Application for NBER Digitization Tutorial 2021

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My name is Shuo Zhang, and I am a sixth year Phd candidate in Economics Department in University of California, Santa Barbara. My contact information is as following:

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Course Description

In the first year, I finished the sequences of microeconomics, macroeconomics and econometrics. Staring from the second year, my focus of courses and study is labor economics, especially the job search behavior in labor market. I have finished the sequence of labor economics, including labor economics, wage structure and population economics, the sequence of macroeconomics, including economic development, aggregate economics and job search theory, and the sequence of econometrics, including two classes on econometric theory, and Bayesian econometrics.

In addition, I have achieved a master's degree from Statistics Department in UCSB with a specialization in Data Science. The courses I took from Statistics department included the sequence of advanced statistical theory, the sequence of advanced statistical method, and the sequence of statistical machine learning (Statistical Data Science, Data Mining and Computational Techniques in Statistics). With solid R experience, I can do the general data analysis with R, such as the data summaries, statistical models, basic design and tests, linear model regression, as well as text mining and website scraping.

Research Description

My main research interest is the empirics of job search and matching in online labor markets, including workers' job search behaviors, employers' recruitment decisions, and the role of internet job platforms in online job matching. My committee members are Peter Kuhn (advisor), Kelly Bedard and Clément de Chaisemartin. Here are my research projects:

Voluntary Wage Disclosure in Job Search Process

This paper investigates the role of worker's voluntary wage disclosure in the job search process. Using the internal data from an online job board in China, we find that the worker's voluntary wage disclosure is incomplete: High-wage, male, younger, less educated and more experienced workers, and workers who conceal their marital status and want to switch industry or occupation are more likely to reveal their current wages. In terms of the employer's response, our empirical evidence suggests that the wage disclosure decision does not affect the callback probability of low-wage workers, but employers tend to decrease the callbacks to workers who choose to disclose their higher-than-expected wages. However, in the application sample that received callbacks, the worker's revealed high wage is positively correlated with the job's posted wage.

Apply What You See: Algorithmic Gender Bias in Job Recommendation Systems

With the increasing of online job searching and recruiting, internet job boards have started applying more complicated recommendation systems to suggest appropriate job positions to workers, rather than simply displaying job vacancies' information. Online job platforms make job recommendations to workers based on the worker's characteristics and previous search behaviors, as well as the match between the worker and jobs. While job recommendation algorithms have the potential to help workers find their preferred jobs faster and to improve worker-job match quality, they also have sparked deep concern about the fairness of the job recommendation algorithms: even when this is not intended by the designers, the recommended jobs may reinforce gender and other stereotypes. To address this problem, I propose an audit study on workers' side to test whether the suggested jobs are different between male and female workers in online job boards.

To my knowledge, most of the online job platforms build hybrid recommender systems, in-

cluding item-based collaborative filtering (CF) approach, content-based recommendation and machine learning models to incorporate information about the workers' characteristics as well as their behaviors when they decide which jobs are displayed to workers. In this study, I describe how the recommender system works in online job boards and summarize the problems of the existing job recommendation algorithms, in particular the potential channels that can induce gender biased job recommendation results. The design of experiment is straightforward: By collecting the recommended jobs of fictitious workers who have the same backgrounds but with different gender, I can compare the job recommendation outcomes and measure the difference between two gender groups.

R Package Development on Two-way Fixed Effects Estimators with Heterogeneous Treatment Effects, with *Clément de Chaisemartin*

In this project, we development the R package $DIDmultiplegt$ to estimate heterogeneous treatment effects in Difference-In-Difference designs with multiple groups and periods. Comparing with the Stata package $did_multiplegt$, the R package is about five times faster, especially in the big datasets. In addition, R is an open-source software and $DIDmultiplegt$ is available to more researchers in economics, statistics, and other social sciences.

Gender-Targeted Job Ads in the Recruitment Process: Evidence from China, with *Peter Kuhn* and *Kailing Shen*, *Journal of Development Economics, Volume 147, 2020.*

Explicit requests for applicants of a specific gender are widely used in emerging-economy labor markets. The extent to which these requests affect the allocation of workers to jobs depends on two factors: how much workers comply with firms' requests in their application decisions, and how much firms enforce their own requests when they encounter gender-mismatched applicants. Using internal data from a Chinese job board, we show that both compliance and enforcement are substantial, but compliance accounts for the vast majority of the gender segregation and gender wage gap associated with employers' explicit gender requests.

In this research, we use the Bernoulli naïve Bayes classifier to predict the implicit maleness and femaleness of each job based on the document of posted job title, and find that both the explicit and implicit gender requests direct workers' job search behaviors.

Words Matter Life: The Effect of Language on Suicide Behavior, with *Donald Lien*, *Journal of Behavioral and Experimental Economics, Volume 86, 2020.*

This paper explores the relationship between future time reference (FTR) in language and suicide behavior on both country level and individual level and provides a new source to explain the huge variation of suicide behaviors across countries. We find that language markers on future tense have impacts on the speakers' behaviors that involve intertemporal considerations, even the most critical decision on life - the suicide behavior. On aggregate level, countries with primary languages marking future tense intensively in grammar have lower suicide rates. We prove this effect is consistent with the results obtained on individual level: Individuals speaking strong FTR languages tend to have lower acceptance on both suicide and euthanasia.