and I have found that exchanging ideas in these settings is one of the most effective ways to advance my work. The integration of lectures, discussions, and participation in the NBER Summer Institute Innovation Policy meeting aligns closely with my research interests and would make a significant contribution to the development of my dissertation.

At the beginning of this academic year, I prepared a career training and development plan in which I identified the NBER Innovation Research Boot Camp as my top priority. I view it as the most rigorous and valuable training available for early-career scholars working on innovation. As I am currently finishing the first paper of my PhD, the timing of the boot camp is ideal for receiving feedback and identifying promising directions for the next stages of my dissertation. For these reasons, and after reading the program description, I think I would be the kind of student this boot camp is designed to support, given its mission to foster young scholars working on the economics of innovation and innovation policy.

My application includes a curriculum vitae, a list of completed and ongoing PhD coursework, and a one-page statement describing my current and future research interests. A confidential letter of recommendation will be submitted separately by my PhD supervisor, Ronald B. Davies.

Thank you for considering my application. I would be honoured to participate in this program and contribute to the community of scholars working on the economics of innovation.

Sincerely,

Maria Sofia Liberati

Recommendation letter writer:

Ronald B. Davies, Professor, University College Dublin. He is my PhD supervisor and an inspiring professor during my academic journey. ronald.davies@ucd.ie

2. Curriculum vitae and a list of all current and completed PhD courses

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Maria Sofia Liberati

University College Dublin

mariasofialiberati31@gmail.com;

maria.liberati@ucdconnect.ie;

+39 3662051788 (Mobile)

Address: 9, Whitebeam Avenue, Dublin, Ireland.



Date of Birth: 29/07/1999

Education and working experience

PhD in Economics, [University College Dublin], [09/2024 – Present]

- I am a PhD Student in Economics and Teaching Assistant in Econometrics at UCD Dublin.
- During the first year I successfully completed the six core modules in econometrics, microeconomics and macroeconomics with an average grade of A and equivalent grade point average (GPA) of 4.0. and I have been a teaching assistant for the courses Introduction to Quantitative Economics and Principles of Macroeconomics.
- In 2024, the UCD School of Economics decided to award me a four-year scholarship to pursue the PhD programme in Economics at University College Dublin.

I was awarded the **Merit prize** by the Il Talento all'Opera Ente Filantropico Foundation and the EY Foundation for **my essay entitled "Patents and Innovation: Incentives versus Drawbacks",** which I submitted after attending the ECOINN Summer School in Pisa. [23/09/2025]

I have participated in and presented at summer schools and training courses in my field of interest to gain expertise and to engage in discussions with other scholars in the field:

- I presented at the **Bordeaux REGIS (REading Group in Innovation Studies) Summer School** a research project on "Venture Capital Investments and Business R&D Expenditure". [June 2025]
- I participated to the **Seasonal School on "Economics of Innovation and Technical Change**" organised by Scuola Superiore Sant'Anna Pisa. [June 2025]
- I attended a course focused on evaluating the **impact of public policies** organised by FBK IRVAPP (Fondazione Bruno Kessler - Istituto per la Ricerca Valutativa sulle Politiche Pubbliche). [April 2025]
- I attended the Summer School in **Network Econometrics** organised by Ca' Foscari University in collaboration with the Italian Econometrics Association (SIdE). [July 2024]

Graduate trainee [Bank of Italy in Milan, Italy], [November 2023–May 2024]. As a graduate trainee, I had the opportunity to be part of the Territorial Research Department (ARET) and to contribute to some sections of the annual Report 2024 "L'Economia della Lombardia". I worked on projects related to the regional labour market, in particular, Firms' hiring difficulties in recruiting human resources and Human capital and the tertiary education system (v. L'Economia della Lombardia, Banca d'Italia, Economie regionali, 32-35, 2024) as well as on projects related to venture capital investments, housing prices, and population dynamics.

Author of ISPOR 2023 poster "Evolution in public procurement for medical devices in Italy", which was subsequently published by the journal Value in Health [15/11/2023].

Health Economics intern [IQVIA], [March 2023- July 2023]. During my internship, I developed an empirical research project on the use of medical devices by Italian hospitals. Additionally, I contributed to departmental projects by drafting reports, preparing presentations, and participating in the development of pharmaco-economic models.

Master's degree in "Economics" [Catholic University of Milan, Italy], [09/2021-10/2023], Profile "*Firms, labour and innovation*", [Final grade of 110/110 cum laude], [LM-56]. My master's thesis was an empirical analysis on the "Drivers of innovative medical device adoption", conducted through the application of empirical methods for economic analysis and based on a database I built using STATA. Among the most interesting courses: Economics of Innovation, Industrial Economics, Statistical Learning, and Econometrics.

