

## **Measuring Labor Market Discrimination Via Anti-Immigrant Sentiment**

**Motivation:** Public discourse about immigrants often contradicts evidence of their role within American society. For example, since the 1960s, immigrants have been 60 percent less likely than the US-born to be incarcerated [1]. Yet, research finds that news coverage of immigrants as criminals has increased by 7 percent since 2010 [2]. Research finds that negative media portrayals of immigrants increase ingroup favoritism and hostility towards immigrants [3]. In addition, health researchers find evidence that negative sentiment about immigrants negatively impacts the physical and mental health of immigrants and their children [4]. Given that the foreign-born account for almost one-fifth of the U.S. labor force, it is essential to understand the impact of anti-immigrant sentiment on immigrants in the labor market. In this study, I measure the impact of anti-immigrant sentiment on the earnings and promotion rates of immigrants and how this effect varies by firm size.

**Intellectual Merit:** This study builds on a large, preexisting literature of taste-based discrimination within the labor market. Taste-based discrimination is the differential and prejudicial treatment of individuals based on personal preferences, especially on the grounds of race, ethnicity, age or sex. While prior literature often attributes the presence and magnitude of taste-based discrimination to what can be observed in experiments or inexplicable gaps in labor market outcomes, this study attempts to measure taste-based discrimination directly. To do so, I use restricted-access panel data which covers almost all employment in the U.S., giving this study rigorous identification rarely seen in economic literature. I combine these data with data from social media. In 2021, 48 percent of U.S. adults received their news from social media, making it a relevant data source for public sentiment [5]. To measure public sentiment, I employ text analysis and a Large Language Model (LLM). The data of this study also allow for investigation of employer discrimination at the retention and promotion margins within a literature where most research about labor discrimination often stops at the hiring margin. The nascent approach using modern data and methods, unprecedented sample representation, and unexplored but unique context underscores the importance of this research.

**Data and Methodology:** Provided my Special Sworn Status (SSS) with the Census Bureau, I use the Longitudinal Employer-Household Dynamics (LEHD) data and Current Population Survey (CPS) to observe the earnings and promotion rates of workers from 2015 through 2022. The LEHD is a quarterly, panel dataset of linked employer-employee data that covers 95 percent of all employment in the United States. I then link the LEHD data with the full-sample CPS, which is monthly-level data that provides the demographic and geographic information of employees. Crucially, this linkage allows me to compare gaps in earnings and promotion rates for a panel of foreign-born and US-born workers while controlling for other observables.

I measure anti-immigrant sentiment by constructing a sentiment score using the machine learning technique of text analysis. For this, I gather data from X, formerly known as Twitter. From X, I collect the contents, latitude and longitude, and time of each post as well as user information such as number of followers. I then finetune a LLM to be particularly accurate in its ability to identify the immigrant sentiment of an X post. The LLM then provides a sentiment score for each post, which is a quantitative measure of immigrant sentiment, ranging from -1 representing the most anti-immigrant sentiment to 1 representing the most pro-immigrant sentiment. Next, I average the sentiment score at the county-quarter level for analysis.

In order to quantify the impact of anti-immigrant sentiment, I use the following difference-in-differences design:  $Y_{icq} = \alpha_i + \delta_c + \gamma_q + \beta_1 T_{cq} + \beta_2 (I_i * T_{cq}) + \varepsilon_{icq}$ . Where  $Y_{icq}$  are the main outcomes of earnings and promotion rates for an individual  $i$ , in county  $c$ , and quarter  $q$ . I include  $\alpha_i$ ,  $\delta_c$ , and  $\gamma_q$ , which are individual, county and quarter fixed effects, respectively. Individual and county fixed effects allow for the control of idiosyncratic characteristics that do not vary over time.  $I_i$  is a binary variable indicating whether the observed individual is an immigrant.  $T_{cq}$  is a binary variable indicating whether the county in each quarter is treated. To be treated in quarter  $q$ , a county must record a sentiment score that is one standard deviation below the average sentiment score across all its prior quarters. Once a county is treated, it remains treated, and the labor outcomes are observed in subsequent quarters. This

design allows for the measurement of the initial impact of an increase in anti-immigrant sentiment and for how long its effects persist over time. The coefficient,  $\beta_2$ , identifies the gap in earnings and promotion rates between treated and non-treated counties, under the assumption of parallel trends. This study rests on the assumption that earnings and promotion decisions are influenced at the local, establishment level that is impacted by local sentiment rather than solely at a national level. Since these changes in sentiment happen at different times across different counties, two-way fixed effects yield incorrect results within this context. To correctly employ the econometrics necessary, I turn to Calloway & Sant'anna (2021) [6].

