

INTRODUCTION

The data provided by the United State Census Bureau's (USCB) 2019 Annual Business Survey (ABS) (2021a) gives insight into the economic and demographic characteristics for businesses and business owners. The datasets available following the survey include, "Company Summary", "Characteristics of Businesses", "Characteristics of Business Owners", and "Technology Characteristics of Businesses". The goal of the present study focuses on diversity in US companies. Namely, to what degree are various demographics disproportionately affected in the US business industry? The research aimed to answer the following questions regarding ethnicity, race, and sex, in relation to US business industries:

1. Which states contribute the most to the overall data?
2. Do males and females differ in the number of business firms across the US?
3. Of the races being studied, how much do they own and in what industries?
4. Do businesses differ in number of employees by sex? By ethnicity?
5. Does the owner ethnicity or sex affect the average amount of income for their employees or business?
6. On average, how much yearly income do the different races receive?
7. Which race contributes the most to number of businesses owned?
8. What is the degree of race representation in business ownership?
9. What is the degree of race representation throughout the industries?
10. How frequently do businesses record joint ownership?
11. What is the trend for amount of businesses owned by females?
12. To what degree do males and females own businesses and in what industries?

DATASETS

Links to the data were supplied in the Pandas and Visualizations module for the Dev10 Data Fundamentals course on BrightSpace (Genesis10, 2021). The Section “Part 1: Get into Groups and Review the API” provided three links: “Census Bureau” (United States Census Bureau, 2022), “Annual Business Survey (ABS) APIs for 2019” (United States Census Bureau, 2021), and “API User Guide” (United States Census Bureau, 2021a). All three to be used in the ETL process. The Census Bureau (2022) page links to all API datasets, section denoted as ABS 2019 (2021) navigates to the specific dataset used in this report, and the API User Guide (2021a) is a guidance page for developers. Additionally, one extra dataset comes from the Census Bureau’s QuickFacts web interface system and is used to get data regarding racial and ethnic breakdowns of the United States (2022a).

It should be noted that all datasets have aggregated their demographics in such a way that maintains owner privacy. The USCB uses noise infusion as an additional confidentiality measure, by perturbing the data values prior to publishing (United States Census Bureau, 2021c).

VISUALIZATIONS

Overview

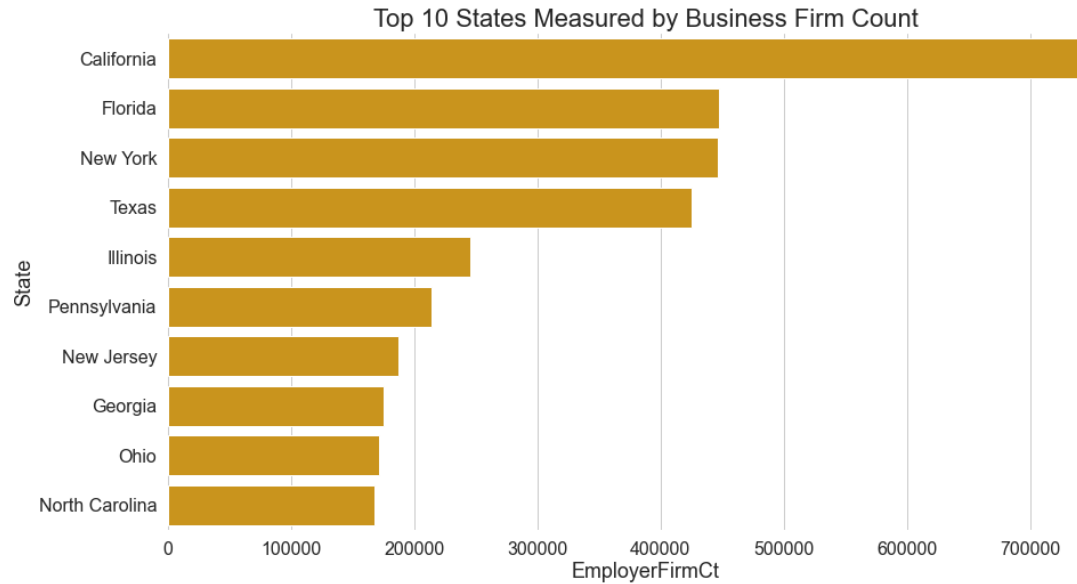


Fig1.1. Top 10 States Measured by Number of Business Firms: The number of business firms by state in 2019. Top 10 states determined by number of business firms, across all demographic measures.

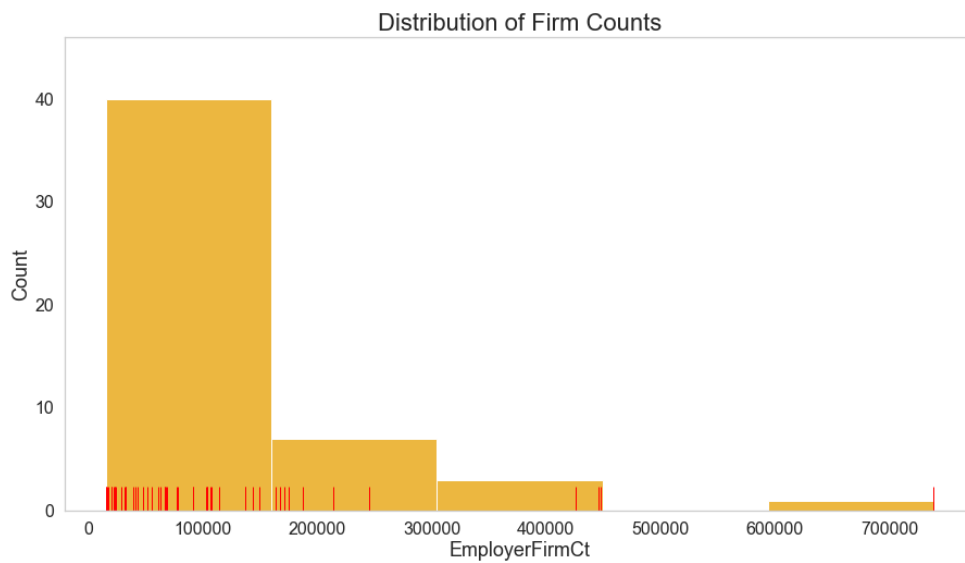


Fig1.2. Distribution of Business Firms by State: Histogram with bins evenly divided by number of firms. Red rug marks denote the location of a state's employer firm count.