Bachelor's degree in " Business and markets economics" [Catholic University of Milan, Italy], [09/2018- 09/2021], [Final grade of 110/110 cum laude], [L-33]. My dissertation "Managerial human capital and firm performance in a changing labour market" critically examined the existing literature on the relationship between managerial human capital and firm performance, highlighting its relevance for the labour market—particularly in light of the transformations that followed the outbreak of the COVID-19 pandemic.

Research Interests

Innovation • Tax incentives • Patents • Public policy • Productivity • Firm Dynamics • Applied Microeconomics • Public Economics

Working Papers / Research in Progress

- *Tax Incentives for Innovation: The Differential Impact Across Innovation Types*— with Professor Ronald Davies. This working paper studies the effects of tax incentives on firms' choices between different types of innovation.

- My master's thesis "*Adoption of innovative medical devices across medical specialties: An empirical analysis on Italian data"* has been submitted as an original research article in a high-

impact journal. Starting from my thesis, I further developed the project, with my master's supervisor Professor Maria Luisa Mancusi. The paper has been submitted to The European Journal of Health Economics.

- *"Competing to Be the Medical Device Provider for a Health Service in a Small Economy".* This working paper models competition between two firms serving the health sector in a small economy, treating their interaction as a contest and studying the role of firms' technology.

- *Evolution in public procurement for medical devices in Italy* — ISPOR 2023 poster, which was subsequently published by the journal Value in Health. The analysis aimed to investigate whether the reform introducing procurement centralization in Italy led to an increase in centralized public procurement of medical devices at both the national and regional levels.

Completed PhD courses

I completed the first year of the PhD programme in Economics at University College Dublin during the Academic Year: 2024/2025.

The first year is dedicated to coursework, which equips students to carry out independent research. Students take six core modules in microeconomics, macroeconomics and econometrics. After passing the modules with an average grade of B (3.4 GPA) students transfer to the PhD register.

During the Spring Trimester, I achieved the following grades:

- ECON50580 PhD Econometrics 2 (Grade A+ and grade points 4.2)
- ECON50720 PhD Microeconomics 2 (Grade A- and grade points 3.8)
- ECON50730 PhD Macroeconomics 2(Grade A+ and grade points 4.2)
- ECON50760 PhD Workshop 2 Passed

While during the Autumn Trimester, I achieved the following grades:

- ECON50570 PhD Microeconomics 1 (Grade A and grade points 4.0)
- ECON50710 PhD Econometrics 1 (Grade A and grade points 4.0)
- ECON50740 PhD Macroeconomics 1 (Grade A- and grade points 3.8)
- ECON50750 PhD Workshop 1 Passed

During the second semester, I concurrently developed a replication and extension of the paper "Innovation and Growth: Considerations for Public Policy" by Ben Westmore (2013, OECD) and a theoretical paper titled "Competing to Be the Medical Device Provider for a Health Service in a Small Economy". I presented the paper by Aghion et al. (2005), "Competition and Innovation: An Inverted-U Relationship", and I wrote a referee report on Dy'evre (2024), "Public R&D Spillovers and Productivity Growth".

Languages & International Experiences

- Italian Mother tongue
- Residing in Dublin (Ireland), since September 2024
- 13/10/2022 IELTS (Overall 7.0)
- 01/02/2019 FIRST (B2)
- 07/2022 IELTS's course at GBS London, UK
- 08/2019 English course at Emerald Institute in Dublin
- 07/2016 English course in Cirencester, UK

Technical Skills

Throughout the educational and professional experiences outlined above—and especially throughout the first year of my PhD—I refined my skills in empirical research using STATA, R, and Matlab. I also gained proficiency in drafting reports with LATEX, the Microsoft Office Suite (including Excel), and Zotero.

Soft Skills & Interests

- From 2019 to 2022, I volunteered as a scout leader within the AGESCI association, having been a scout since 2007. In this role, I was as an educator for children aged 8 to 12.
- I consider myself a responsible and dedicated individual.
- I enjoy traveling, especially when it involves educational development opportunities, and in my free time, I engage in sports such as mountain hiking and skiing.

In compliance with the Italian legislative Decree no. 196 dated 30/06/2003 coordinated with Legislative Decree 101/2018 and Article 13 of the GDPR (EU Regulation 2016/679), I hereby authorise to use and process my personal details contained in this document for the purposes of personnel search and selection.

3. A one-page essay that describes the applicant's current and future research as well as the reason for wanting to attend the boot camp

My research interests lie in the economics of innovation and innovation policy. I am particularly motivated by questions concerning how public policies—especially tax-based incentives—shape innovative activity. My current work focuses on how such incentives influence firms' choices between different types of innovation.

