Todd Lensman

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NBER Innovation Boot Camp Application Panel

I am eager to apply for admission to the inaugural NBER Innovation Boot Camp. I am a third-year PhD student in the Department of Economics at MIT, and my research interests are closely connected to innovation, innovation policy, and their interactions with competition and inequality. These topics are crucially relevant to current public policy debates concerning the effects of market power and dominant firms, as well as the role of technological change in shaping labor market outcomes and earnings inequality. I am excited to participate in the Boot Camp to learn more about the economics of innovation and conduct more informative research on these issues. My prior coursework and research have prepared me to take advantage of this unique opportunity, and I look forward to collaborating with other students and faculty who share a passion for this field of economics.

Thank you for your consideration.

Sincerely,
Todd Lensman

Reference: Professor Daron Acemoglu
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Education

PhD Candidate, Economics, Massachusetts Institute of Technology 2019 -
- Advisors: Daron Acemoglu, Michael Whinston

BA with Distinction, Economics & Mathematics, Cornell University 2015 - 2019
- *summa cum laude* (x2)
- Thesis: "Nonlinear Income Taxation with General Preferences"
  Advisor: Maxim Troshkin

Publications

"Implications of Uncertainty for Optimal Policies," with Maxim Troshkin 2022
Journal of Economic Theory

Working Papers

"Horizontal Mergers with Endogenous Input Prices," with Rebekah Dix 2022

Works in Progress

"Externalities with Complementary Innovations," with Rebekah Dix 2022

Conference & Seminar Presentations

Society for Economic Dynamics (St. Louis) 2019

Fellowships, Honors, & Awards

NSF Graduate Research Fellowship 2019

Presidential Fellowship (MIT) (declined due to NSF fellowship) 2019

Uri M. Possen Memorial Award, Best Undergraduate Economics Thesis (Cornell) 2019

Merrill Presidential Scholar, Top 34 in Class of 2019 (Cornell) 2019

Phi Beta Kappa, Junior Inductee, Top 3% in College (Cornell) 2018

Omicron Delta Epsilon, Junior Inductee (Cornell) 2017

Service

Organizer, MIT Third-Year Lunch 2022

Mentor, Harvard/MIT Application Assistance and Mentoring Program 2021

Teaching Experience

Teaching Assistant, MIT Department of Economics

- 14.05 Intermediate Macroeconomics (Undergraduate) 2021
- 14.41 Public Finance and Public Policy (Undergraduate) 2021

Course Assistant, Cornell Department of Mathematics

- Calculus Preparation and Quantitative Methods (Undergraduate) 2018
- Statistics Preparation and Quantitative Methods (Undergraduate) 2017

Completed PhD Courses

MIT

- 14.121 Microeconomic Theory I (waived)
- 14.122 Microeconomic Theory II (waived)
- 14.123 Microeconomic Theory III (waived)
- 14.124 Microeconomic Theory IV (waived)
- 14.126 Game Theory
- 14.281 Contract Economics
- 14.192 Advanced Research Communication
- 14.272 Industrial Organization II
- 14.380 Statistical Methods in Economics
- 14.381 Applied Econometrics
- 14.382 Econometrics
- 14.385 Nonlinear Econometric Analysis
- 14.451 Dynamic Optimization Methods with Applications (waived)
- 14.452 Economic Growth
- 14.453 Economic Fluctuations
- 14.454 Economic Crises
- 14.462 Advanced Macroeconomics I
- 14.462 Advanced Macroeconomics II
- 14.471 Public Economics I

14.472 Public Economics II

Harvard

ECON 2059 Decision Theory

Cornell

ECON 6090 Microeconomic Theory I

ECON 6100 Microeconomic Theory II

ECON 6130 Macroeconomics I

Current/Future Research

My research is focused on improving our understanding of efficient public policies, with an emphasis on innovation, competition, and tax policies. I am interested in studying the market failures and redistributive concerns that justify government intervention, as well as the efficient design of public policies that address them. I generally approach research questions from an applied theory perspective; I try to ensure that my questions are empirically motivated, and I am interested in more closely integrating theory and data in future work.

