EMILY CUDDY

CONTACT INFORMATION

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EDUCATION

2021 (expected)	Ph.D. in Economics	Princeton University
2017	M.A. in Economics *Field exams: Industrial organization, labor economics*	Princeton University
2012	B.A. in Economics *Honors in economics; summa cum laude*	Wellesley College

WORKING PAPERS

Cuddy, E. 2017. "Price dispersion in the US over-the-counter drug market."

I examine price dispersion in the US over-the-counter (OTC) drug market. Analysis of weekly sales data from 2006-2015 for over 4,000 drug products suggests that there is widespread price dispersion across the country, even when defining a product at the granularity of the universal product code (UPC). Consistent with recent discussions of health care "exceptionalism," I find suggestive evidence that much of the dispersion can be explained by preexisting theories of price dispersion, including costly consumer search, store-level amenities, and retail-chain effects. I estimate that (i) an additional annual purchase of a drug product is associated with a reduction of 20-30 cents in the 90/10 price gap (~15 percent), an effect which is strongest for the most expensive drugs and (ii) about three percent of observed price dispersion can be explained by store-specific differences and about one-third by chain-specific differences.

Cuddy, E. 2018. "New Drug Prices: Theory and Evidence."

Cuddy, E., Currie, J., and B. MacLeod. 2018. "Are small area variations due to spillovers in practice style? The case of depression."

Cuddy, E. and J. Currie. 2018. "Drug Treatment for Childhood Depression: Effects on Costs and Future Health."

FELLOWSHIPS, GRANTS, AND AWARDS

2016-2019	National Science Foundation Graduate Research Fellowship
2015-2020	Princeton University Graduate Fellowship
2012	Natalie Bolton Faculty Prize in Domestic Economics
2012	Case Fellowship
2011	Phi Beta Kappa (as junior)

PROFESSIONAL ACTIVITIES

Fall 2018	NBER Young Scholars Workshop on the Economics of Artificial Intelligence
2014-2015	Research assistant at Brookings Institution
2012-2014	Research associate at Federal Reserve Bank of Kansas City
2014	Conference on Bank Structure and Competition (Chicago)
2013	Federal Reserve System Applied Microeconomics Conference (New York City)

TEACHING EXPERIENCE

2017	Introduction to Microeconomics (Undergraduate) *with Professor Hank Farber*	Princeton University

COMPLETED PH.D. COURSEWORK

ECO 501 Microeconomic Theory I
ECO 502 Microeconomic Theory II
ECO 503 Macroeconomic Theory I
ECO 504 Macroeconomic Theory II
ECO 517 Econometric Theory I
ECO 518 Econometric Theory II
ECO 523 Public Finance I
ECO 531 Economics of Labor
ECO 532 Topics in Labor Economics
ECO 541 Industrial Organization and Public Policy
ECO 542 Industrial Organization and Public Policy II
ECO 543 Topics in Industrial Organization
ECO 506 Directed Research in Health Economics

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Woodrow Wilson School of International and Public Affairs
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Sept. 22, 2018

Ben Handel, Katherine Ho, and Jonathan Kolstad
Selection Committee

Re: Health Economics Research Boot Camp for Graduate Students

Dear Ben, Kate, and Jonathan,

I am please to write a letter of recommendation for Emily Cuddy, who has been working with me for the past two years. Because health economics was not offered as a field in her second year, I inititally got to know her when she did a reading course with me. The format involved Emily presenting recent papers and commenting on their relationship to past research in each paper's area. I found Emily to be smart, hard-working, and thoughtful, with an unusual ability to think outside the box and critique the papers she was reading in a constructive way that led to new research ideas. Since that time, she has been working as my research assistant, and has proven to be an invaluable research partner.

Emily's third year paper examined price dispersion in U.S. over-the-counter (OTC) drugs. The impetus for her research was the realization that previous tests of theories about price dispersion used prescription drugs. However, since the majority of consumers have some kind of prescription drug insurance, they should not be sensitive to list prices but only to co-pays. In contrast, consumers don't typically have insurance for over the counter drugs. Emily used the Neilson scanner data to analyze weekly sales data from 2006-2015 for over four thousand drug products. She found a great deal of price dispersion at the level of the UPC code, and some evidence that it was related to consumer search costs and store-level amenities. She estimated that each additional purchase of a product per year, was associated with a 15% reduction in the 90-10 price gap, and that a third of the gap could be explained by store and chain-specific differences. She is working on revising this paper for eventual publication.

We are currently working on two joint projects: The first examines "small area variations" in the prescribing of psychiatric drugs, examining the extent to which they are due to spillovers in physician behavior. A second paper uses data from Blue Cross Blue Shield to examine the effects of anti-depressant prescribing on children. There is a great-deal of physician-level variation in prescribing patterns which yields significant differences in the probability that children in different areas who receive mental health treatment will receive drug prescriptions. We will use this variation and follow children over time to determine the effects on future treatment and health care costs. Since millions of children are being treated with psychotropic medications and we have very little evidence about their effects, this paper will fill an important gap in the literature.

