

**Name:** Sarah H. Bana, Ph.D. Student in Economics

**Institution:** University of California, Santa Barbara

**Email:** sarah.bana@gmail.com

**Phone:** 626.616.0795

**Status:** 4th year student and returning student applicant to NBER Economics of Digitization Graduate Student Tutorial

**Committee:** Peter Kuhn (Chair), Kelly Bedard, Heather Royer

**Fields:** Labor, Econometrics, Macroeconomics

**Relevant Coursework:** Search and Matching, Labor Economics, Wage Structure, Econometric Theory, Bayesian Econometrics, and Stochastic Processes.

**Research Focus:** J24 - Human Capital/Skills/Occupation Choice/Labor Productivity

**Research Interests:**

My research is broadly on the changing composition of tasks in the economy, and with technology advancing, how the division of tasks between workers and machines develops, and how workers and firms adapt to these changes.

In my first paper, I explore an intuitive reason why some displaced workers may experience lower earnings than others: poor local labor market conditions in their pre-displacement occupation. Because fine occupation-level growth rates are not available, I construct an estimator of occupation growth rates using a shift-share method by using state-level variation in industry composition. I find displacement from a shrinking occupation is associated with decreased earnings, increased unemployment duration, and changes to occupations where previous skills are left unused. This research suggests vulnerable displaced workers can be identified based on occupation-specific state labor market conditions.

Following this finding, I am interested in understanding drivers of shrinking occupations. The digitization of simple tasks and markets may play a significant role. As scholars of the economics of digitization, I think it is crucial for us to think about implications of digitization on the labor market.

I am still developing my second paper idea but I have a few potential directions:

1. I am hoping to look at jobs lost as a result of automation, and compare the growth rates and profits of firms that do and do not automate certain tasks. My hypothesis is that while companies that lay off workers shrink in the short run, they are more agile and can invest more in capital, causing them to grow faster later. Using the Bureau of Labor Statistics data on mass layoffs and reasons for those layoffs (including automation, business demand, import competition, domestic competition, and reorganization or restructuring of company), I should be able to test this hypothesis. It

might also be interesting to compare the demographics of the workers impacted by these changes. For example, are older workers more likely to be laid off as a result of automation? Do workers laid off as a result of contract completion have shorter unemployment durations?

2. Frey and Osborne (2013) attempts to estimate the fraction of occupations that will be automated by 2030. I think a significant indicator of what will and will not be automated is a function of the disutility and/or risk associated with a human performing that occupation. For example, at airports, baggage weight is restricted to limit human discomfort and health issues. I would like to develop a model of automation in occupations and look at occupations that are soon to be automated to see where workers displaced from these occupations would go. This would allow us to look at general equilibrium implications of automation, which were not addressed in Frey and Osborne's research.
3. In June 2015, the Office of Personnel Management (OPM) shut down the federal government's H.R. online background check function "eQIP" for almost a month. The reason for the shut down was related to the massive data breaches discovered by the U.S. government. Stronger cybersecurity could have prevented this hack, and shutdown of the system. I am interested in quantifying the second order effects of this hack by assessing whether the system's closure increased the time-to-hire for government employees and lead to worse hires. While search frictions are clearly forces in the labor market, there has been little work on characterizing different levels of friction for different industries. This paper may shed some light on the potential costs associated with digitization in the labor market, and the benefits associated with cybersecurity.