Prior research finds that labor market discrimination at the hiring margin can be concentrated among a select set of large employers and may vary by firm size [7]. Given the scope of data for this project, I assess whether these findings hold among the same set of large firms for earnings and promotion rates and if they vary by firm size. To do so, I interact  $I_i * T_{cq}$  with indicators for being a small or medium sized firm. I categorize small firms as firms in the lowest quartile of number of employees and medium firms as the second and third quartiles, as commonly done in financial economics literature. The coefficients on these interactions identify, relative to large firms, the impact of anti-immigrant sentiment on the earnings and promotion rates of immigrants who work at small and medium sized firms in county  $c$ , and quarter  $q$ .

**Broader Impact:** It is crucial to study the intersection of anti-immigrant sentiment and labor market discrimination due to the increasing presence and importance of immigrants in the U.S. labor market. The Pew Research Center projects that 82 percent of the increase in the U.S. population will be due to immigrants arriving from 2005 through 2050 and their US-born descendants [8]. My research introduces a new framework that can quantify the impact of general rhetoric and public sentiment on racial and ethnic disparities. Thereby drawing the link between the intangible and real-world impacts.

Contextualizing this study within the firm provides insight into which firm size may best safeguard its foreign-born employees against anti-immigrant sentiment and why. This research sheds light on the potential characteristics of a firm that can be investigated within other firms or industries that may struggle with the permeation of anti-immigrant sentiment but want to better protect their employees.

In addition to the impact of anti-immigrant sentiment on immigrants' labor market outcomes, there is also potential for spillover effects on American workers. I have begun work on this in my honors thesis where I find positive, statistically significant results regarding the impact of low-wage immigration on high-wage female labor supply via household production. Anti-immigrant sentiment may mitigate the positive impact of immigrants on some of American's most productive female workers, exacerbating gender wage inequality.

My research agenda also includes investigating the interdependence of occupations and the subsequent impacts on the macroeconomy. US-born workers rely on foreign-born labor. It is important to measure how much earnings or productivity US-born workers could lose as a result of the negative impacts that anti-immigrant sentiment can have on foreign-born labor. According to the Hamilton Project, higher immigration has boosted job growth and contributed 0.1 percentage points to GDP growth annually in 2022 and 2023 and is projected to do so again in 2024 [9]. As America diversifies, understanding the reliance that US-born workers have on immigrant and minority labor is necessary for the future of the macroeconomy.

**References:** [1] Abramitzky, R. et. al. (2024) Law-Abiding Immigrants: The Incarceration Gap Between Immigrants and the US-born, 1870-2020. *NBER*. [2] Young, M. et. al. (2021) Coverage and Framing of Immigration Policy in US Newspapers. *The Milbank Quarterly*. [3] Conzo, P. et. al. (2021) Negative media portrayals of immigrants increase ingroups favoritism and hostile physiological and emotional reactions. *Sci Rep*. [4] Szaflarski, M. and Bauldry S. (2019) The Effects of Perceived Discrimination on Immigrant and Refugee Physical and Mental Health. *Adv Med Sociol*. [5] Pew Research Center (2024) Social Media and News Fact Sheet. [6] Callaway, B. and Sant'anna, P. (2021) Difference-in-Differences with multiple time periods. *Journal of Econometrics*. [7] Kline, P. et. al. (2022) Systemic Discrimination Among Large U.S. Employers. *NBER*. [8] Passel, J. et. al. (2008) US Population Projections: 2005-2050. *Pew Research Center*. [9] Edelberg, W. and Watson, T. (2024) New immigration estimates help make sense of the pace of employment. *The Hamilton Project*.