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## **Educational attainment, race, and employability post COVID-19: insights from data visualization**

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### **Abstract**

The COVID-19 pandemic caused unemployment rates to reach record highs, adding to an already unequally divided system (Kawohl & Nordt, 2020). Minorities' unemployment rates in the United States were significantly higher in 2020 than the white unemployment rate, regardless of educational attainment. This study draws upon U.S. census data after the onset of the pandemic to investigate the relationship between educational attainment, race, and employment rates in the United States. Logistic regression revealed that the probability of being employed in 2020 was higher for whites than minorities and significantly higher for those with higher levels of education. Based on these preliminary results, we discuss the relationships among race, educational attainment, and employment, and suggest routes for further inquiry.

**Keywords:** Data visualization, COVID-19, analytics, race, educational attainment, employment

### **Introduction**

The COVID-19 pandemic affected economies across the globe. As companies took safety precautions to prevent the spread of the disease, some were forced to close completely. As a result, many people were unemployed throughout 2020 and continue to be unemployed (King, 2021). Specifically, there is widespread unemployment amongst blacks and other people of color (Center on Budget and Policy Priorities, 2021). The disparity in employment regardless of educational attainment shows the disproportionate inequities that existed long before the pandemic and plague our society. Prior to the COVID-19 pandemic, in 2019, the unemployment rate for Americans was 3.7% but varied across races and ethnicities, with the highest rate of those unemployed being 6.1 % for Native Americans, 6.1 % for blacks and 4.3 % for Hispanics, with significantly lower unemployment rates for whites and Asians. During the COVID-19 pandemic, in April 2020 the unemployment rate rose to a record high of 14.7% with 31.8% for blacks and 31.4% for Latinx (Couch et al., 2020). These inequities raise important questions about how long minorities will be affected, and according to the U.S. Bureau of Labor and Statistics there are many differences among race and ethnicities that are factors and not quantifiable (2019).

The aim of this study is to investigate disparities in employment rates among different races and levels of educational attainment after the onset of COVID-19 using U.S. census data. We would like to determine whether or not additional educational attainment increases the likelihood of employment and whether or not race is a factor. We first review literature related to unemployment rates, race, and educational attainment, and explore relevant theory. We then describe our research methodology, present and discuss implications of our results, and finally offer suggestions for future research to examine the question, do race and educational attainment play a role in employability?

## Literature Review

On January 30, 2020, The World Health Organization announced that COVID-19 was a global emergency. The unemployment rate increased to 13% in the second quarter of the year 2020 before dropping to 6.7% in the fourth quarter ending a decade-long job expansion initiative (Smith et al., 2021). At the beginning of the recession, employment began to fall for all races and ethnicity groups. Permanent workers were forced into part-time work, the number of self-employed workers declined, unemployment rates for veterans doubled, and the number of people with disabilities doubled in unemployment. However, minorities were more adversely affected than whites during the COVID-19 recession, regardless of education.

Prior to the pandemic in 2019, the unemployment rate in the United States was 3.7% and the labor force was 77% white, 13% black, 6% Asian, and 1% American Indian and Alaska Native (U.S. Bureau of Labor Statistics). Pacific Islanders accounted for less than 1 percent of those employed, with people of two or more races serving as 2% of the labor force (U.S. Bureau of Labor Statistics, 2020). The U.S. Bureau of Labor Statistics further discusses how minorities' labor participation is greater among each respective race and ethnicity (2021).

The COVID-19 pandemic severely hindered the labor market. The unemployment rate skyrocketed to 14.7% and the economy is still recovering years after its onset. While blacks experienced lower unemployment rates than anticipated, Latinx experienced an unemployment rate of 18.2 (Couch et al., 2020). Both Blacks and Hispanics unemployment rates were impacted significantly, causing concern about the long-term effects this might have on minorities. According to the U.S. Bureau of Labor statistics, prior to the pandemic, 90% of whites, blacks, and Asians that were employed and only 77% of Hispanics had at least a high school diploma (2020). Asians were the most likely to achieve a bachelor's degree or higher. The unemployment ratios from the same data show, with the exception of whites, that minorities' unemployment rates were the lowest in history (2020).

Preliminary research has compared unemployment during the pandemic to unemployment during previous periods of recession (Gezici & Ozay, 2020). A study related to recession employment and race found that disparities among race remained similar during the recessions of the 1980s and 2007 (Hoynes et al, 2012). Other research related to the health effects of unemployment during the COVID-19 pandemic found that there were disparities in unemployment among races and that this had disproportionate effects on mental health (Lee et al., 2021). One study accounted for disparities in employment related to work performed by "essential" versus "non-essential" workers but found that further work was needed to investigate disparities related to race and education level (Montenovo et al., 2020).

## Theoretical Background

Disparities in employment related to race and educational attainment remain a controversial area of study, and suggested theoretical explanations range from the economic to the sociological. In economic theory, there are two main models used to explain disparities related to discrimination: "taste-based" and "statistical" discrimination (Lang & Spitzer, 2020). Taste-based discrimination may indicate the biased preferences of an employer (Becker, 2010). Without qualitative data, it is difficult to obtain support for taste-based labor market discrimination.

Our approach to disparities in employment is the statistical approach first proposed by Phelps, which proposes that discrimination is based on valid statistical inference (1972). In our study, we seek confirmation that employment disparities remain after the onset of COVID-19. Furthermore, we determine

the probability that a person of a particular race or education level is more or less likely to have employment in the climate of the pandemic.