Emily's main thesis research is focusing on an interesting and under-studied problem: How companies bringing a new drug to market choose to price that drug? Since spending on drugs is one of the most rapidly growing dimensions of health care spending, this is an important question. While the question can be simply posed, the problem is extremely complex. Emily has spent a lot of time to date addressing problems such as: What is the price of a drug? The price received by the manufacturer differs from the price received by pharmacy benefit managers (with or without rebates), or by the pharmacy, and as noted above, it may have little bearing on the price paid by the consumer. She has also delved into rules

governing the length of time a company is granted patent protection or the right to be an exclusive seller (periods which may or may not be concurrent). Since patents and exclusivities that have expired are removed from the FDA's "Orange Book," Emily has also invested considerable time finding older versions of the data so that she can construct time series. She is now in an excellent position to begin to model the way changes in rules governing patents and exclusivities have affected and would be likely to affect new drug prices.

This would be a terrific point for Emily to be able to participate in the Health Economics Research Boot Camp. She is extremely serious and deeply knowledgeable about health economics (and especially the pharmaceutical industry) but would benefit greatly from hearing the perspectives of the outstanding researchers who will be leading it and getting their feedback on her work in progress. Emily has the rare combination of skills and common sense, so that while she will want to use the latest techniques to estimate her models, she will also be sure to see that they pass the "smell test" and provide some real insight into an important policy problem.

In addition to getting a lot out of the workshop, I think she would also contribute a great deal. Emily goes out of her way to talk to her peers about their research and to offer thoughtful and constructive comments. I'm sure she would do the same in this workshop.

I hope these brief comments are helpful. I would be more than happy to answer any further questions about Emily.

Sincerely,



Janet Currie
Co-Director, Center for Health and Wellbeing
Henry Putnam Professor of Economics and Policy Affairs

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September 23, 2018

National Bureau of Economic Research
1050 Massachusetts Avenue
Cambridge, MA 02138-5398

To whom this may concern:

I am writing to apply for the Health Economics Research Boot Camp for Graduate Students at the NBER. As a fourth year economics PhD at Princeton University, I am in the preliminary stages of my thesis research on dynamic pricing in the US pharmaceutical market and, as such, would benefit greatly from participating in this year's boot camp.

I have a longstanding interest in health research beginning as an undergraduate and continuing as a graduate student. With fields in IO, health, and labor economics, I am familiar with many of the fundamental health papers; moreover, I have worked as a research assistant for a prominent health economist—Janet Currie. Currently, I am involved in four health-related research projects: on pricing in the pharmaceutical drug market, price dispersion in the OTC drug market, the effects of anti-depressant prescribing on children, and the role of physician prescribing behavior in generating small area variations in health care use and spending.

Given my experiences, I would relish the opportunity to attend the boot camp. On the one hand, it would expose me to how other prominent, active researchers in the field think about important research questions and would immerse me further in the research frontier. On the other hand, it would also introduce me to other PhD students interested in health economics. Because there are so few students actively researching health topics at Princeton, the opportunity to talk with other like-minded students at the boot camp would be one I would not waste.

Attached you will find my CV and two-page essay on my rationale for attending the boot camp. My PhD advisor, Professor Janet Currie (jcurrie@princeton.edu), will submit my recommendation letter separately.

Thank you for your consideration.

Sincerely,



Emily Cuddy

My name is Emily Cuddy. I am a fourth-year economics PhD student at Princeton University, and my rationale for attending this year's Health Economics Research Boot Camp is simple—I am eager to immerse myself in the research frontier of health economics.

My interest in health economics is longstanding; in fact, it was my curiosity about healthcare policy that served as my entrée into economics. Growing up, I was fixated on being a physician; however, after a summer internship program in a hospital, I quickly realized that, to me, the "important" unanswered questions in medicine were more easily addressed with an economics degree than a medical one. That fall, I enrolled in a health economics course taught by Robin McKnight and, in the year that followed, I wrote a thesis on tort reform and its effect on cancer treatment in the US under the guidance of Kristin Butcher.

At Princeton, my interests never wavered. After finishing my first year coursework, I sent an email to Janet Currie to see whether she had any interest in hiring me as an RA—her papers on physician behavior in the wake of tort reform and child health had been particularly influential to me—and I knew that I could learn a lot from her. The summer research assistantship that followed was affirming: after grinding through the first-year coursework, participating in the launch of a new project on physician prescribing behavior of mental health drugs helped reinforce why I had chosen economics in the first place. And, indeed, that summer was the beginning of a very fruitful relationship (to be discussed further below)!

