

OFFICE CONTACT INFORMATION

MIT Department of Economics
 77 Massachusetts Avenue, E52-301
 Cambridge, MA 02139
<https://economics.mit.edu/people/phd-students/todd-lensman>

HOME CONTACT INFORMATION

Email: tlensman@mit.edu
 Mobile: 330-605-1236
 Personal Website: toddlensman.com

MIT PLACEMENT OFFICER

Professor David Autor
dautor@mit.edu
 617-253-4669

MIT PLACEMENT ADMINISTRATOR

Ms. Shannon May
shmay@mit.edu
 617-324-5857

DOCTORAL STUDIES

Massachusetts Institute of Technology (MIT)
 PhD, Economics, Expected completion June 2025
 DISSERTATION: “Essays on Economic Growth and Innovation”

DISSERTATION COMMITTEE AND REFERENCES

Professor Daron Acemoglu
 MIT Department of Economics
 77 Massachusetts Avenue, E52-446
 Cambridge, MA 02139
 617-253-1927
daron@mit.edu

Professor Michael Whinston
 MIT Department of Economics
 77 Massachusetts Avenue, E62-533
 Cambridge, MA 02139
 617-258-8408
whinston@mit.edu

Professor Jacob Moscona
 MIT Department of Economics
 77 Massachusetts Avenue, E52-452
 Cambridge, MA 02139
moscona@mit.edu

PRIOR EDUCATION

Cornell University
 BA in Economics and Mathematics
Summa Cum Laude (x2)

2019

CITIZENSHIP

USA

GENDER: Male**LANGUAGES**

English (native), Spanish (intermediate)

FIELDS

Primary: Macroeconomics, Innovation
 Secondary: Industrial Organization, Economic Theory

TEACHING EXPERIENCE

Industrial Organization II (PhD, MIT course 14.272)
 Teaching Assistant to Prof. Nancy Rose, Prof. Michael Whinston (scheduled)

2025

Economic Growth (PhD, MIT course 14.452)
 Teaching Assistant to Prof. Daron Acemoglu (scheduled)

2024

MIT Economics

TODD LENSMAN

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	Economic Growth (PhD, MIT course 14.452)	2023
	Teaching Assistant to Prof. Daron Acemoglu (overall rating: 6.8/7.0)	
	Public Economics I (PhD, MIT course 14.471)	2022
	Teaching Assistant to Prof. James Poterba, Prof. Iván Werning (overall rating: 7.0/7.0)	
	Intermediate Macroeconomics (undergrad, MIT course 14.05)	2022
	Teaching Assistant to Prof. Christian Wolf (overall rating: 5.6/7.0)	
	Public Finance and Public Policy (undergrad, MIT course 14.41)	2022
	Teaching Assistant to Prof. Jonathan Gruber (overall rating: 5.8/7.0)	
RELEVANT POSITIONS	Research Assistant to Prof. Daron Acemoglu	2022-2024
	Research Assistant to Prof. Neil Thompson (MIT CSAIL)	2023
	Research Assistant to Prof. David Atkin, Prof. David Donaldson	2021
FELLOWSHIPS, HONORS, AND AWARDS	Finalist, MIT Economics Best Graduate TA	2024
	George and Obie Shultz Fund	2021-2023
	NSF Graduate Research Fellowship	2019
	MIT Presidential Fellowship (declined)	2019
	Uri M. Possen Memorial Award, Best Economics Thesis, Cornell	2019
	Merrill Presidential Scholar, Cornell	2019
	Phi Beta Kappa (Junior Inductee), Cornell	2018
PROFESSIONAL ACTIVITIES	Refereeing: <i>Economic Policy, Journal of Public Economics, Proceedings of the National Academy of Sciences, Review of Industrial Organization</i>	
	Presentations: LSE Environment Day	2023
	International Industrial Organization Conference	2022
	Society for Economic Dynamics	2019
PUBLICATIONS	“Regulating Transformative Technologies” (with Daron Acemoglu) <i>American Economic Review: Insights</i> , September 2024.	
	Transformative technologies like generative AI promise to accelerate productivity growth across many sectors, but they also present new risks from potential misuse. We develop a multisector technology adoption model to study the optimal regulation of transformative technologies when society can learn about these risks over time. Socially optimal adoption is gradual and typically convex. If social damages are large and proportional to the new technology’s productivity, a higher growth rate paradoxically leads to slower optimal adoption. Equilibrium adoption is inefficient when firms do not internalize all social damages, and sector-independent regulation is helpful	

but generally not sufficient to restore optimality.

“Implications of Uncertainty for Optimal Policies” (with Maxim Troshkin)
Journal of Economic Theory, January 2022.

We study the implications of ambiguity for optimal fiscal policy in macro public finance environments with heterogeneous agents and private idiosyncratic shocks. We describe conditions under which ambiguity implies that it is optimal to periodically reform policies. Periodic reforms lead to simplified optimal policies that are not fully contingent on future shocks; at times they also lose dependence on the full history of past shocks. These simplified policies can be characterized without complete backward induction when the time horizon is finite. However, linear policies can be far from optimal. We also show that equilibria in decentralized versions of these economies are not generally efficient, implying a meaningful role for government provision of insurance, unlike in conventional environments with a narrower view of uncertainty.