## Methodology

To investigate disparities in employment among races and levels of educational attainment, employment data by race and level of educational attainment from the year 2020 was obtained from the Labor Force Statistics from the Current Population Survey (2020). Data included the total number of individuals aged twenty-five or older of each race by level of educational attainment that were employed and unemployed that year. The raw aggregate data provided for Asians, blacks, and whites is shown in Table 1. Six categories of educational attainment are reported, from individuals with “Less than a high school diploma” to those with an “Advanced degree,” which include the attainment of a master’s, doctoral, or professional degree such as those in law or medicine (Labor Force Statistics from the Current Population Survey, 2020).

**Table 1: Aggregate CPS employment data**

	Less than high school diploma	High school graduate	Some college	Associate’s degree	Bachelor’s degree	Advanced degree
<b>Asian</b>						
Employed	374	1189	607	513	3116	2884
Unemployed	75	189	73	56	222	131
<b>Black or African American</b>						
Employed	881	4466	2938	1843	3466	2131
Unemployed	169	666	358	182	247	104
<b>White</b>						
Employed	6304	24822	14648	11688	27757	16765
Unemployed	743	2148	1196	812	1514	616

Data presented in the report for Hispanic or Latino ethnicity was excluded from our analysis, as individuals reporting as such may also report as individuals of Asian, black, or white race and our scope is limited to that of differences race (Labor Force Statistics from the Current Population Survey, 2020).

To prepare data for statistical analysis, the aggregated data was first recoded using a dummy coding procedure to obtain individual records representative of persons included in the CPS report. A total of 135,891 records were produced to represent each individual in the sample. Each record included a categorical designation of race (black = 1; Asian = 2, white = 3), level of educational attainment (less than HS diploma = 1; advanced degree = 6), and employment status (unemployed = 0; employed = 1) for the individual.

Statistical discrimination theory suggests that individuals that identify as white and those with higher levels of education will be more likely to be employed than those other races and lower levels of educational attainment. Thus, we use a logistic regression to determine whether or not whites and those of higher levels of education are more likely to be employed than other individuals and, if so, the increase in probability that they will be employed.

## Results

A logistic regression was carried out to assess the effect of educational attainment and race on the likelihood of being employed in the United States in the year 2020. As shown in Table 2, the overall model was

statistically significant when compared to the null model, ( $\chi^2 (7) = 1300.584, p < 0.001$ ), explained 2.4% of the variation in employment (Nagelkerke  $R^2$ ) and correctly predicted 93% of cases. Educational attainment level ( $p < 0.001$ ) and race ( $p < 0.001$ ) were significant. Each additional level of educational attainment increased the probability of being employed. Those that received at least a bachelor’s degree were more than two times as likely and those that received an advanced degree were more than three times as likely to be employed than those without a high school diploma. Asians and whites were more likely to be employed than blacks.

**Table 2: Logistic Regression Results**

	B	S.E.	Wald	df	Sig.	Exp(B)
Black			282.844	2	<.001	
Asian	0.029	0.047	0.375	1	0.54	1.029
White	0.422	0.028	221.103	1	<.001	1.525
Less than high school diploma			972.425	5	<.001	
High school diploma	0.291	0.039	55.589	1	<.001	1.337
Some college	0.391	0.043	83.723	1	<.001	1.478
Associate’s degree	0.557	0.047	142.406	1	<.001	1.745
Bachelor’s degree	0.824	0.041	401.886	1	<.001	2.279
Advanced degree	1.233	0.049	634.963	1	<.001	3.43
Constant	1.697	0.041	1682.752	1	0	5.46

**Discussion**

With respect to the different factors affecting employability, we confirmed that minorities and those of lower levels of education are disproportionately underemployed post-pandemic. We also determined the difference in probability that a white individual was likely to be hired than an Asian or black individual. There are many potential explanations for these disparities, including racial discrimination. Disparities might also be accounted for by terminations due to the pandemic or transfers to remote work and a need for fewer support staff.

The differences in the employability of minorities compared to whites is likely due to racial inequality. That minorities are fewer than whites yet so close in percentages demonstrates the disproportionate nature of the labor force. Without diversity and inclusion programs, the inequities of the labor force will continue and leaves a bleak future for minorities. With respect to the diversity and inclusion programs currently in place, they may have been less important human resource initiatives to administration in the onset of the pandemic.

Race is more than likely a contributing factor to the unemployment and employment disparity. A look into the past, shows a trend of inequities for minorities within the labor market. While COVID-19 was an unprecedented event, the data shows now more than ever there is a disparity in minorities and those of lower levels of education being employed.

**Limitations and Future Research**

Our study determined that there are employment disparities related to race and educational attainment post-pandemic and found the probability that an individual would be employed based on these characteristics. Our study is limited to employment data among Asians, blacks, and whites of different levels of education during the year 2020. While our analysis provides some insight into the employment landscape in the wake

of the pandemic, it is limited to the first year of its onset and does not include qualitative data that might provide more insight into the circumstances of employment disparities.

Further research in this area is needed. Additional years of data before and after the pandemic can be analyzed in a longitudinal study to further investigate patterns in employment related to COVID-19, race, and educational attainment. Qualitative data from social media can also be obtained for linguistic analysis to determine if there are suspected causes of unemployment reported by individuals. Additionally, further insight can likely be gained by narrowing employment data by region, state, or type of employment.

## Conclusion

In this study, we investigated the differences in measures of race, employment, and education levels for the year 2020 at the onset of the COVID-19 pandemic. Our results confirmed that there are in fact employment disparities affecting minorities and those of lower levels of education in the labor market. We think these disparities in employment are related to inequities in the labor market; however, there may be other contributing factors. Additionally, we found that COVID-19 is affecting the decade-long labor initiative in the United States and that minorities are not being hired at the same rate as they were prior to the pandemic. In fact, the numbers show a growing concern which could have long term effects on minorities and those of lower levels of education. Our findings call for a more thorough investigation of the reasons for unemployment and the disparity in employment rates.

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