

MIT Economics

ADAM HARRIS

OFFICE CONTACT INFORMATION

MIT Department of Economics
77 Massachusetts Avenue, E52-301
Cambridge, MA 02139
asharris@mit.edu
economics.mit.edu/people/phd-students/adam-harris

HOME CONTACT INFORMATION

101 Elm Street, Unit 3
Somerville, MA 02144
Mobile: 860-262-2450

MIT PLACEMENT OFFICER

Professor Rob Townsend
rtownsen@mit.edu
617-452-3722

MIT PLACEMENT ADMINISTRATOR

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

CURRENT POSITION Postdoctoral Fellow at National Bureau of Economic Research (NBER) 2023 -
Supported by NSF and US Department of Transportation

DOCTORAL STUDIES Massachusetts Institute of Technology (MIT)
PhD, Economics, June 2023
DISSERTATION: "Essays on Industrial Organization"

DISSERTATION COMMITTEE AND REFERENCES

Professor Tobias Salz
MIT Department of Economics
77 Massachusetts Avenue, E52-460
Cambridge, MA 02139
617-715-2266
tsalz@mit.edu

Professor Nancy Rose
MIT Department of Economics
77 Massachusetts Avenue, E52-420
Cambridge, MA 02139
617-253-8956
nrose@mit.edu

Professor Nikhil Agarwal
MIT Department of Economics
77 Massachusetts Avenue, E52-440
Cambridge, MA 02139
617-324-6804
agarwaln@mit.edu

PRIOR EDUCATION Yale University 2017
B.S. Economics & Applied Mathematics, magna cum laude
Phi Beta Kappa

CITIZENSHIP United States **GENDER** Male

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FIELD	Industrial Organization	
TEACHING EXPERIENCE	14.271: Industrial Organization I (MIT, graduate) Teaching Assistant to Professors G. Ellison and S. Ellison	2020
	14.272: Industrial Organization II (MIT, graduate) Teaching Assistant to Professors N. Rose and M. Whinston	2021
	14.20: Industrial Organization (MIT, undergraduate) Teaching Assistant to Professor N. Rose	2021
RELEVANT POSITIONS	Research Assistant for Professor Tobias Salz (MIT)	2019
	Research Assistant for Professor Dave Donaldson (MIT)	2018
	Research Assistant for Professor Michael Peters (Yale)	2016 - 2017
FELLOWSHIPS, HONORS, AND AWARDS	Postdoctoral Fellowship (NBER)	2023 -
	Graduate Research Fellowship (NSF)	2018 - 2023
	George & Obie Shultz Fund Grant (MIT)	2020
	John Krob Castle 1963 Fellowship (MIT)	2017 - 2018
PROFESSIONAL ACTIVITIES	Refereeing: <i>American Economic Journal: Applied Economics</i>	
	Presentations: International IO Conference (IIOC): Rising Stars Session (April 2021) MIT Center for Transportation and Logistics Research Seminar (March 2021)	
RESEARCH PAPERS	Human Decision-Making with Machine Prediction: Evidence from Predictive Maintenance in Trucking (with Maggie Yellen) (Job Market Paper)	
	In this paper, we study the role of predictive artificial intelligence (AI) in human decision-making. Using a rich decision-level data set from the maintenance of heavy-duty trucks, we document how the repair decision-making of expert technicians changes with the introduction of an AI tool designed to predict the risk of truck breakdowns. We develop and estimate a dynamic discrete choice model of technician decision-making. The resulting estimates show that technicians with the AI tool exhibit a substantially better ability to predict breakdown risk than those without the tool. This improvement in predictive ability translates into better results: The AI tool reduces the total costs that technicians incur by \$343-\$686 per truck per year. Furthermore, with the AI tool, technician decision-making is nearly optimal;	

only 5% more cost savings could feasibly be achieved with further improvements in decision-making quality.

Long-Term Relationships in the US Truckload Freight Industry

(with Thi Mai Anh Nguyen)

(Conditionally accepted, *American Economic Journal: Microeconomics*)

This paper provides evidence on the scope and incentive mechanisms of long-term relationships in the US truckload freight industry. In this setting, shippers and carriers engage in repeated interactions under fixed-rate contracts that allow for inefficient opportunism. The main dynamic mechanism involves shippers using the threat of relationship termination to deter carriers from short-term opportunism. This threat and the potential of future rents induce more carrier cooperation. We test this mechanism against likely alternatives and analyze relationship scope for different carrier types. We find that incentive schemes do not exploit the full temporal and spatial scope of relationships.

Long-term Relationships and the Spot Market: Evidence from US Trucking

(with Thi Mai Anh Nguyen)

Long-term informal relationships play an important role in the economy, capitalizing on match-specific efficiency gains and mitigating incentive problems. However, the prevalence of long-term relationships can also lead to thinner, less efficient spot markets. We develop an empirical framework to quantify the market-level tradeoff between long-term relationships and the spot market. We apply this framework to an economically important setting—the US truckload freight industry—exploiting detailed transaction-level data for estimation. At the relationship level, we find that long-term relationships have large intrinsic benefits over spot transactions. At the market level, we find a strong link between the thickness and the efficiency of the spot market. Overall, the current institution performs fairly well against our first-best benchmarks, achieving 44% of the relationship-level first-best surplus and even more of the market-level first-best surplus. The findings motivate two counterfactuals: (i) a centralized spot market for optimal spot market efficiency and (ii) index pricing for optimal gains from individual long-term relationships. The former results in substantial welfare loss, and the latter leads to welfare gains during periods of high demand.

RESEARCH IN PROGRESS

Which Workers Benefit from AI? Estimating Heterogeneous Effects on Productivity

This extension of my job market paper aims to explore heterogeneity in how technicians utilize a predictive AI tool in making engine repair decisions for heavy-duty trucks. By combining data on technician characteristics with rich data on repair decisions, this study seeks to address two pivotal questions: First, how might the quality of technicians' decision-making vary with experience? Second, how does the introduction of a predictive AI tool differentially affect the quality of decision-making for technicians with

different experience levels? The first question speaks to the returns to experience in this context. The second speaks to whether predictive AI tools act as complements to or substitutes for such experience. The findings aim to offer insights into the distributional impacts of predictive AI on professional human decision-makers, as well as potential effects on incentives for these decision-makers to invest in experience (i.e., human capital).

Long-term Relationships and Supply Chain Resilience (with Thi Mai Anh Nguyen)

Recent supply chain disruptions have highlighted the vulnerability of the goods economy to upheaval in freight transportation markets. In the US, the trucking industry may represent a particular susceptibility, both because of its singularly central role (72% of all domestic shipments are transported by truck) and because of its peculiar market institutions. As described in our first two papers, long-term relationships, rather than a centralized spot market, are the key means of arranging trucking transactions. This likely affects the ability of the industry—and thus, the US goods economy as a whole—to adjust to shocks. If transactions in this industry were arranged through a spot market, we would expect price signals to effect a rapid adjustment to shocks. However, in a world where transactions are actually arranged through a decentralized network of informal long-term relationships with prices that are (at least in the short-run) fixed, this may not be true. With this motivation in mind, this study analyzes—at the micro level—how shocks affect relationship stability and—at the macro level—how such shocks are transmitted through relationship networks.