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Personal Information: US Citizen

Undergraduate Studies:
B.A. in Economics and Mathematics, Williams College, *Summa Cum Laude*, 2016

Graduate Studies:
Harvard University, 2016 to present
Ph.D. Candidate in Economics
Thesis Title: "Essays on Technology and International Trade"
Expected Completion Date: May 2022

References:

Professor Pol Antras
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Professor Marc Melitz
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Teaching and Research Fields:
Primary fields: International Trade

Secondary fields: Macroeconomics, Innovation and Technology

Teaching Experience:

Spring 2019-2021	Intermediate Microeconomics (Undergraduate), Harvard University, Teaching Fellow for Professor Marc Melitz
Fall 2019-2021	Intermediate Microeconomics (Undergraduate), Harvard University, Teaching Fellow for Professor Maxim Boycko
Fall 2018	The World Economy: Growth or Stagnation (Undergraduate), Harvard University, Teaching Fellow for Professor Dale Jorgenson

Research Experience and Other Employment:

2019-2021	Research Assistant for Professor Teresa Fort, Tuck School of Business at Dartmouth College
2018	Research Assistant for Professor Marc Melitz, Harvard University
2015	Summer Research Analyst at the Federal Reserve Bank of New York

Professional Activities

Invited Presentations: Western Economic Association International 2021
Referee for *Quarterly Journal of Economics*

Honors, Scholarships, and Fellowships:

2021	Harvard University Dissertation Completion Fellowship
2018-2021	Harvard University Bok Center Certificate of Distinction in Teaching (Awarded to Teaching Fellows with average evaluation score of 4.5/5 or higher)
2015	Beinecke Scholarship

Job Market Paper:

"Robots, Trade, and Offshoring: A Perspective from US Firms" (Job Market Paper)

Abstract: What is the impact of automation on trade? This paper studies the impact of industrial robots on US manufacturing firms, with a focus on trade and offshoring. I construct a parsimonious model of two-stage production that incorporates automation and offshoring in both production of intermediate inputs (upstream production) and assembly (downstream production). I then develop a novel instrumental variables strategy based on immigrant inflows of robot-complementary workers to examine the impact of robot adoption on firm-level outcomes. Using a detailed administrative dataset of US manufacturing firms, I find that at the firm level, robot adoption has a positive effect on imports of both intermediate inputs and final outputs, but the effect is significantly larger for input imports. Robot adoption also leads to an increase in sales and productivity, and an increase in employment and wages favoring non-manufacturing workers. These empirical findings are consistent with predictions of the model and the hypothesis that robots are mainly used in assembly. Quantitative estimation of the model confirms the comparative advantage of robots in downstream production. Following a positive shock to productivity of robots, robot adopters increase their sales, imports, and domestic inputs but not domestic assembly, while non-adopters contract in all dimensions due to within-industry competition. In aggregate, the rise of industrial robots in the US between 1992 and 2012 is associated with a 15% increase in imports and a 14% decrease in domestic manufacturing employment, with significant heterogeneity across different types of imports and workers. I use the estimated model to evaluate costs and benefits of robot taxes and subsidies.

Research in Progress:

"The Cost of Banking Deserts: Racial Disparities in Access to PPP Lenders and their Implications" (with David Hao Zhang)

Abstract: Many government support programs for small businesses are designed to pass through banks and credit unions. However, this poses barriers for minority communities that are less connected to financial institutions for obtaining this support. Using the latest program for supporting small businesses, the Paycheck Protection Program (PPP), as an example, we show that there was a large disparity in the density of PPP enrolled lenders by racial composition of the neighborhood. This difference is both due to a lower density of lenders in those neighborhoods in general, and by the fact that the banks and credit unions that do operate there are smaller, are less likely to have previous relationships with the Small Business Administration, and are less likely to enroll in the program. More heavily Black neighborhoods have significantly lower take-up of PPP loans particularly in lower population (more rural) areas where this disparity is most salient. Through an instrumental variables analysis, we show that the intensive margin of access to enrolled lenders can explain about 35% of the racial disparity in take up within the

relevant areas. Our results suggest that government programs that provide "support through banks" can have undesirable distributional implications.

"Technology and Reallocation: Evidence from US Labor Markets"

Abstract: How do automation technologies shape labor market outcomes? In this paper, I exploit a unique technology shock based on immigrant inflows of robot-complementary workers to study the impact of industrial robots on U.S. local labor markets. Robots have a negative effect on local employment at the commuting zone level. However, I show that this effect is primarily driven by reallocation across industries. Once industry variation is controlled for, commuting zones with higher exposure to the robot shock experience an increase in employment and wages, concentrated in college graduates working in non-routine-intensive occupations. Empirical results suggest that technology induces reallocation along three margins: labor markets, industries, and worker types. I discuss implications of these reallocation mechanisms for wage inequality in the United States.

"Exporting and Default Risk" (with Jack Feng)

Abstract: This paper seeks to understand the relationship between exporting and default risk on the firm level. Using a dataset of publicly traded US firms connecting data on balance sheet, exports, and corporate bonds, we find that exporting is associated with a higher default risk, measured by corporate bond yield spread. This positive relationship is present for both extensive margins and intensive margins of exporting and exhibits non-monotonicities. We rationalize these empirical findings with a stylized model in which exporting requires a fixed cost and exposes a firm to foreign demand shocks leading to an increase in volatility. The model predicts that the positive effect of exporting on default risk is stronger when (1) fixed costs are higher as a share of revenue, (2) foreign demand is more volatile, and (3) correlation between foreign and domestic demand is higher. Combining the firm-level dataset and product-level import data for the US, we provide empirical evidence supporting each of the theoretical predictions.

"AI and firms" (with Rafael Proenca, in progress)