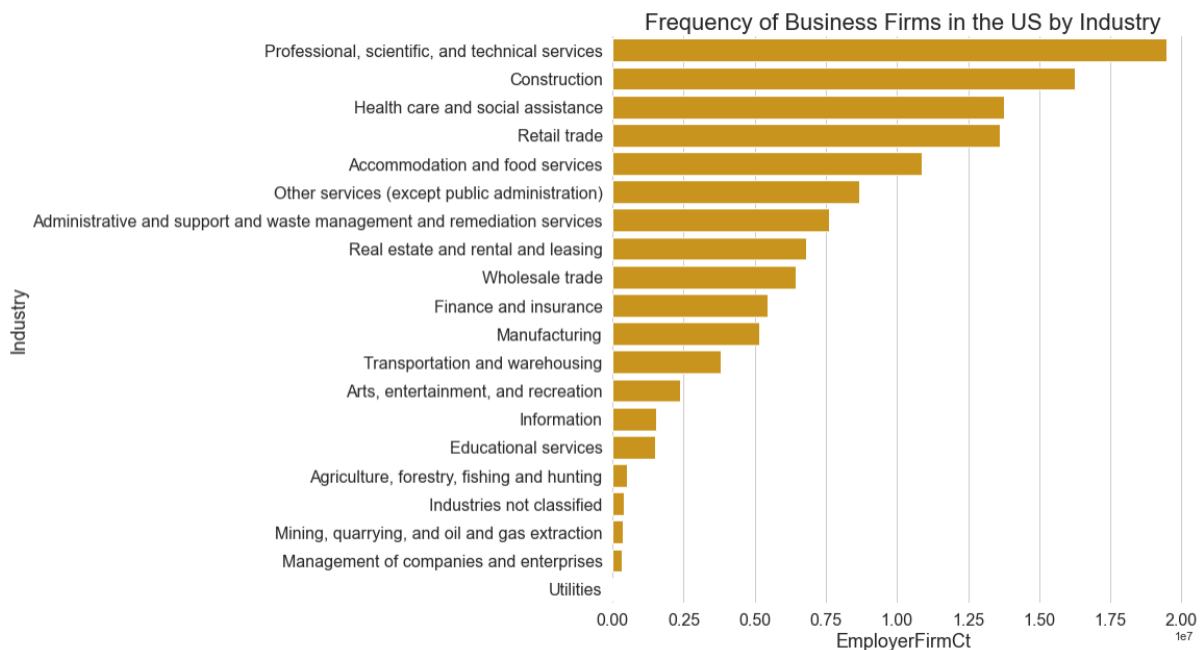


Fig1.3. Industries in the US Measured by Firm Counts: Industry categories outlined by the Census Bureau and sorted by most recorded. Data measures are totals within each owner demographic.

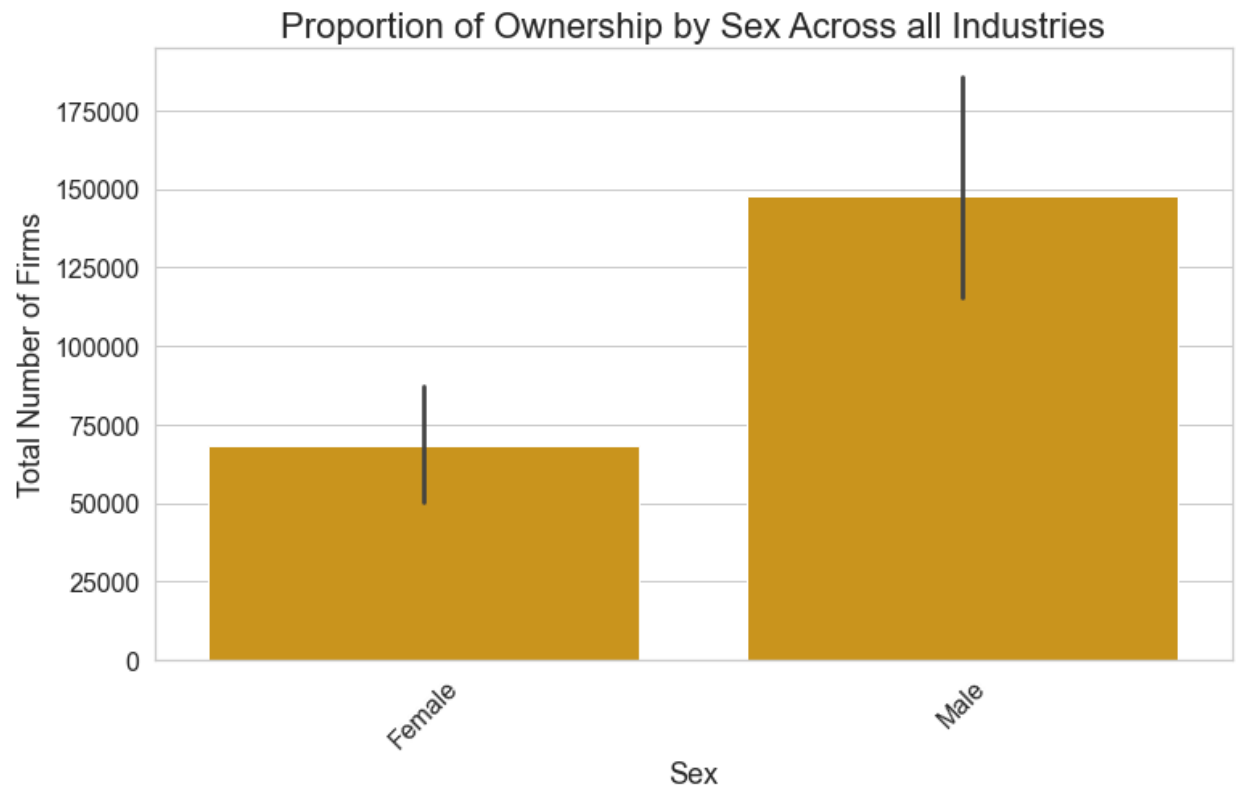


Fig1.4. Business Firm Owners by Sex: Bar plot with error bars illustrating the number of businesses owned by male and females across all industries.

