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Innovation Research Boot Camp Admission Panel
National Bureau of Economic Research
1050 Massachusetts Avenue
Cambridge, MA 02138

January 19, 2022

Dear Professors Bryan, Jones, and Williams,

It is with great enthusiasm that I submit my application to the NBER Innovation Research Boot Camp.

I am a Ph.D. Candidate in the Public Policy program at Harvard University researching innovation and the diffusion of knowledge in the health care sector. In this role I have worked closely with **Professor Amitabh Chandra**, who has generously provided a confidential letter of recommendation on my behalf. In collaboration with Professor Chandra and Professor Craig Garthwaite (Northwestern Kellogg), I recently coauthored an NBER working paper that explores the quality-signaling value of follow-on indication approvals for prescription drugs. Coauthoring this paper has given me many opportunities to consider the roles of regulation in the diffusion of innovative technologies. Bringing the insights that have emerged from this research to IRBC would allow me to share my perspectives while exposing me to scholars whose knowledge and experience will lead me to refine my beliefs about the world.

My specific interests in attending IRBC are twofold. First, I would relish the opportunity to engage with both established and junior researchers to conceive and develop new research projects in the innovation space. Second, the innovation-specific coursework will complement the more broadly-focused coursework I completed at my institution. Both of these opportunities would be invaluable to me as I progress in writing my dissertation. I also believe that, because of my background in innovation research and my innate curiosity, my participation would enhance the experience of IRBC for the other participants.

I am based locally in Cambridge, MA and therefore do not require funds for travel or lodging. Thank you for your consideration, and I look forward to hearing back from you soon.

Best regards,

Benjamin Berger

Ben Berger

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Homepage: **ben-berger.com**

Education

Ph.D. in Public Policy (Economics Track), Harvard University, May 2024 (expected)
B.A. in Economics and Mathematics, University of Miami, *magna cum laude*, 2016

Research Interests

Health Economics, Innovation, Industrial Organization

Research Experience

05/2019 – 08/2019	Graduate Research Assistant to Amitabh Chandra, Harvard Kennedy School
05/2019 – 08/2019	Graduate Research Assistant to Nicole Maestas, Harvard Medical School
07/2016 – 08/2018	Full-Time Research Assistant to Amitabh Chandra, National Bureau of Economic Research
06/2015 – 08/2015	Research Intern, International Council of Shopping Centers
01/2015 – 06/2015	Undergraduate Research Assistant to Chris Parmeter, University of Miami

Publications

Working Papers

"Regulatory Approval and Expanded Market Size." NBER Working Paper, 2021. *(with Amitabh Chandra and Craig Garthwaite)*.

Book Chapters

"The Link Between Health and Working Longer: Disparities in Work Capacity." In Overtime: America's Aging Workforce and the Future of "Working Longer". The Alfred P. Sloan Foundation, Forthcoming. *(with Nicole Maestas)*.

"The Orphan Drug Act at 35: An Outlook for the 21st Century." In Innovation Policy and the Economy, Volume 19. University of Chicago Press, 2018. *(with Nicholas Bagley, Amitabh Chandra, Craig Garthwaite, and Ariel Dora Stern)*.

Teaching Experience

Spring 2021 Empirical Methods II, Master's Level, Harvard Kennedy School
Teaching Fellow for Theodore Svoronos
Overall Effectiveness: 4.61/5 (average among TFs: 4.42)
Selected feedback: *I can't believe this is Ben's first time teaching — he's incredibly good at it and I hope he continues for a long time!*
Ben is wonderful — he is so helpful and takes a lot of time to make sure that you understand difficult concepts and that he answers questions clearly and comprehensively.

Fellowships and Scholarships

NSF Graduate Research Fellowship, Awarded (2019).
NSF Graduate Research Fellowship, Honorable Mention (2018).
Dickinson Merit Scholarship, University of Miami, Awarded (2012).

Personal

United States Citizen

Completed Coursework

- Microeconomics
  - ECON 2020A – Microeconomic Theory I
  - ECON 2020B – Microeconomic Theory II
- Econometrics
  - ECON 2120 – Principles of Econometrics
  - ECON 2140 – Econometric Methods
- Public Economics (Primary Field)
  - ECON 2465 – Health Economics
  - ECON 2450A – Public Economics and Fiscal Policy I
  - ECON 2450B – Public Economics and Fiscal Policy II
- Industrial Organization (Secondary Field)
  - ECON 2610 – Industrial Organization I
  - ECON 2611 – Industrial Organization II
  - ECON 2612 – Advanced Topics in Industrial Organization
- Seminars
  - API 901 – Doctoral Research Seminar
  - API 902 – Doctoral Research Seminar
- Other
  - ECON 2099 – Market Design
  - GOV 2158 – Political Institutions and Economic Policy
  - MIT 21A.409 – Ethics of Intervention

My research agenda focuses on the diffusion of biomedical information and the adoption of health care technologies. Specifically, I am interested in how economic incentives and regulatory frameworks shape how health care providers use biomedical information to determine treatment of their patients. I am fortunate to have had opportunities to pursue this research agenda both independently and alongside excellent collaborators.

In June 2021, I submitted my first NBER working paper coauthored with my advisor Professor Amitabh Chandra (Harvard) and Craig Garthwaite (Northwestern Kellogg). This paper, entitled "Regulatory Approval and Expanded Market Size," considers the demand-side response to FDA approval of prescription drugs. While it is challenging to isolate this demand-side response because drugs legally cannot be sold prior to FDA approval, we take a novel approach by considering the expansion of markets for off-label drug uses after those uses are approved by FDA. We find that off-label uses discontinuously increase in prevalence after they are approved and thus go on-label. We find these post-approval increases far exceed the pre-approval trends in use that might be attributed to market learning. Moreover, the post-approval increase is significantly greater for newly approved uses that are medically more dissimilar from previously approved uses. Lastly, we find that the size of the post-approval increase appears to be unrelated to the prevalence of utilization restrictions like prior authorization, suggesting that the increase truly reflects decreased uncertainty in drug efficacy rather than a change in the hassle cost of obtaining a prescription. We are now seeking to publish our paper in an economics journal and are waiting for a decision from AEJ: Economic Policy.

