NBER Entrepreneurship Research Boot Camp

February 14, 2023

Dear Committee Members,

I am pleased to attach my application for the NBER Entrepreneurship Research Boot Camp. You will find below a CV with my contact information, an overview of graduate studies to date and a description of my interests and current research projects. I will gladly provide any other supporting materials upon request.

The letter of recommendation will be provided by Pr. **Shane Greenstein**.

You can contact me at my email jboudou@hbs.edu

Thank you for your consideration, and I look forward to hearing from you.

Sincerely,

Justine Boudou

JUSTINE BOUDOU

Harvard Business School
jboudou@hbs.edu

EDUCATION

Harvard Business School, Boston (USA) — 2020 to date
Ph.D. Student in Business Administration
Field: Technology & Operations Management (Innovation track)

HEC Paris, Jouy-en-Josas (France) — 2016 – 2019
MiM (Master in Management)

Delft University of Technology, Delft (The Netherlands) — 2017 – 2018
M.S. Management of Technology
(Exchange program during the last year of Master of the ENPC)

Ecole Nationale des Ponts et Chaussées, Paris (France) — 2014 – 2018
M.S. Engineering (specialization Economics & Finance)

WORK EXPERIENCE

Philips, Amsterdam (The Netherlands) — 2019 – 2020
Mergers & Acquisitions Analyst

Pierre Fabre, Paris (France) — 2016 (Summer)
Research Intern, Finance and Strategy department

Polytechnic University of Catalonia, Barcelona (Spain) — 2015 (Summer)
Research Intern, Environmental Engineering and Microbiology Group (GEMMA)

RESEARCH

Are PhDs joining the sector where they have the highest social returns? *(solo - in progress)*

Distance between academic start-ups' and founders' knowledge bases: implications for outcomes on the entrepreneurial and academic markets *(with Maria Roche - in progress)*

From public to private: contractors' type at FFRDCs and the impact on innovation *(with Kyle Myers – in progress)*

Leaving or staying? The impact of scientific contests on scientists' choice of research direction *(solo - in progress)*

AWARDS

Best Master Thesis Award (HEC Paris) — 2019

OTHER

NBER Economics of Privacy Tutorial — Fall 2022

Economics of Ideas, Science and Innovation Online PhD Short Course – Institute for Progress — Fall 2022

NBER Digitization Tutorial — Spring 2023

GRADUATE COURSEWORK

All coursework is completed and is at Harvard, except specified otherwise.

Economics

1. Microeconomic Theory I (Rahul Deb)
2. Microeconomic Theory II (Chris Avery and Dennis Yao)
3. Industrial Organization I (Ariel Pakes)
4. Labor Economics and Labor Market Institutions (Amanda Pallais)
5. Empirical Research in Labor and Public Economics (Winnie van Dijk)

Innovation

1. Economics of Ideas and Innovation (Pierre Azoulay and Scott Stern - MIT)
2. Empirical studies of Innovation and Digitization (Shane Greenstein)
3. Economics of Ideas, Science and Innovation Online Course (Pierre Azoulay, Matt Clancy, Ina Ganguli, Ben Jones and Heidi Williams, organized by the Institute for Progress)

Methods

1. Econometric Methods for Applied Research I (Gregory Bruich)
2. Econometric Methods for Applied Research II (Will Dobbie)
3. Causal Inference in Management Research (Tim Simcoe - BU)
4. Machine Learning and Big Data Analytics (Soroush Saghafian)
5. Machine Learning (David Parkes and Finale Doshi-Velez)

Technology Management

1. Empirical Technology & Operations Management (Antonio Moreno)

ESSAY

Since I began my doctoral studies two and a half years ago, my interest in the Economics of Innovation and Entrepreneurship has grown extensively, mainly inspired by my advisor Pr. Kyle Myers and the Economics of Ideas and Innovation class I attended at MIT. For this essay, I choose to present two projects I am currently working on. The first one is developed in collaboration with Pr. Maria Roche and studies academic startups. The second one is an independent project that focuses on the labor economics aspect of the knowledge production function.

Project 1: *Distance between academic start-ups' and founders' knowledge bases: implications for outcomes on the entrepreneurial and academic markets*

Universities have long been recognized to be among the major drivers of economic growth. While their role was initially confined to the production of academic research, there has been an increased interest in the role of academic entrepreneurship in economic performance. Famous examples include Tableau (founded by Pat Hanrahan, professor at Stanford), Genentech (launched by Herbert Boyer, professor at the University of California) or Duolingo (initiated by Luis von Ahn, professor at Carnegie Mellon University).

However, recent empirical evidence suggests that academic spinouts do not perform particularly well on the market (Roche et al., 2020). This is at odds with the large literature on the benefits of science for innovation (Fleming & Sorenson 2004, Ahmadpoor & Jones 2017, Krieger et al. 2022). If academic spinouts have better inventions that never reach the market, we may be missing out on important social returns. In parallel, other work has studied the impact of professors' involvement in activities other than research on their academic output. The literature on academic spinouts and its relationship with research output is scarce, but results point to an ambiguous relationship (Ambos et al. 2008, Toole & Czarnitzki 2010, Fini et al. 2022). While these different streams of literature have developed quite independently, they generate important findings that are worth considering jointly. On the one hand, the discrepancy between invention quality and performance on the exit market calls for **a better understanding of what predicts academic start-ups' success.** At the same time, what makes these spinouts more successful may also detrimentally impact **the academic output** of their founders, highlighting the **potential trade-off** generated by the dual involvement of faculty in entrepreneurship and academia.