My current focus is a project entitled "Externalities with Complementary Inputs," joint with graduate student Rebekah Dix. In this project, we study the externalities and strategic complementarities that arise when innovating firms produce complementary inputs into downstream production. In contrast to the negative business-stealing externality observed when firms are direct competitors, we show that when inputs are complementary and demand for the downstream good is sufficiently elastic, a quality-improving innovation by one firm increases the demand for inputs produced by the remaining firms. This positive "market expansion" externality provides a new mechanism, distinct from technological spillovers and downstream surplus externalities, by which the rate of innovation may be inefficiently low.[1] Moreover, we find that market expansion can also lead to strategic complementarities in innovation rates: A firm may find it profitable to increase its rate of innovation when another input-producing firm innovates more rapidly. These strategic complementarities are crucial to understand because they affect the cost of correcting externalities through R&D policy.

In ongoing work, we are developing an industry equilibrium model in which to theoretically and empirically study the market expansion externality and the associated strategic complementarities. We plan to quantify these effects by estimating the model using firm-level data from Compustat and the Annual Survey of Manufactures. In this sense, our work is most closely related to Bloom, Schankerman, and Van Reenen (2013), though their econometric strategy precludes them from quantifying externalities that operate *across* complementary product markets, as is our emphasis. We hope that this work will provide additional insight into the economics of "upstream innovation" and indicate sectors that should be targeted for R&D support.

Recently, I have also studied the design of antitrust policy in a working paper, "Horizontal Mergers with Endogenous Input Prices," again joint with Rebekah Dix. We enrich a standard model of horizontal mergers by endogenizing the input prices observed by the merging firms, allowing them to be set by imperfectly competitive upstream firms or through bargaining. We show that this has meaningful implications for antitrust policy: Optimal antitrust policy that assumes fixed input prices is likely too lenient when input prices are endogenous. This paper

[1] Evidence suggests that the elasticity of substitution between intermediates in production is likely far below one (Atalay, 2017), so we emphasize this externality for input-producing rather than final good-producing firms.

contributes to a recent IO literature that explores the effects of market structure in settings with vertical contracting, and we hope it will inform merger analysis when input markets are imperfectly competitive. More generally, through my readings for this project I became aware of questions about the relationship between market structure and the rate and direction of innovation.[2] In particular, I am interested in understanding the extent to which competition policy should take into account the dynamic effects of market structure on innovation, a relatively understudied topic. In addition, recent claims about the extent to which dominant firms inefficiently dictate the direction of innovation deserve more rigorous study.[3]

Motivated by evidence about the rising degree of macroeconomic uncertainty,[4] in a recent paper joint with Prof. Maxim Troshkin (Lensman and Troshkin, 2022) we study the design of optimal fiscal policy in a standard macroeconomic model when agents are uncertain about the stochastic process for productivity shocks. We show theoretically that it can be optimal to reform fiscal policies periodically and to design policies that do not depend fully on all shocks, providing a microfoundation for common properties of real-world fiscal policies. I remain interested in optimal fiscal and tax policies, but particularly in their relation to innovation and the inequality it can produce. For example, recent evidence indicates that a form of innovation (automation of routine tasks) has played a substantial role in the rise in US wage inequality.[5] This fact raises several research questions that I would like to pursue: How do new cohorts of workers adapt to automation through education? Does this response change the skill composition of the labor force, and is there any attendant feedback on the direction of innovation? Are certain demographic groups (e.g., poorer households) less well-equipped to adjust to this technological change? What are the implications of automation of well-paying routine jobs for economic mobility? Can tax policy help address any inequities precipitated by automation?

Interest in Boot Camp

I am eager to attend the Boot Camp because my research interests are tightly connected to topics in innovation, and I believe my understanding of these topics would benefit from intensive lectures and conversations with similarly interested students and faculty. I am most excited to learn about frontier research topics in innovation (including through the NBER SI Innovation Policy meeting), and particularly those that interface with economic growth, competition, and inequality. I also look forward to meeting other students with common interests, with the hope of building research relationships that will lead to productive collaborations.

[2] Aghion, Bloom, Blundell, Griffith, and Howitt (2005); Cunningham, Ederer, and Ma (2021); Igami and Uetake (2020).