I am currently writing a paper with Ian Calaway, a Ph.D. Student at Stanford University that seeks to unravel how access restrictions on academic papers impact consumption of open access alternatives, namely preprints. Using a matched difference-in-differences strategy, we find that preprint downloads of biology articles that are published in restricted access journals increase significantly more after publication than preprint downloads of matched articles that are published in open access journals. This indicates that restricted access causes substantial substitution from publications to preprints; however, it is unclear who the marginal individuals

who are induced to consume preprints are, for instance whether they are medical professionals rather than academic researchers. To better characterize marginal preprint readers, we have obtained data from Altmetric that links articles to engagement on Twitter and personal blogs. We are now in the process of integrating this data into our analysis.

The last main project I am working on is what will become my single-authored job market paper. In this project, I consider the role of diagnosis in determining health care treatment and the implications of that role. Specifically, because health care providers have incentives to provide more care, they may expand their pool of patients by attempting to diagnose more patients, possibly by adopting new diagnostic technologies. I will identify sources of plausibly exogenous variation in reimbursement for care to identify the effect of reimbursement on diagnosis and then evaluate how different mechanisms contribute to that effect, including adoption of diagnostic technology. A particularly interesting context to evaluate diagnosis endogeneity is in the treatment of prostate cancer, a disease that many people die with rather than as a result of. The aggressiveness of prostate cancer treatment varies by physician, with many preferring a "watchful waiting" strategy over surgery or chemotherapy. Changes to reimbursement will thus impact physicians differently by creating different changes in incentives for diagnosis and adoption of diagnostic technology.

There are two main reasons I think participating in the Innovation Research Boot Camp would benefit my research. First, the innovation-specific coursework would provide solid foundational knowledge of the innovation sub-field, supplementing the broader coursework I have completed in public economics and industrial organization. Moreover, the variety of lecturers will certainly expose me to a diversity of viewpoints that I can incorporate into my own research. Second, participating in the program would be invaluable to me due to the opportunity to build lasting connections with university faculty and other graduate students interested in innovation. I am especially interested in engaging with students and faculty who focus on the intersection of health care and innovation. For all these reasons, I believe that I would be an excellent IRBC participant and that I would benefit greatly from the experience.

Harvard University

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Amitabh Chandra
Malcolm Wiener Professor of Public Policy
Chair Editor, Review of Economics and Statistics

email: Amitabh_Chandra@Harvard.EDU

November 1st, 2021

Dear Ben, Heidi and selection committee members

I am delighted to write a letter of recommendation for **Benjamin Berger** '16 (B.A from the University of Miami in Economics and Math) for the NBER innovation bootcamp.

I've known Ben since 2016 he was my full-time research assistant and is now a PhD student at the Harvard Kennedy School. In 2019, he won an NSF Fellowship.

Ben is doing important work on innovation in the life-sciences. For his PhD dissertation, Ben is working on important questions on the economics of pharmaceutical innovation. This is an area of first-order importance for patients and society, and the insights of economists have been particularly important for policy, as well as for the tradeoff between static and dynamic efficiency.

Ben has published a chapter in an NBER volume (with me, Craig Garthwaite and Ariel Stern) on the Orphan Drug Act and how many of the ideas in it need to be revisited in an era of precision-medicines. We are doubtful that the ODA encourages the development of products that otherwise would not have been brought to market or whether, instead, it simply rewards the producers of inframarginal products. We present empirical support for our claims of an evolving marketplace, and we discuss the tradeoffs associated with reshaping the ODA for the twenty-first century. Ben did all the empirical work in the paper including the novel finding that many orphan drug markets are starting to resemble 'natural monopoly' situations.

Along with Craig Garthwaite and I, Ben also has an NBER working paper on the role of the FDA in creating a market for novel medicines by credibly signaling the quality of these medicines. Regulatory review of new medicines is often viewed as a hindrance to innovation by increasing the hurdle to bring products to market. However, a more complete accounting of regulation must also account for its potential market expanding effects through quality certification. We combine data on FDA approvals for follow-on indications and patient-level data on utilization (all assembled by Ben) to examine whether FDA approval of a follow-on indication increases the use of a drug for that indication. We find 5

facts for the market-expanding role of regulation: (1) follow-on approvals increase the share of patients taking a drug with that indication by 4.1 percentage points, or 40% increase over baseline use, at the time of approval; (2) there is little market learning prior to or following the approval of the follow-on indication, suggesting that such approvals fully certify the new use; (3) the effect of these approvals is larger for uses in a different disease area than previous indications, an increase equivalent to over 4 ½ years of market-learning; (4) it is FDA approval, not the initiation of clinical trials that generate the expansion in market size; (5) the market expansion is consistent with physicians prescribing the medicines more because of higher perceived benefits, not reduced administrative costs. Here too, Ben led all the empirical work – he wasn't the research assistant on the paper for he proposed the topic, found the data for it (we assisted with getting it), and then performed all the empirical work with very little direction from us.

Ben would be an excellent candidate for the NBER programs: he works on important but unstudied problems, he is highly collaborative and improves the work of people around him, and he's also curious and open-minded about facts – so he'd also benefit a lot from the NBER camp and from exposure to all of you.

I hope that you find my letter useful. Please don't hesitate to contact me if I can provide more information on Ben.

Sincerely,

Amitabh Chandra.