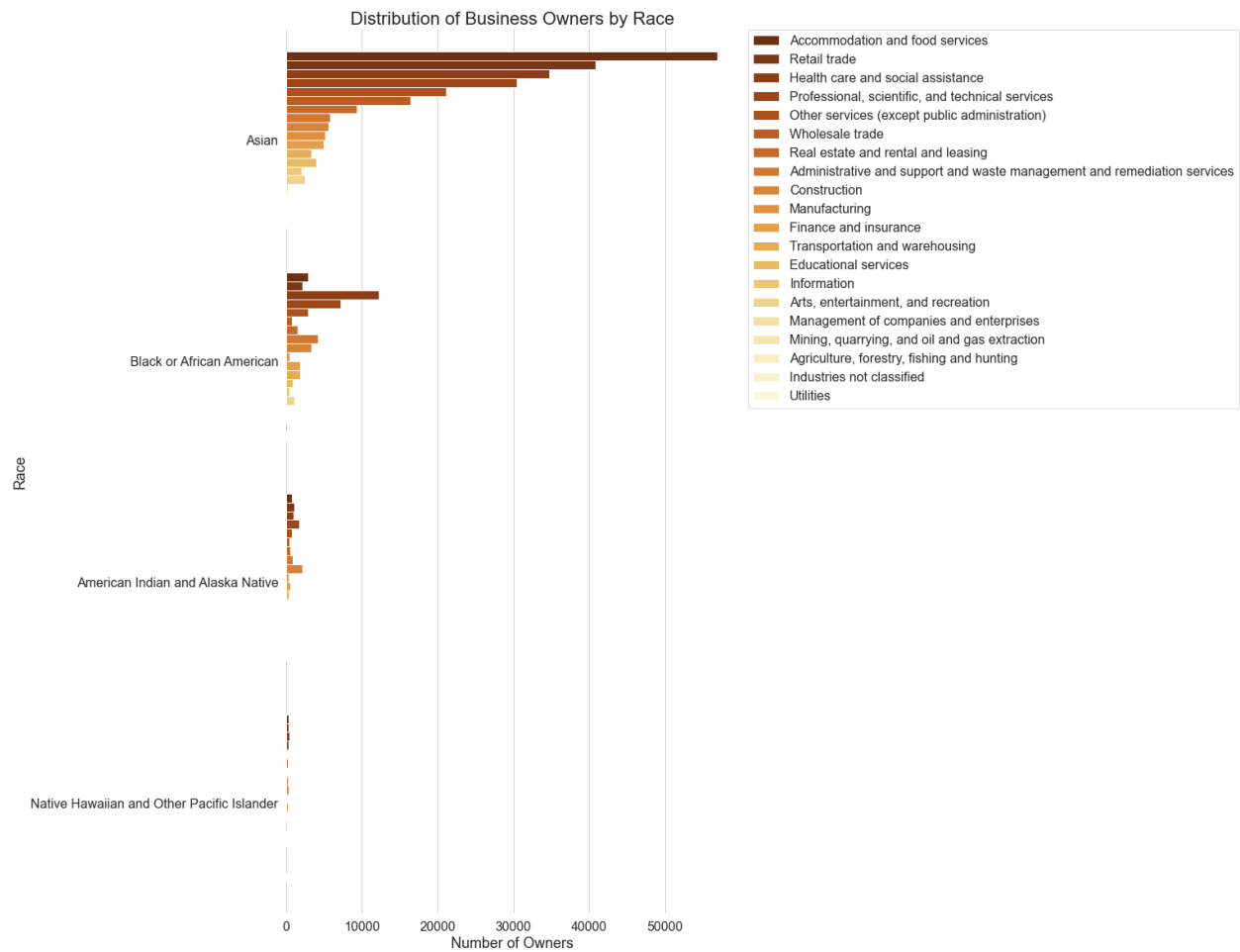


Fig1.5. Industry Ownership by Race: Number of businesses owned in each industry grouped by Race. White demographic removed as an outlier.

