MIT Economics

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DOCTORAL STUDIES

Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2026
DISSERTATION: "*The Technologies of Global Supply Chains"*

DISSERTATION COMMITTEE AND REFERENCES

Professor David Atkin
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Professor Arnaud Costinot
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PRIOR EDUCATION

Princeton University 2018
AB in Economics, *summa cum laude*

CITIZENSHIP: USA **GENDER:** Male

LANGUAGES English (native), Spanish (fluent), Hindi (fluent)

FIELDS Primary Fields: *International Trade, Development Economics* [firms]

Secondary Fields: *Organizational Economics* [technology]

TEACHING EXPERIENCE

14.772: PhD Development – Macroeconomics — 2024
[firms, trade, spatial models, misallocation, industrial policy]
TA to Prof. Rob Townsend and Prof. Isabela Manelici

14.771: PhD Development – Microeconomics — 2023
[econometrics: DID, IV, RDD, SSIV, randomization inference]
TA to Prof. Esther Duflo and Prof. Ben Olken

14.73: The Challenges of World Poverty — 2023
[case method class with undergrad, policy, and MBA students]
TA to Prof. Esther Duflo and Prof. Frank Schilbach

RELEVANT POSITIONS

Research Assistant to David Atkin (MIT), Amit Khandelwal (Yale), and John van Reenen (LSE) — 2020-23

Predoctoral Fellow for Michael Greenstone (UChicago) — 2020-22

FELLOWSHIPS, AWARDS, AND GRANTS

Dartmouth Globalization Fellowship [visitor]	Fall 2025
MIT Jerry A. Hausman Dissertation Fellowship	2024-25
NSF Graduate Research Fellowship	2020-23
George and Obie Shultz Fund [modularity and resilience projects]	2022, 2024
STEG PhD Grant [with Dan Ehrlich]	2024
IGC Early Career Grant [with Brandon Tan]	2023

SEMINAR PRESENTATIONS

MIT Organizational Economics Seminar, LSE Junior Trade Workshop, MIT Sloan Priority Technologies Group, NEUDC (2025); NEUDC (2021)

RESEARCH PAPERS

Specialization by design: the unequal geographic effects of modular product design (Job Market Paper)

I show that modular design – a revolution in how firms organize innovation – concentrates industrial production in large countries. Modular products follow common rules called design platforms, and thus can share inputs while remaining customized for local needs. Combining six new datasets on global automotive design and trade, event studies of product redesigns, and a model with input scale economies, I show that design platforms reshape global trade in two phases. First, platform-sharing across destinations *increases input trade*, as countries specialize in preferred product types rather than in local products. For instance, poor countries export engines for affordable cars. Second, platform-sharing across product types *creates winner-take-all supply chains* in which the largest and most-productive countries produce all inputs. Both effects occur because modularity increases the scope of countries' market size advantages, concentrating input production in large markets for each platform rather than each product. As a result, modular design has unequal aggregate effects: in model counterfactuals, present-day adoption shifts production from smaller to larger economies, and universal platforms (expected by 2030 for EVs) double American and Chinese production shares while reducing production by over 80% in a majority of countries.

Unreliable firms: evidence from Rwanda w/ Brandon Tan (IMF)

Journal of Development Economics (2025)

This paper develops a new measure of reliability – whether firms execute transactions on-schedule – for the universe of Rwandan formal firms using transaction timing data and describe the characteristics of reliable firms. Reliable firms have larger interfirm sales, export more, supply exporters and multinationals, and transact with other reliable firms. Reliable firms are less sensitive to supply chain disruptions. Supplying an MNC increases seller reliability even when servicing non-MNC buyers.

Supply chain resilience via partial integration w/ Aroon Narayanan (MIT)

How do firms adapt to ensure supply chain resilience? This paper introduces partial integration, defined as targeted buyer interventions across firm boundaries, as an effective alternative to full vertical integration. Using novel daily timeline data from Indian manufacturing supply chains, we show that supplier underinvestment in key inputs, stemming from working capital constraints and noncontractibilities in input use, are the primary driver of supply chain disruptions. To overcome these issues, buyers exert control over supplier processes—through in-person monitoring, contingent contracts, and direct sourcing of raw materials—rather than merely advancing cash. This buyer involvement escalates as disruption risk increases: an unanticipated working-capital shock leads to direct buyer control of inputs for the most constrained suppliers. We develop a three-stage model that rationalizes these strategies, which clarifies that buyers control input decisions to prevent resource diversion due to noncontractibility. The model predicts that relational buyers with low monitoring and sourcing costs enjoy a comparative advantage in fostering resilient trade with poor regions.

Who picks winners? Evidence from industrial policy application cycles w/ Tishara Garg (Stanford)

In many settings, bureaucrats are formally responsible for industrial policy, but politicians retain de facto power to disburse limited funds. Using confidential data on the universe of industrial subsidy applications in a large Indian state, we show that bureaucrats approve over 90% of applications, yet fewer than 30% of approved subsidies are ultimately paid, with an average delay of 3.5 years. Firm bargaining power (proxied by size and local headquarters) predicts earlier payouts, and payments often prioritize a specific high-profile plants or industrial cluster. Moreover, firms facing larger negative demand shocks—identified via a shift-share design—are more likely to receive payments for previously approved investments. These results highlight the challenge of insulating industrial policy from political influence, as constrained funds and opaque decision-making enable favoritism long after investments have been made.

RESEARCH IN PROGRESS

Managing the machine: organizing production in the automated firm
w/ David Atkin (MIT), Amit Khandelwal (Yale) and John van Reenen (LSE)

This paper examines the productivity effects of reorganizing workers for automated production environments. Specifically, we evaluate the staggered rollout of a multinational manufacturer's internal production system across machines within several later-adopting manufacturers. The intervention, which was implemented by an elite professional services firm, consists of (i) giving each production worker overall responsibility for a single machine, (ii) requiring workers to complete proactive cleaning and regular maintenance alongside machine operation, and (iii) soliciting worker input on production issues through structured daily line-level meetings. The treatment reduces unplanned downtime by 50%, largely through reductions in short unplanned stops of under 5 minutes in duration. To achieve these gains, workers increase the precision of unique stop reasons tracked during production, and work more days in non-production tasks. The intervention leads to a 25% increase in plant-wide productivity, in part because machine-level gains spill over to (i.e. reduce stops in) other production stages within each plant.

A bank on every corner? Informal supply chain credit amid information frictions w/ Daniel Ehrlich (UChicago)

Fieldwork completed November 2025

Supply chains in poor countries are underpinned by informal supply chain credit from suppliers to retailers, and from retailers to customers. How do sellers informally enforce trade credit payments, what frictions constrain the provision and repayment of supply chain credit, how do they shape firm size and scope, and what government interventions could address these frictions? By combining a field experiment with novel transaction-level supply chain credit data from an Indian bookkeeping app, we document that (i) trade credit defaults are common, which increases de facto trade costs, (ii) firms restrict supply chain credit to socially and geographically proximate networks, (iii) firms learn customer creditworthiness over time, (iv) public information on buyer nonpayment is underprovided and predictive of future repayment, and (v) in event studies, providing public default information through the app improves trade credit enforcement within existing (in-default) relationships. Finally, by building a model in which firms grow through new credit relationships, we study how a counterfactual de-bundling of trade and credit through the introduction of credit cards affects the size and number of retail and wholesale firms.

The spatial reach of family business: evidence from India
w/ Sukrit Puri (London Business School) and Shivram Viswanathan (Harvard)

OTHER PUBLICATIONS

Does social distancing matter? w/ Michael Greenstone (UChicago)
COVID Economics, 2020.