Colin Davison

3060 Jenkins Nanovic Hall, Notre Dame, IN 46556

614-505-7838 ♢ cdaviso1@nd.edu

Professors Bloom, Lerner, Robinson, Schoar, and Stern,

My name is Colin Davison. I am a fourth year PhD student at the University of Notre Dame, and I am very excited about the opportunity to attend the NBER Entrepreneurship Boot Camp. My current research agenda explores interesting questions regarding the types of innovations being created, the commercialization and incentives of science, and firm strategy.

My hope is that my broad reading in the fields of innovation economics and firm strategy along with my current projects will serve as excellent complements to the research agendas of those in attendance. By complementing the ideas of others, I hope to create new research agendas which lie at the intersection of innovation and entrepreneurship economics. My goal is that this would not only lead to the formation of new research ideas, but also enduring and mutually beneficial co-authorship relationships. I would bring an attitude that seeks to engage with the expertise and thoughts of others as much as possible by bringing my ideas to the questions at hand. If I had the opportunity to attend, I would be fully devoted to these goals, seeking to gain the most I can from the Boot Camp and in the process giving the most to others. My advisor, Professor Kirk Doran, will supply my letter of recommendation, along with a note from Professor Benjamin Pugsley. Thank you for considering my application.

Genuinely,
Colin

A two-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 are mainly in the fields of firm strategy and innovation, fields that pair nicely with the study of entrepreneurship. My potential job market paper introduces a new dataset to these fields, a novel classification of patents into product and process innovations. To create this data, I define product and process innovations and then hand classify the publication claims of a sample of patents into product and process innovations through careful reading of the publication claims and firms' 10-K statements. Next, I use machine learning methods to apply my classifications to over one million corporate patents granted between 1980-2015.

With this dataset, I put forward evidence which supports several conclusions. First, I document a large secular decline in the share of innovations which are process innovations, from 28% in 1980 to 12% in 2015. Next, in line with economic theories, I show that increased competitive pressure pushes firms to lower their process share of innovation. Finally, process innovations generate fewer knowledge spillovers. This last finding has importance given the crucial role that knowledge spillovers play in models of economic growth. In addition, my results provide empirical validation of a channel that can alter the process share of innovation, competitive pressure. Lastly, I plan to make the dataset publicly available which will allow others to use the data for future research. Currently, the project completes the classification for publicly traded companies, but I am interested in the possibility of extending my work to all firms. This would better allow me to speak to how product and process innovation vary over the life cycle of the firm, as well as the types of innovation that startups engage in.

I am also working on a research project with Kirk Doran and Ina Ganguli looking to examine how applied knowledge creation impacts basic research. Our empirical setting is biomedical research around the time of the COVID-19 pandemic. Due to the disruption of the COVID-19 pandemic in March 2020, some clinical trials had to be delayed or canceled. We use this as an unanticipated negative shock to applied research. For our measures of basic research we turn to the PubMed database and are planning to examine the effect

that this decline in clinical trials (applied research) has on the quantity, quality, and direction of PubMed publications (basic research). The cancellation of clincial trials could have interesting effects on biomedical startups, something we are interested in possibly exploring.

Another project I am working on asks the question: how do firms control who uses the knowledge they create? I hypothesize that firms gain more control over who uses their knowledge by searching locally in the space of ideas. When firms search locally, they have a better understanding of the relevant actors in the space as well as the nature of the technology. I find evidence in support of this hypothesis: innovations with higher self backward citation shares, repeat backward citation shares, and innovations which reuse familiar components result in more intentional knowledge sharing and higher likelihood of knowledge retrieval. This work highlights local search as one mechanism that firms use to prevent unwanted knowledge spillovers.

A future area of research I am hoping to work in is related to the commercialization of basic scientific research, something that intersects nicely with the study of entrepreneurship. A potential setting I have identified to address this topic is the arrival of genetic engineering, pioneered by Paul Berg and Herbert Boyer in 1972 at Stanford University. The methods of genetic engineering have been successfully commercialized into various drugs and agricultural crops. What allowed some firms to commercialize this new technology while others did not? Are entrants the ones responsible for commercializing this new technology or was it mostly done by incumbents? If the former, how are entrants formed? Are they formed through spinouts where individuals leave incumbent firms to start their own competing firm or some other means?

By attending the NBER Entrepreneurship Boot Camp I hope to accomplish several things. First, I will be bringing my knowledge and work on innovation economics along with my interest in expanding that work to the study of entrepreneurship. I hope that others in attendance will find my ideas complementary to their own, resulting in new and useful insights and co-authorship relationships. In addition, I am hoping that exposure to the frontier thinking on the study of entrepreneurship will allow me to take the leap to combine my current work in innovation with the study of entrepreneurship, creating a new research agenda for me and any coauthors.

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CURRENT EMPLOYMENT

Doctoral Student *Present - May 2023*
University of Notre Dame, Department of Economics, Indiana, USA

EDUCATION

University of Notre Dame, Indiana, USA
M.A., Economics *2019*

Miami University, Ohio, USA
B.A., Economics, *Summa Cum Laude* *2015*

RESEARCH INTERESTS

Innovation Economics, Firm Strategy, Labor Economics

WORKS IN PROGRESS

The Nature of Product and Process Innovation: Evidence from Patent Text
Innovative Search and the Appropriation of Corporate Knowledge
The Effect of Applied Science on Basic Research: Evidence from Clinical Trials (with K. Doran and I. Ganguli)
Education and Invention: Evidence from Compulsory Schooling (with K. Doran and C. Yoon)

TEACHING EXPERIENCE

University of Notre Dame, Indiana, USA
Teaching Assistant, Principles of Microeconomics *Spring 2021*
Teaching Assistant, Principles of Microeconomics *Fall 2018*

Miami University, Ohio, USA
Tutor: Economics and Calculus I *Fall 2012-Spring 2013*

RESEARCH EXPERIENCE

University of Notre Dame, Indiana, USA
Research Assistant to Professor Christopher Cronin *Fall 2021-Spring 2022*
Research Assistant to Professor Kirk Doran *Fall 2020*
Research Assistant to Professor Taryn Dinkleman *Fall 2019-Spring 2020*
Research Assistant to Professor Ethan Lieber *Spring 2019*

SKILLS

Software: Stata, Python
Database: USPTO PatentViews, Google Patents, Compustat, PubMed

REFERENCE

Kirk Doran
University of Notre Dame
Department of Economics
3048 Jenkins Nanovic Hall
Phone: (574) 631-3289
E-mail: kdoran@nd.edu

Courses Taken

- *Microeconomic Theory I* with Terence Johnson
- *Microeconomic Theory II* with Kali Rath
- *Macroeconomic Theory I* with Rudiger Bachmann
- *Macroeconomic Theory II* with Jasmine Xiao
- *Econometrics I* with Drew Creal
- *Econometrics II* with Marinho Bertanha
- *Labor Economics I* with Kirk Doran
- *Labor Economics II* with Kirsten Cornelson
- *Labor and Economic Demography* with Kasey Buckles
- *International Trade* with Robert Johnson
- *Economic Development Topics* with Lakshmi Iyer
- *Advanced Topics in Economic Development* with Taryn Dinkelman
- *Public Economics I* with Daniel Hungerman
- *Public Economics: Education* with Chloe Gibbs