Ethnicity

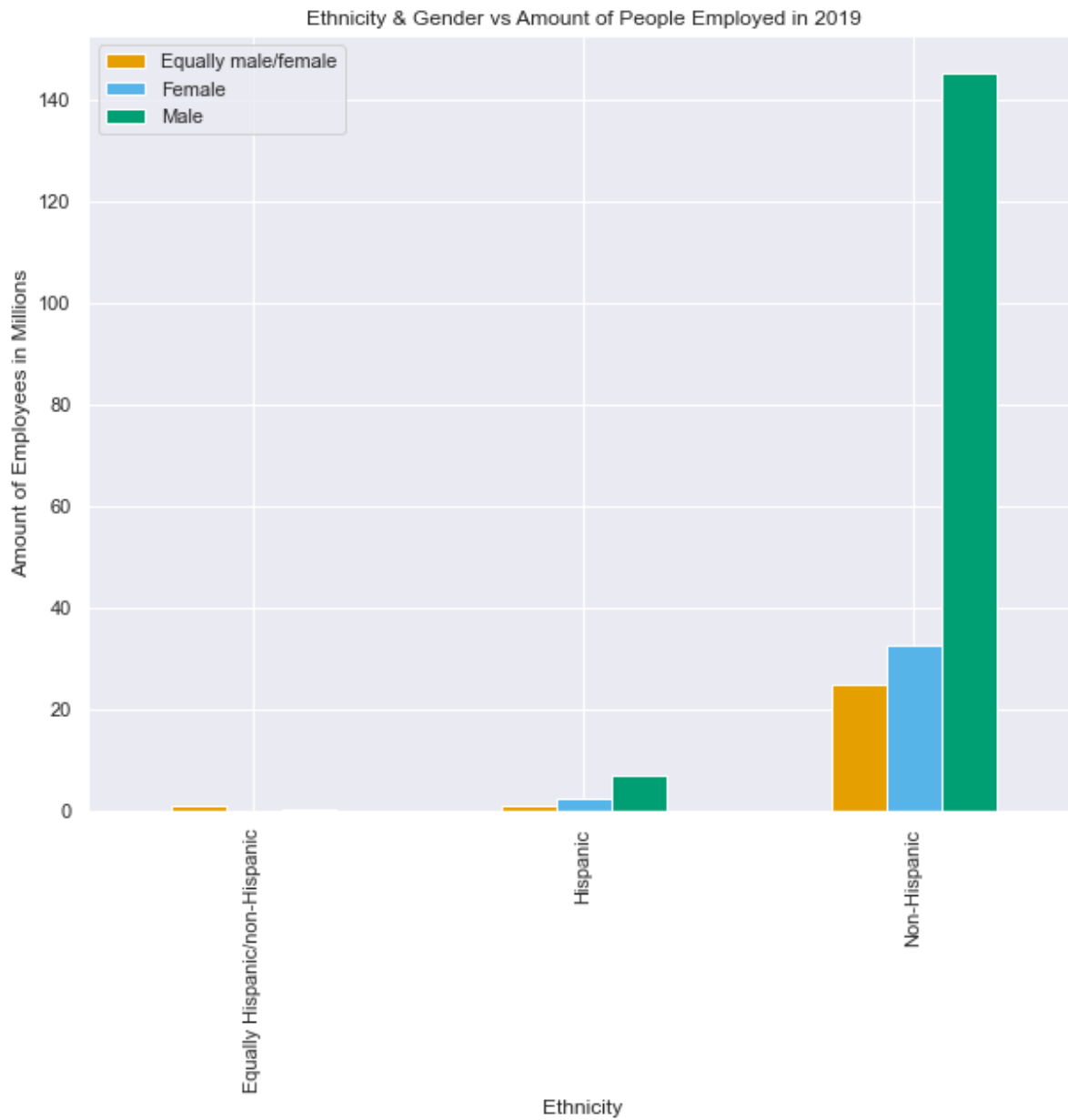


Fig2.1. Number of Employees by Business Owner Ethnicity and Gender: Count of employees in the millions grouped by the business owner's ethnicity and sex.

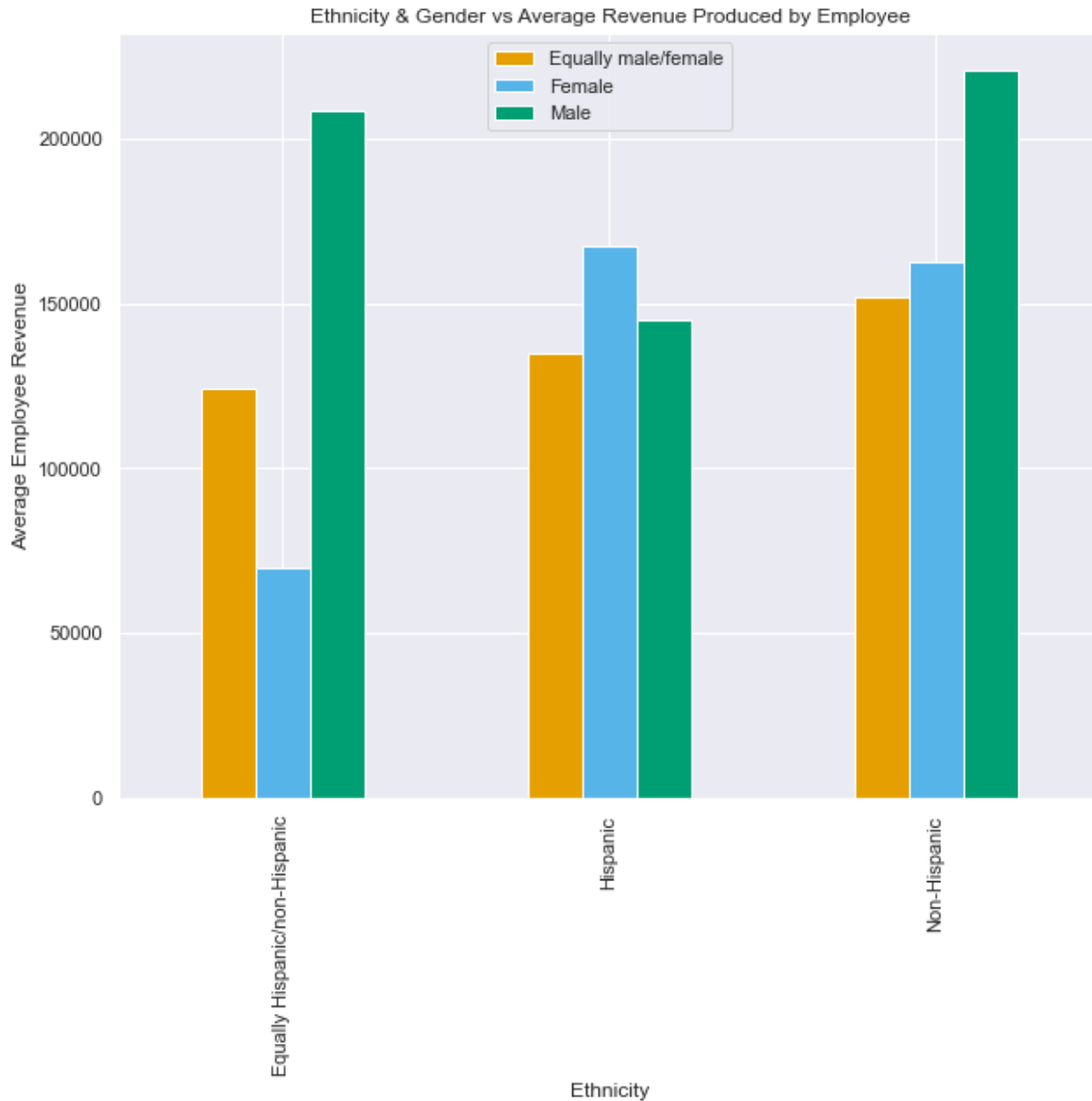


Fig2.2. Average Revenue Generated by Businesses: Amount of revenue generated as determined by the Owner's Ethnicity and Gender across all industries.

