María Alejandra Rodríguez

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Course of Graduate Studies

- Current year: 3rd.
- Fields: Macroeconomics, Labor Economics.
- Research interests: Firm dynamics, Technology, Labor markets.
- Classes taken:
  - First year: Microeconomics I and II, Macroeconomics I and II, Econometrics I and II, Computational Methods for Economics.
  - Second year: Advanced Macroeconomics I and II, Labor Economics I and II, International Trade I, Topics in Empirical Economics, Applied Empirical Methods.

Education

- **Yale University** — **New Haven – CT, United States**
  PhD in Economics — *2022 – Present*
- **University of British Columbia** — **Vancouver – BC, Canada**
  MA in Economics — *2018 – 2019*
- **Universidad del Pacífico** — **Lima, Peru**
  Bachelor in Economics, Master in Economics — *2012 – 2018*

Professional Experience

- **Stanford Institute for Economic Policy Research** — **Stanford – CA, United States**
  Predoctoral Research Fellow — *2020 – 2021*
- **Becker Friedman Institute for Economics** — **Chicago – IL, United States**
  Predoctoral Research Professional - Labor Markets Initiative — *2019 – 2020*
- **University of British Columbia** — **Vancouver – BC, Canada**
  Graduate Research Assistant — *2018 – 2019*
- **Central Reserve Bank of Peru** — **Lima, Peru**
  Analyst — *2016 – 2018*

Misc.

- Languages: Spanish (*Native*) , English (*Fluent*).
- Citizenship: Peru.

Research Project: Impacts of AI on Labor Markets and Firm Dynamics

Authors: Abigail Kuchek, María Alejandra Rodríguez, Bianca Yue.

Abstract This project seeks to examine the impacts of artificial intelligence (AI) adoption on both workers and firms by posing two primary questions: (1) How is AI changing worker composition? (2) How does AI adoption differ by firm size, and what implications does this have for market concentration and inequality? These questions will be explored in separate studies, each employing distinct methodologies. To investigate AI's effects on workers, we employ a model of task automation that leverages Census data on actual AI adoption, offering a more precise understanding than measures of potential exposure. To assess AI's impact on firms, we use a model of firm dynamics, analyzing Census data on AI adoption, business owner characteristics, and firm life-cycle information. This approach allows us to study how AI adoption varies by firm size, with a specific focus on its influence on market concentration and economic inequality. We hypothesize that AI may disproportionately benefit smaller firms, and recent data indicate that these firms are indeed accelerating their adoption of AI.

Labor Markets As artificial intelligence rapidly advances and permeates workplaces worldwide, economists are tasked with making sense of how this will affect workers. A robust literature on technological change has been developed in the last 30 years in response to similar booms in information technology and industrial robots. Given this strong theoretical foundation, the first step to studying AI is to answer a foundational question that remains open: what makes AI *different* from previous technologies—or is it ultimately no different at all? Although still in its early stages, AI adoption is gradually increasing. According to the Annual Business Survey (ABS) data for 2016–2018, 3.2% of firms reported using AI, compared to 2% using robots. However, these technologies have already reached a sizable share of the workforce, with 12.6% and 15.7% of U.S. workers employed at firms using AI and robotics, respectively[1]. While adoption has been slow, recent trends suggest it may be accelerating. By late 2023, 3.9% of firms were using AI, and 6.5% planned to adopt it within the next six months, according to the Business Trends and Outlook Survey (BTOS).

In this project, we plan to use Census data on firm technology adoption over time to study

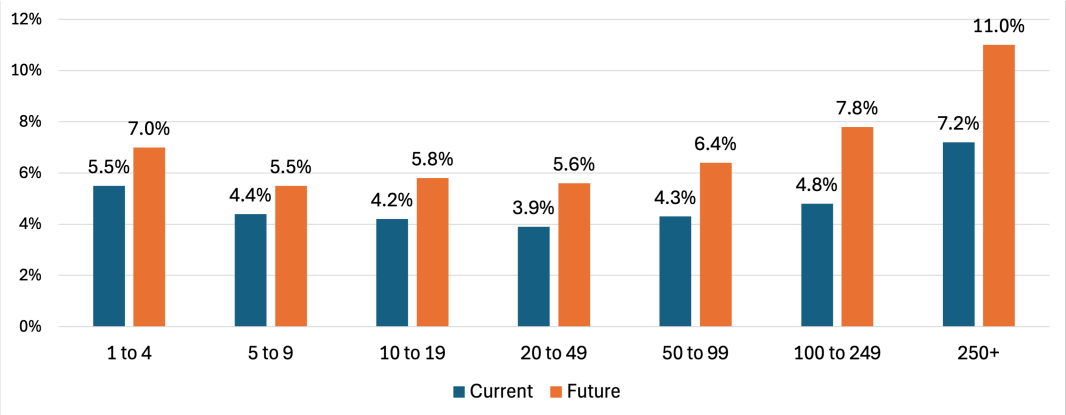
[1] Acemoglu et al (2022). Automation and the Workforce: A Firm-Level View from the 2019 Annual Business Survey. In Technology, Productivity, and Economic Growth. University of Chicago Press.

how AI adoption is affecting worker composition during these early stages of the technology. Our objective is to compare findings based on actual adoption measures with previous studies that developed measures of exposure to AI, as well as prior research on automation.

Firms AI may differ from past automation technologies, such as industrial robots, because adopters do not necessarily face high fixed costs. Instead, they can rent cloud computing resources and use pre-trained AI models. This could lead to different adoption patterns among firms. Bassi et al. (2022)[2] examines how a rental market for capital disproportionately benefits smaller firms by separating ownership from utilization, and alleviating the problem of capital indivisibility. Similarly, a recent paper by Reichardt (2024)[3] contrasts two types of technological change: large-scale-biased (with high fixed costs but low marginal costs) and small-scale-biased (with low fixed costs but high marginal costs). The latter type of technical change tends to reduce the number of workers per firm and the ratio of profits to wages. These results have implications for inequality, as business income is typically concentrated among the wealthiest individuals. Early evidence from the Business Trends and Outlook Survey (BTOS) supports our hypothesis that AI may benefit smaller firms, with small firms adopting AI at higher rates than medium sized ones (Figure 1).

In this project, we plan to use Census data on firm characteristics and AI adoption to investigate this pattern of adoption by smaller firms and its implications for market concentration and inequality.

Figure 1: AI Current and Future Use, by Firm Size



Source: Business Trends and Outlook Survey, combined estimates for data collected from 12/04/2023 to 02/25/2024.

[2]Bassi et al. (2022). Achieving Scale Collectively. Econometrica, 90 (6), 2937–2978.
[3]Reichardt, H. (2024). Scale-Biased Technical Change and Inequality.