[3] Steven Lohr. "Economists Pin More Blame on Tech for Rising Inequality." *New York Times*, 11 January 2021.

[4] Bloom (2014).

[5] Acemoglu and Autor (2011); Acemoglu and Restrepo (2021).

References

Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. In *Handbook of labor economics* (Vol. 4, pp. 1043–1171). Elsevier.

Acemoglu, D., & Restrepo, P. (2021). *Tasks, automation, and the rise in us wage inequality*. National Bureau of Economic Research.

Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and innovation: An inverted-u relationship. *The quarterly journal of economics*, *120*(2), 701–728.

Atalay, E. (2017). How important are sectoral shocks? *American Economic Journal: Macroeconomics*, *9*(4), 254–80.

Bloom, N. (2014). Fluctuations in uncertainty. *Journal of Economic Perspectives*, *28*(2), 153–76.

Bloom, N., Schankerman, M., & Van Reenen, J. (2013). Identifying technology spillovers and product market rivalry. *Econometrica*, *81*(4), 1347–1393.

Cunningham, C., Ederer, F., & Ma, S. (2021). Killer acquisitions. *Journal of Political Economy*, *129*(3), 649–702.

Igami, M., & Uetake, K. (2020). Mergers, innovation, and entry-exit dynamics: Consolidation of the hard disk drive industry, 1996–2016. *The Review of Economic Studies*, *87*(6), 2672–2702.

Lensman, T., & Troshkin, M. (2022). Implications of uncertainty for optimal policies. *Journal of Economic Theory*, *199*, 105206.

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January 16, 2022

Dear Colleagues:

I am writing to enthusiastically recommend Todd Lensman for the NBER Innovation Bootcamp.

Todd is a tremendously promising and engaging third-year student in our PhD program. I am his main advisor and have been talking to him about research for the last three years (since Todd came into the program full of energy from the first day and jumped into research as well as his coursework).

Todd is an impressive economist. He has so far sketched out and make progress towards two very ambitious sets of projects (all of these are joint with Rebekah Dix, another one of our third-year student, and another one of my students).

In their first project, Todd and Rebekah develop a general framework for studying pass-through and propagation of shocks in an economy with input-output linkages and oligopolistic firms. This is a very challenging problem that has been recognized as important but difficult to make progress on (recent supply chain disruptions showcase its importance, if additional proof were necessary).

Todd and Rebekah make more progress on this problem than I have seen before, and develop a beautiful framework where different effects of changes in the environment on markups, pass-throughs and outputs responses can be transparently understood (though it is a very challenging problem, because there are several competing effects).

I expect this project to yield a very nice theory paper. Rebekah and Todd have also been exploring critical applications of this framework, using the LRD data.

As part of this project, or perhaps as an extension, Rebekah and Todd have also produced a very nice set of results on how input-output linkages change criteria for merger policy (since now one has to take into account the implications working through supply chains).

The second project Todd and Rebekah have initiated is more ambitious and the reason why the Bootcamp would be excellent for Todd. They have developed a very nice and tractable framework for studying complementarities in innovation over supply chains (again set up as a standard input-output economy). The key question is whether innovation by an input-supplier or customer encourages or discourages innovation by firms, and how this affect changes depending on competition structure and the overall network.

This is a fantastic question, which has attracted very little attention (innovation and input-output problems have generally been treated separately, even though there are important linkages). The project is both theoretical (on which to have already made important progress)

and empirical (with some preliminary suggestive evidence, and planned work using confidential census data).

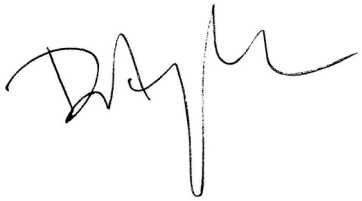
I am confident that Rebekah and Todd will make great progress on this very exciting research project.

This also clarifies the context in which Todd would be an excellent participant in the Bootcamp. He has much to learn from the experts in this literature, both in terms of the conceptual issues and institutional context. But I also believe that he already has quite a bit to add the discussions.

I recommend him very strongly and without any reservation.

Please do not hesitate to contact me if you have further questions.

Sincerely,



Daron Acemoglu