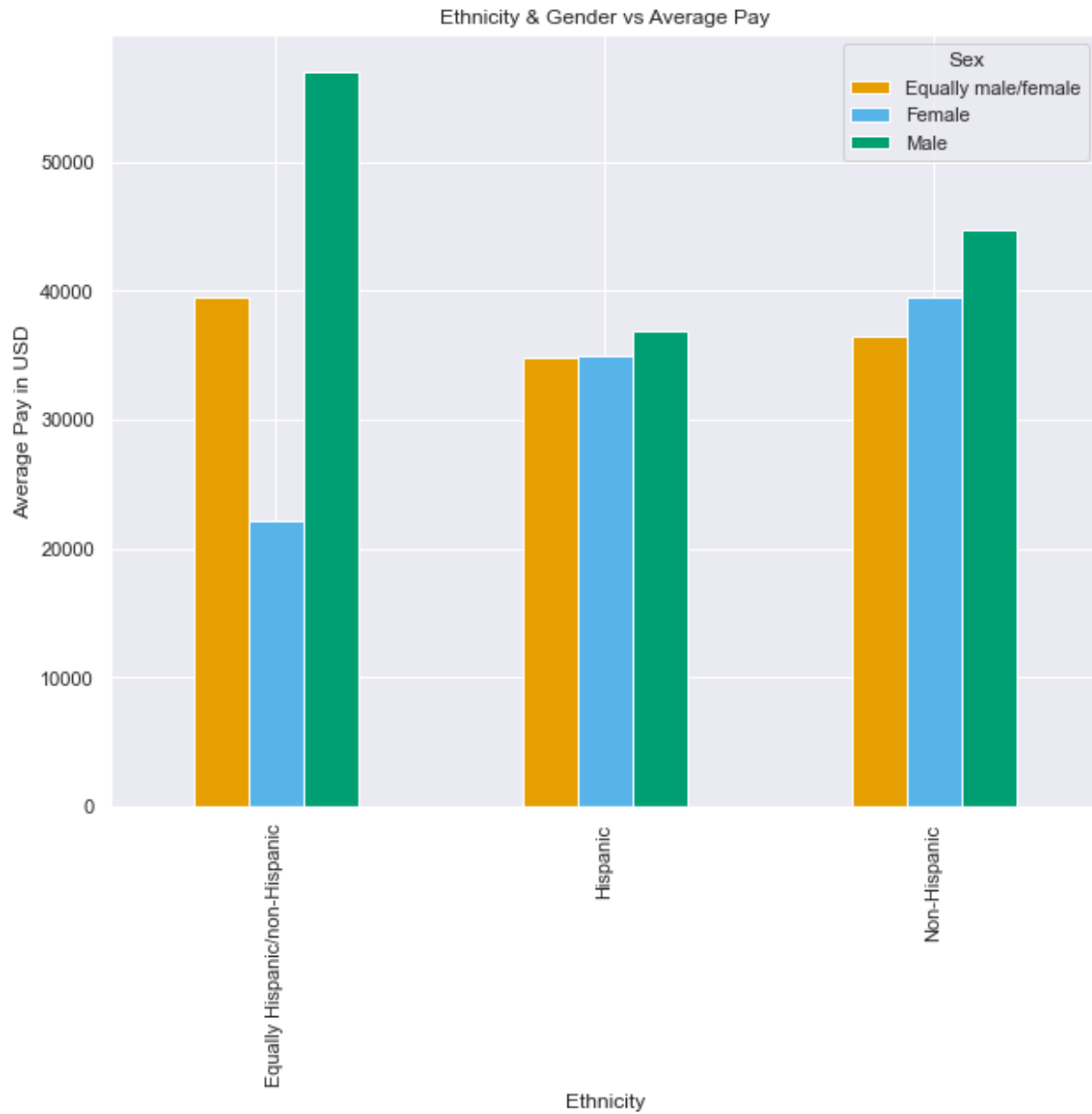


Fig2.3. Average Yearly Employee Pay : Average pay issued to employees in USD. Amount determined by the business owner's ethnicity and sex.

Race

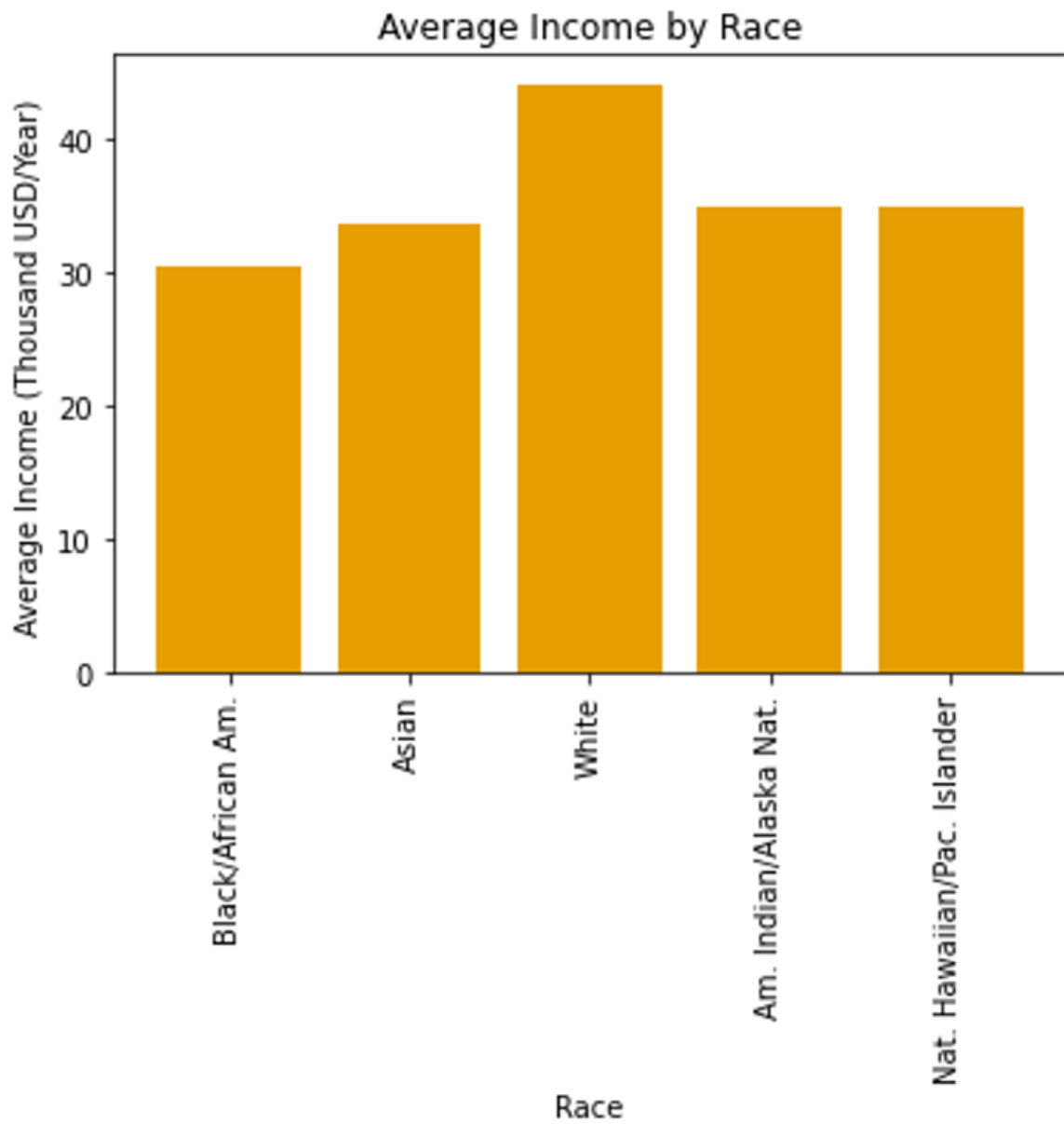


Fig3.1. Average Business Income by Race: Average income generated by US businesses by the owner's race. Income measured as thousands of USD per year.