In this project, we build on these insights and study one determinant of academic start-up success, and how it relates to founders' performance in academia: **the distance between the knowledge base of a start-up and that of its founders.** We conceptualize this measure as a proxy for the degree to which technology, vs market demand, is a driving force in the creation of a start-up. Proximity between the two knowledge bases should indicate the degree to which a technology is "pushed" out of the lab, while a larger distance should capture the "pull" by the market for a solution an academic founder may have developed as part of their research agenda. Interestingly, the consequences of proximity vs distance on start-up and academic success may not go hand in hand. While founders who rely significantly more on their own academic research may have better private information (Fuller & Rothaermel, 2012; Kolev et al., 2022) and specialized knowledge about the value of their invention, it may also make their start-up harder to be acquired because incumbents are less likely to have the expertise needed to build on these scientific insights (Krieger, 2022). At the same time, founders engaged in spinouts closer to their own research may remain more academically productive, highlighting the tension generated by a dual involvement in academia and entrepreneurship.

The empirical analysis builds on Conti & Roche, (2021) and examines a panel data set of 537 academic start-ups in biomedicine created between 2005 and 2015. For each start-up,

we have information about founding date and place, founders, patents and exit events. We also link each academic founder to their research output using Dimensions AI. Our treatment variable is the distance between the knowledge base of a start-up and that of its founders, which we operationalize by linking each start-up to its patents and calculating the percentage of citations these patents make to their founders' academic papers using the Reliance on Science dataset (Marx & Fuegi, 2020, 2022).

Our results reveal interesting patterns. While we do not find any significant impact of founders' reliance on their own academic knowledge on innovation quality and funding, we find that start-ups that are closer to their founder's knowledge base are **less likely to be acquired**. These results strongly suggest that the main impact of distance from founders' academic research may come from the nature of the technology: it is harder for incumbents to assimilate and hence acquire a start-up when its knowledge base is closer to the founder's academic work. On the academic market, our preliminary results indicate that academic entrepreneurs launching a start-up with a greater reliance on their academic knowledge base fare similarly to those with more knowledge base distance with regards to their own academic work, both in terms of publications, citations, and propensity to be last author. In our next steps, we plan to assess the relationship of knowledge base proximity with more nuanced publication output and firm survival.

Project 2: *Are PhDs joining the sector where they have the highest social returns?*

Another project of mine aims to study the sorting decision of PhDs at graduation between Industry and Academia, and the consequences of this choice on earnings and scientific production. Taking the example of the Computer Science (CS) field, private Tech firms such as Google, DeepMind, Meta or IBM have heavily increased their production of research papers, publishing in the same prestigious conferences as Carnegie Mellon University, MIT or Stanford. This involvement does not seem to be without consequences for the academic system. In particular, the wage offered by these companies for research positions seems to have led to an important leakage of PhDs students from Academia to the industrial sector after graduation. While we do expect scientists to be paid more in the private sector as a compensation for a loss in research freedom (Stern 2004), it is not clear how this earning gap compares to the difference in research output. While Science may indeed "be privatized", PhDs joining Industry may also have a greater research output there than in the counterfactual case where they would have joined Academia: firms often have access to larger data and more powerful computational resources and/or these individuals may just be more suited for the private sector. Considering *heterogeneity* and *selection into treatment* with Marginal Treatment Effects, I would like to compare earnings and research output in Industry vs Academia to assess whether students are joining the sector where they have the highest social returns. I just got access to licensed data from the NCSES, and I am currently working on the empirical analysis while trying to develop a model that links together private returns (earnings) and social returns (earnings + spillovers from public research).

With my dissertation being directly related to the economics of innovation and entrepreneurship, this bootcamp is a unique opportunity for me to benefit from experts in the field and make progress on my work. It would also allow me to hear and benefit from other students and initiate fruitful collaborations as I move closer to graduation.

Thanks a lot for your consideration,

Sincerely,
Justine Boudou

Harvard Business School

Shane M. Greenstein
he/him/his
Martin Marshall Professor of Business Administration, Technology and Operations Management

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Justine Boudou

February 14, 2023

I heartily recommend Ms. Justine Boudou for the NBER Entrepreneurial Book Camp. Ms. Boudou is completing her third year of graduate training at the Harvard Business School as part of the Technology and Operations and Management unit. If students going into their fourth year are your priority, this is an excellent opportunity to influence her agenda by having her attend boot camp.

I first met Ms. Boudou when she took my empirical studies of innovation course in the Spring of 2022. We have since begun an extensive conversation about one of her projects, which examines how a contest alters the composition of a scientific community. It looks at the teams that entered a contest and explore how the results shape later entries and composition. It is very original.

She also has several other projects. For another chapter of her thesis, she obtained a panel of data about the post-PhD careers of many scientists. This will let her investigate the rate of the direction of scientists after selecting the industry and academic employment. The data is exceedingly rich, especially about how the market for academic/entrepreneurial employment and career paths has changed across different scientific fields over time.

In addition, she has initiated other projects, working closely with Kyle Myers and Maria Roche on joint projects, which, IMHO, is the best way to learn to research in this field. These projects examine different aspects of the boundary between academic and entrepreneurial organizations. These collaborations are consistent with her broad innovation and entrepreneurial economics research agenda, focusing on the science/commercialization boundary.

Harvard Business School

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Ms. Boudou also has all the traits you desire in a participant. She makes thoughtful and creative remarks in discussions. She listens well and speaks clearly. She asks probing analytical questions. She also has determination and enthusiasm for studying innovation economics. You cannot help but notice the enthusiasm. It is infectious.

She intelligently designed her studies at Harvard around her goals to pursue this field, taking courses in economics, industrial organization, machine learning, and innovation. In other words, Ms. Boudou studies entrepreneurship and innovation because she finds the topics fascinating, which motivates her to seek relevant training.

I cannot say enough wonderful things about Ms. Boudou. She is great to have around and will be a terrific participant in your boot camp.

Sincerely,