Nevertheless, my second year presented a challenge. Specifically, due to a lack of demand in my cohort, the department did not offer a health field course. Instead, Currie and I organized an independent reading course, wherein I would read a foundational paper in the field, prepare slides, and then informally present the paper to her, one-on-one, each week. Over the course of the semester, we covered much of the syllabus that would have been taught in a typical graduate health course—from Amy Finkelstein's 2007 paper on the aggregate effects of health insurance and Jonathan Kolstad's 2013 paper on surgeon incentives to (then unpublished) working papers like Kate Ho and Robin Lee's work on insurer competition and Emily Oster's work on disease-induced vaccination.

My two fields were industrial organization and labor economics. The former was a natural pairing with the health research I was being exposed to in the reading course; I appreciated the structural approach and its possibility of powerful, policy-relevant counterfactuals. Although none of the IO professors were actively researching health questions, we worked through a series of health IO papers in the second half of the course, including Amy Finkelstein's many papers on moral hazard and adverse selection in insurance markets from the early 2000s as well as Ben Handel's 2013 paper on consumer inertia in health insurance markets. While brief, these health-oriented IO lectures started to generate lots of research ideas in my head.

My third-year paper—the primary requirement for the third year of the PhD program—was one example. In particular, upon reading Alan Sorensen's 2000 *JPE* paper on price dispersion in the prescription drug market, I realized that his setting did not fit his model, insomuch as most consumers do not internalize the cash prices of drugs because of drug insurance. The over-the-counter drug market, on the other hand, is a setting where consumers' choices are largely unaffected by drug insurance, and so I reexamined his conclusions using proprietary Nielsen scanner data on monthly OTC drug sales in six major cities from 2006-2015. I documented widespread price dispersion, even at the UPC level, and found that an additional the average annual purchase frequency by one reduced the 90/10 price gap by about 15 percent.

Now, as a fourth-year student, I am in the midst of several projects with Currie and also in the preliminary stages of my own thesis research. One of our papers uses claims data from Blue Cross Blue Shield to examine the effects of anti-depressant prescribing on children. We use physician-level variation in prescribing patterns as an instrument for whether a child with a mental health issue receives a prescription and follow the child over time to examine the consequences in terms of future health care costs. While the conceptual framework for the paper is quite simple, it fills an important gap in the literature since millions of children are being prescribed medications despite little data on their effects. The second paper reexamines the literature on "small area variations" in health care use and spending, examining how much is due to differences in physician prescribing behavior.

My thesis research builds on the institutional knowledge of the US pharmaceutical market that I acquired through my research assistantship with Currie. In particular, I am examining how drug manufacturers price new pharmaceutical products using the BCBS claims data. Despite intense public interest and a growing share of health care expenditures accounted for by spending on new drugs, much of the literature on pharmaceutical pricing is purely descriptive in nature or setting-specific (like Fiona Scott Morton and Mark Duggan's 2010 paper on Medicare Part D). And yet, with its dynamic considerations, uncertainty, and many intermediaries (insurers, PBMs, and the government), the pricing problem is sufficiently complex to warrant further study. Furthermore, building a model which explains manufacturers' behavior will allow for the possibility of policy-relevant counterfactuals, like the welfare effects of introducing drug price ceilings as in Europe.

By exposing me to many topics, allowing me to work closely with an eminent health economist, and pushing me to formulate my own research questions, the first three years of my PhD have served as an extended version of this fall's boot camp in health economics. So, why then do I want to participate? The reason is simple: although my training at Princeton has been immensely valuable, there would be a huge benefit to seeing multiple perspectives about health economics research. I would greatly appreciate learning how different researchers think through problems—such as information frictions in drug markets, the role of PBMs, the objective function of an insurance company, etc., and hearing what they view as the most important unanswered research questions in the field. In a similar vein, listening to the fifteen scheduled hours of research presentations would be a pleasure. As dramatic as it may seem, these nine academics have written many of the papers which have led me to where I am today. Hearing them talk at length about their work and field and getting to ask them questions directly would be an invaluable experience and would likely inform how I do research in the future.

Attending the conference would also put me face-to-face with the next generation of health economists. Recently, I attended the NBER Young Scholars Workshop on the Economics of AI. Given the widespread applicability of AI across fields, the other students at the workshop were a particularly diverse group—there were macroeconomists, labor economists, theorists, and applied microeconomists. Perhaps by luck or by chance, many of us interested in health were assigned to the same discussion group, and for that session as well as the remainder of the following conference, we stuck together, discussing ongoing projects, tricky data issues, and potential future collaborations. As one of relatively few students interested in health questions at Princeton, the opportunities to interact with other like-minded students are few and far between, so the premise of sitting in a room full of economics PhD students with similar research interests is exciting.

In short, my rationale for attending the boot camp is that it will position me right in the middle of the action in health research—interacting with not only some of the most prominent, active researchers in the field today but also its next generation. Thank you for your consideration.