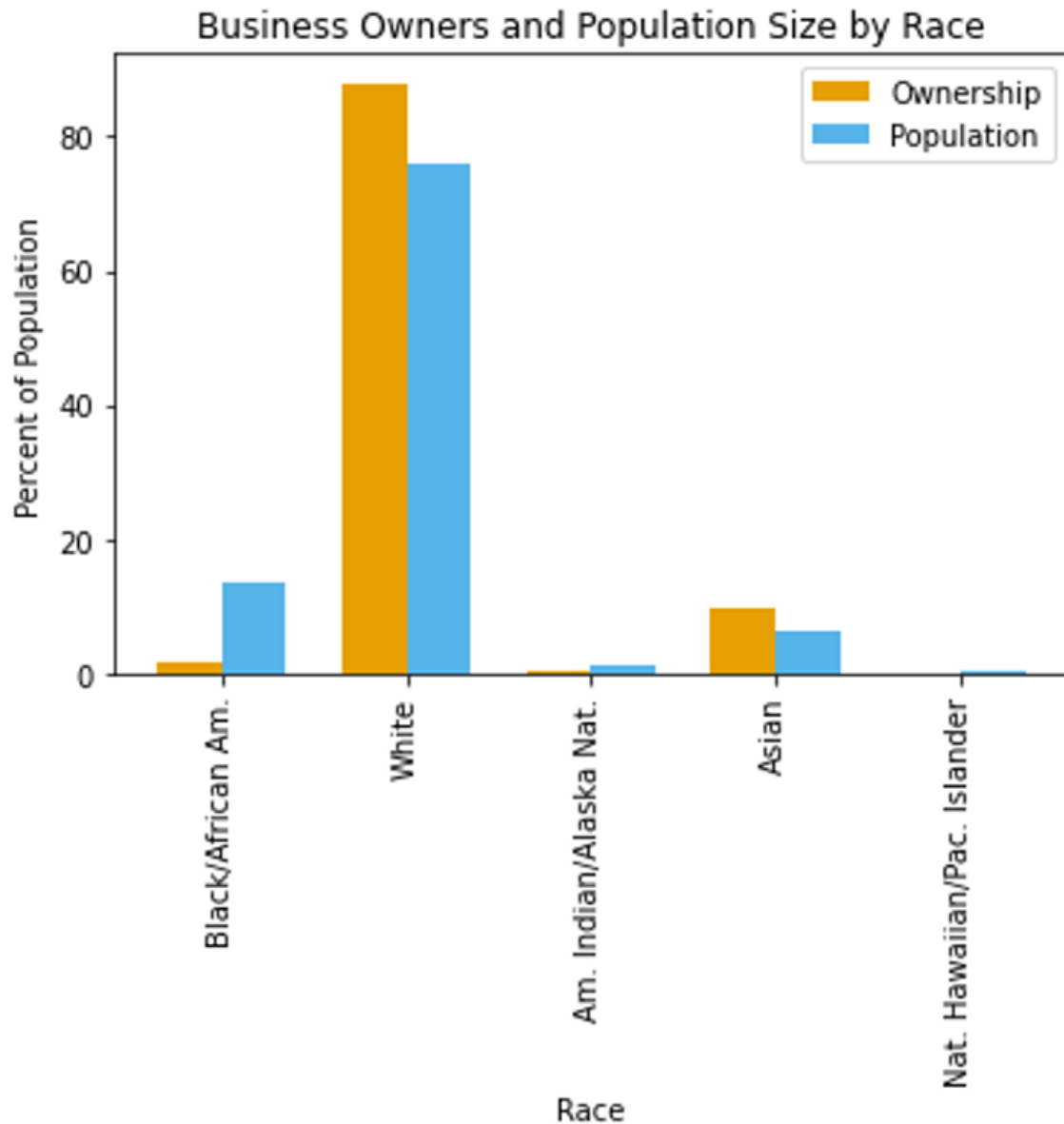


Fig3.2. Population of Business Owners by Total Population: Frequency of business owners compared to the total population. Percent measures grouped by the owner's race.