**RESEARCH
PAPERS**

“Technology Choice, Spillovers, and the Concentration of R&D” (Job Market Paper)

The direction of innovation shapes both current technologies and future innovation opportunities, as firms acquire expertise and create public knowledge through discovery. But how do firms choose which technologies to develop, and why might they fail to exploit new technological paradigms? I study these questions in a tractable new model of directed innovation and firm dynamics, highlighting a novel connection between market structure, the direction of innovation, and economic growth: Expertise in a current technology gives incumbents a comparative advantage at innovating it relative to entrants, who instead favor a new technology with higher growth potential. Each firm’s innovation decisions influence others through knowledge spillovers, which can inefficiently delay or prevent the emergence of the new technology. Concentrating R&D resources in a small number of firms can exacerbate this problem by amplifying the influence of incumbents, even though it accelerates growth in the absence of a technology choice. I provide empirical evidence for the theory using data on firm patenting and R&D expenditures, and I apply it to explain the historical development of mRNA vaccines.

“Combining Complements: Theory and Evidence from Cancer Treatment Innovation” (with Rebekah Dix)

Innovations often combine several components to achieve outcomes greater than the “sum of the parts.” We argue that such combination innovations can introduce an understudied inefficiency – a positive market expansion externality that benefits the owners of the components. We demonstrate the

existence of this externality in the market for pharmaceutical cancer treatments, where drug combination therapies have proven highly effective. Using data on clinical trial investments, we document several facts consistent with inefficiently low private innovation: firms are less likely than publicly funded researchers to trial combinations, firms are less likely to trial combinations including other firms' drugs than those including their own drugs, and firms often wait to trial combinations including other firms' drugs until those drugs experience generic entry. Using microdata on drug prices and utilization, we quantify the externalities that arise from new combinations and find that the market expansion externality often dominates the standard negative business stealing externality, suggesting too little innovation in combination therapies. As a result, firms may have incentives to free ride off others' innovation, which we analyze with a dynamic structural model of innovation decisions. Finally, we use the estimated model to design cost-effective policies that advance combination innovation. Redirecting publicly funded innovation toward combinations with high predicted market expansion or consumer surplus spillovers minimizes crowd out of private investments, increasing the rate of combination innovation and total welfare while remaining budget neutral.

“Input-Price Responses to Horizontal Mergers and the Bargaining-Leverage Defense” (with Rebekah Dix)

In several recent antitrust cases, defendants have argued that a horizontal merger would allow them to negotiate reduced input prices with suppliers and pass on the resulting savings to consumers. This input price effect is often supported by models in which firms simultaneously set goods prices and bargain with suppliers over input prices, because a downstream merger can reduce suppliers' outside options. We study new forces that arise when input prices are set before goods prices, and we show that they often tend to increase input prices after a merger. Generalizing the first-order approach to merger analysis, we derive a measure of incentives to adjust input prices after a downstream merger, Input Pricing Pressure. We use this measure to show that mergers often incentivize higher input prices, and that these incentives hinge on changes in downstream pass-through rates, marginal cost efficiencies generated by the merger, and input-output linkages. By implication, consumer surplus-maximizing antitrust policy may be too lax when input prices are assumed fixed, and it should be biased against claims that input prices will fall after a downstream merger. In an empirical application to local retail beer markets, endogenizing input prices substantially raises the consumer harm from mergers of retailers.

RESEARCH IN PROGRESS

“Entrepreneurship and Productivity Growth in Tight Labor Markets”

Motivated by recent evidence linking local labor market tightness to business creation, I study conditions under which a positive aggregate demand shock can raise productivity growth by incentivizing high-tech entrepreneurship. I develop a search model of the labor market in which workers face an

occupational choice between employment and entrepreneurship. Successful entrepreneurs create firms by adopting technologies from a productivity frontier, while unsuccessful ones become unemployed. An aggregate demand shock that raises labor demand has an ambiguous effect on entrepreneurship: A tighter labor market lowers the cost of failure by shortening unemployment spells, but it also directly raises the opportunity cost of entrepreneurship. The former channel dominates when successful entrepreneurs primarily come from employment, providing a mechanism by which an increase in aggregate demand can increase productivity. This mechanism suggests a novel role for accommodative monetary policy to stimulate productivity growth, and I consider methods to estimate its magnitude in the data.

“A Theory of Innovative Firms and Power over New Technologies and Researchers”

I construct a theory to explain the emergence of large, innovative firms as a means to internalize spillovers in the innovation process, and I show how these firms exert power over the direction of innovation and the labor market for researchers. Researchers must choose one of several technologies to study, and their innovations generate knowledge spillovers to others working on the same technology. A manager can internalize these spillovers by coordinating researchers' innovation decisions, raising economic growth given a fixed set of technologies. But with limits to firm size from convex monitoring costs, this innovative firm can instead slow growth and reduce welfare when new technologies arrive over time: If innovation is combinatorial, so that the owners of past innovations for a technology benefit from subsequent ones, the firm has an incentive to pursue an old technology even as outside researchers exploit a more productive new one. Limits to firm size imply that spillovers are only partially internalized, so the equilibrium direction of innovation is generally inefficient. These spillovers allow the firm to distort the innovation decisions of outside researchers, and I explore how the firm can exploit its size in the labor market for researchers to affect the direction of innovation.

“Technology Paradigms, Lock-in, and Economic Growth” (with Daron Acemoglu)

We develop a theory of economic growth in which innovation alternates between dominant technological paradigms and the emerging paradigms that might replace them. Innovation within a paradigm is subject to decreasing returns as “ideas get harder to find,” but innovations for an emerging paradigm only generate profits after it becomes dominant. Our analysis reveals how this trade-off can generate technological lock-in or growth cycles. Long-run growth requires the development of both dominant and emerging paradigms, and we show how creative destruction within and across paradigms distorts this process. We explore methods to identify technological paradigms in the patent data, facilitating empirical analysis of productivity dynamics as industries proceed along paradigms and transition between them.

We assess the extent to which declining research productivity can be attributed to the maturation of dominant paradigms, suggesting scope for a growth resurgence as innovators explore alternatives.