In my first dissertation paper, I study how front-end incentives (such as R&D tax credits) and back-end incentives (such as patent boxes) affect firms' decisions to pursue product, process, or mixed innovation. Using a simple theoretical framework, I model how these incentives alter the optimal allocation of inventive effort. Empirically, I draw on European Patent Office data to examine heterogeneous effects across innovation types. Preliminary results suggest that patent box regimes increase mixed patent applications at the expense of product patents, offering a potential explanation for the rising prevalence of mixed patents over time. These findings indicate that fiscal incentives may unintentionally distort firms' innovation portfolios—encouraging certain types of innovation while inducing underinvestment in others.

For many years, an active debate has surrounded the effectiveness of tax incentives designed to stimulate innovation and research and development (R&D). Empirical evidence on front-end tax incentives—such as tax credits and deductions—has generally converged, indicating that these instruments successfully increase firms' R&D investment as they decrease the cost of the investment (Bosenberg and Egger 2017; Dechezlepretre et al. 2016; Melnik and Smyth 2024). In contrast, back-end tax incentives such as patent box regimes have raised a few concerns, including whether they genuinely foster new innovation (Mohnen et al. 2017; Bradley et al. 2015; Gaessler et al. 2019) or instead function primarily as mechanisms for shifting profits from high-tax to low-tax jurisdictions (Alstadsæter et al. 2018; Griffith et al. 2014; Ciaramella 2023), or even may encourage the submission of applications for low novelty innovations that otherwise would not have been submitted (Davies et al. 2021; Ernst et al. 2014). The literature has largely focused on assessing whether these tools achieve their intended goals,

concentrating on their impact on the overall level of R&D investment and on the number of new patent applications (Bosenberg and Egger 2017; Dechezlepretre et al. 2016; Melnik and Smyth 2024; Mohnen et al. 2017; Bradley et al. 2015; Gaessler et al. 2019; Alstadsæter et al. 2018; Griffith et al. 2014; Ciaramella 2023). Much less attention has been devoted to understanding how these instruments can influence the type of innovation firms choose to pursue.

My broader dissertation project, *Innovation and the Role of Public Policies*, aims to extend this work by studying how policy mixes influence knowledge production, patent transfers, and real economic activity. These choices have important implications for domestic employment, skill composition, and the geographic distribution of innovative activity. For instance, multinationals have used patent boxes strategically to shift and maximise profits (Gaessler, 2021). Global profit shifting is estimated to reach $616 billion annually (Tørsløv, Wier and Zucman, 2020), prompting the OECD to launch the Base Erosion and Profit Shifting (BEPS) plan in 2015. The plan introduced a 15% global minimum corporate tax rate and a nexus requirement—stipulating that patents and the underlying R&D must occur in the same jurisdiction to qualify for patent box benefits (BEPS Action 5). While intended to align patent-related profits with R&D location, this requirement may also have encouraged firms to relocate R&D to jurisdictions offering favourable patent boxes. In my second and third dissertation papers, I therefore plan to examine how policy mixes affect multinational knowledge production and patent transfers. Firms may have incentives to produce and transfer product patents (and associated R&D) to countries with patent boxes, generating country-specific effects on R&D employment and on the distribution of high- and low-skilled labour across R&D and non-R&D firms, with important implications for inequality. How IP-related tax policies evolve will be crucial for countries' economic efficiency and long-run growth (Bradley, 2021).

My interest in the economics of innovation began during my master's degree at the Catholic University of Milan, where I was introduced to this research community through courses taught by Professors Gabriele Pellegrino, Fabio Montobbio, Maria Luisa Mancusi, and Marco Vivarelli. This early exposure shaped my academic trajectory and deepened my awareness that innovation is a central driver of long-run economic growth (Solow, 1957; Romer, 1990), productivity improvements, and ultimately fosters more equitable growth. Public policies such as patent boxes or R&D tax credits aim to incentivise innovation and address firms' underinvestment (Greenhalgh, 2010), yet many underlying mechanisms remain imperfectly understood. This motivated me to pursue a PhD focused on these questions. The relevance and dynamism of innovation research—highlighted, for example, by the recent Nobel Prize awarded to Philippe Aghion—continue to reinforce my commitment to contributing to this field.

I am applying to the NBER Innovation Research Boot Camp because it offers a valuable and unique opportunity for structured, high-quality training. Learning directly from leading scholars whose work has shaped the discipline would significantly accelerate my progress. I hope to have the opportunity to participate at the Boot Camp, which would expose me to cutting-edge research, active research questions, and help me refine my research plan.