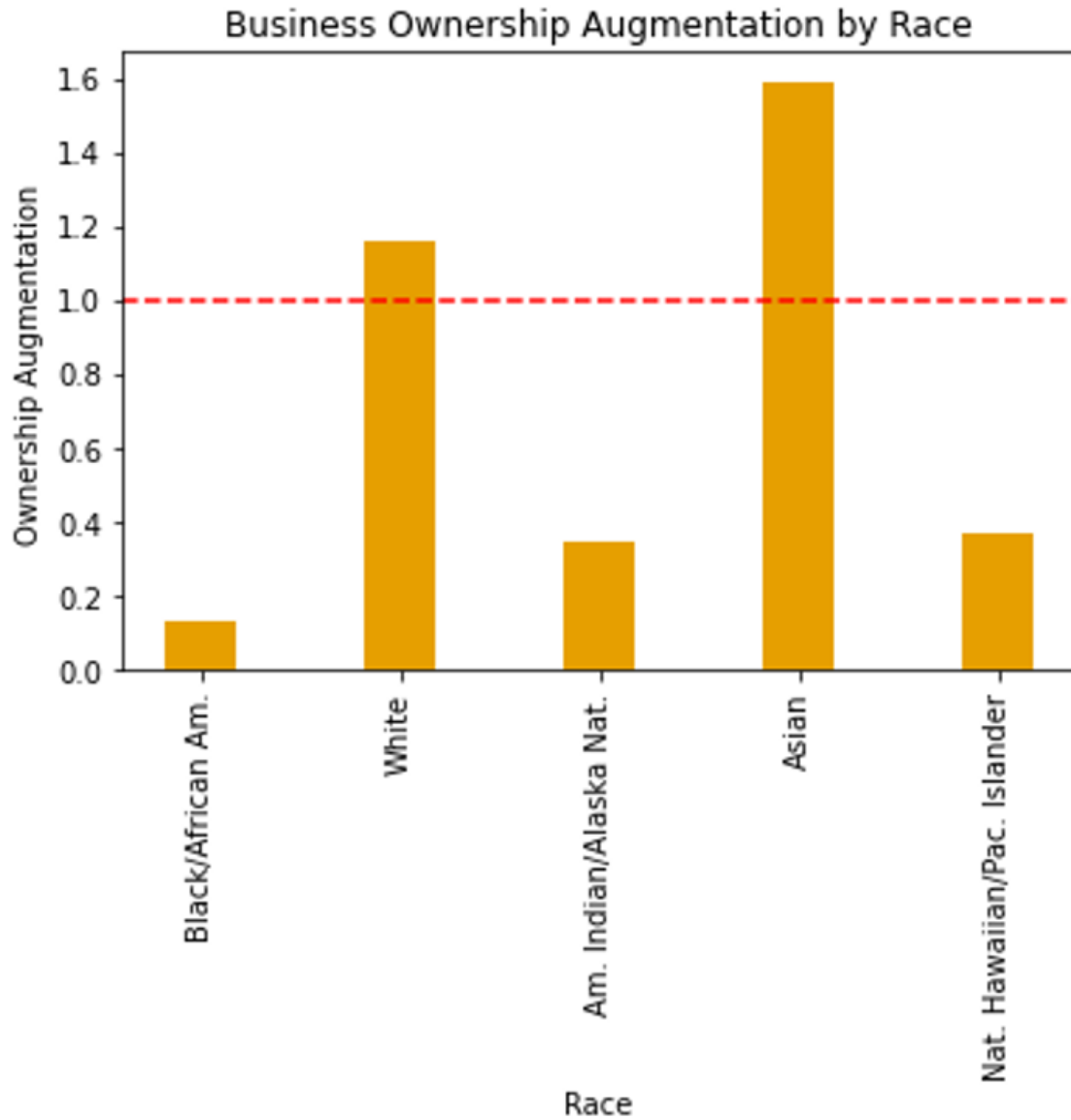


Fig3.3. Augmentation of Business Owners: Augmentation of Fig3.2. reflecting race representation in business ownership.

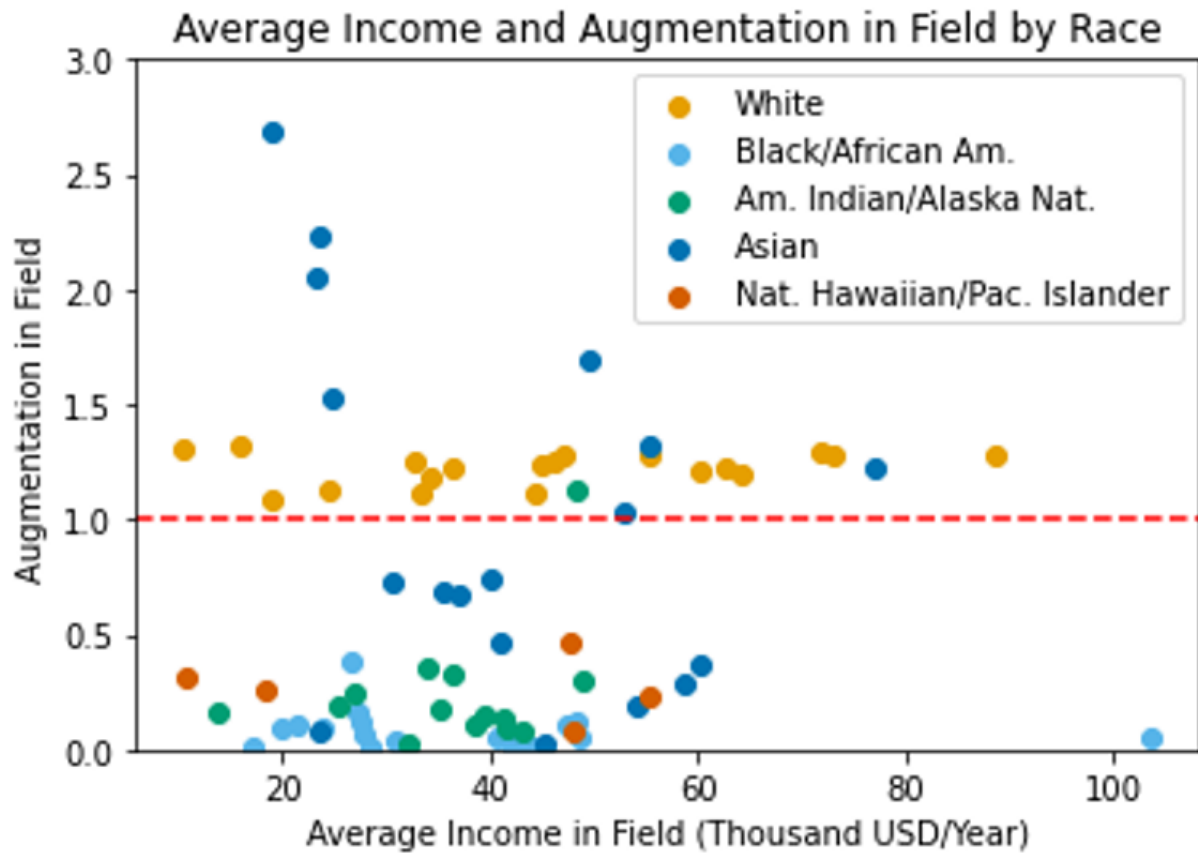


Fig3.4. Augmentation of Business' Income by Owner Race: Scatter plot visualizing the average income generated within industries by race. Plotted against augmentation boundary.

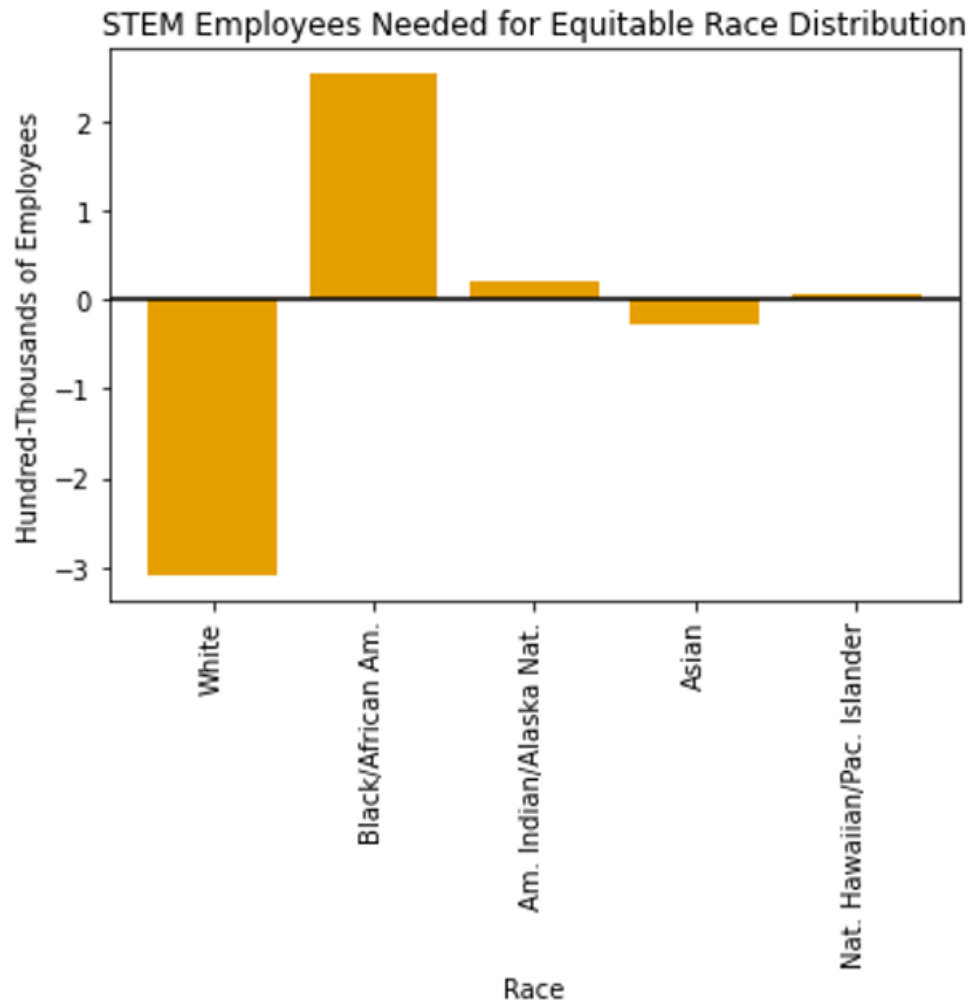


Fig3.5. STEM Field Employee Disproportions: Diverging bar plot visualizing the number of employees in hundred-thousand necessary to reflect and equitable STEM industry.

Sex

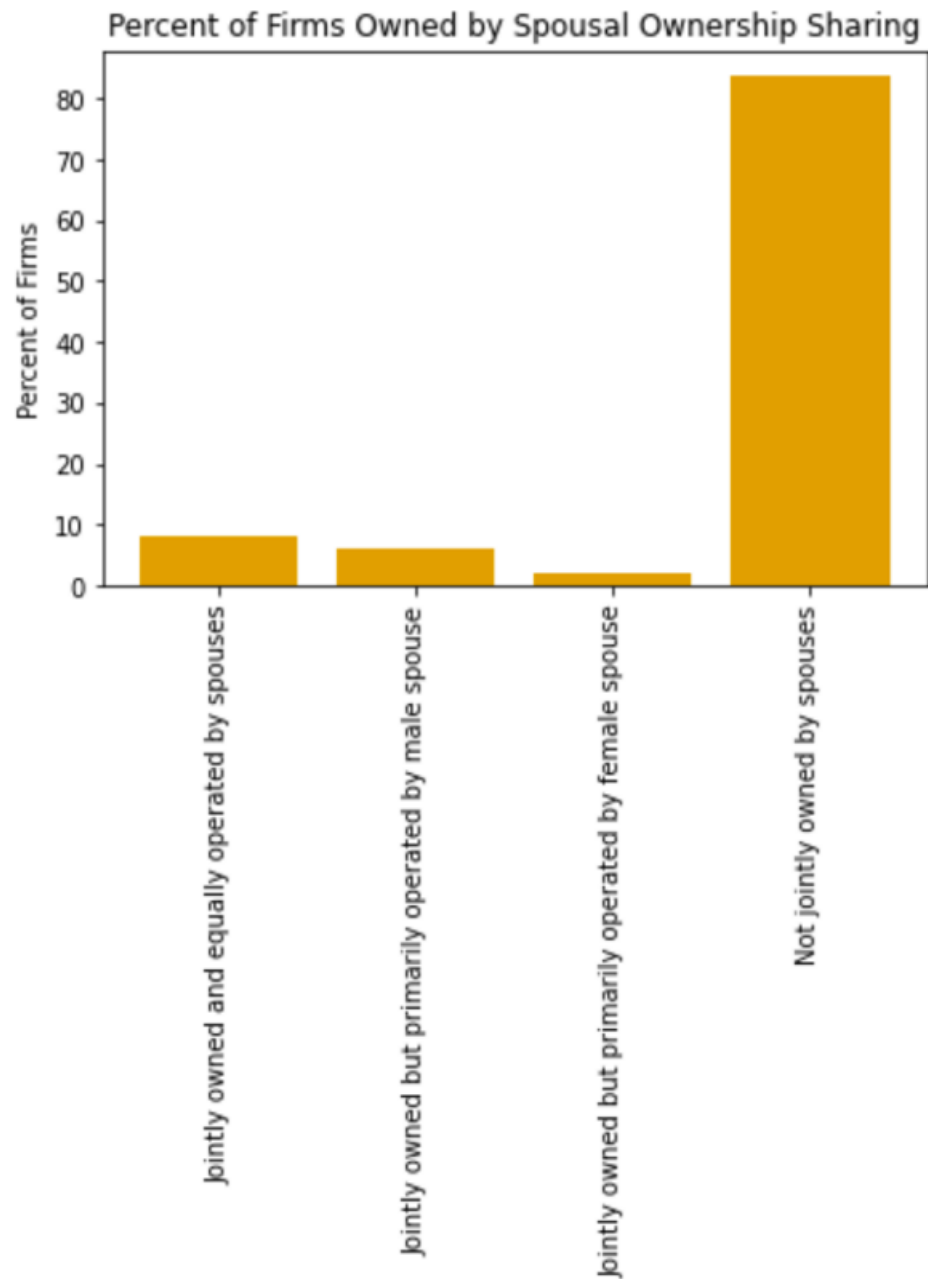


Fig4.1. Percent of Firms by Spousal Ownership: Bar plot measuring percent of businesses as a function of the ownership. Business ownership determined by owners' marital relation.

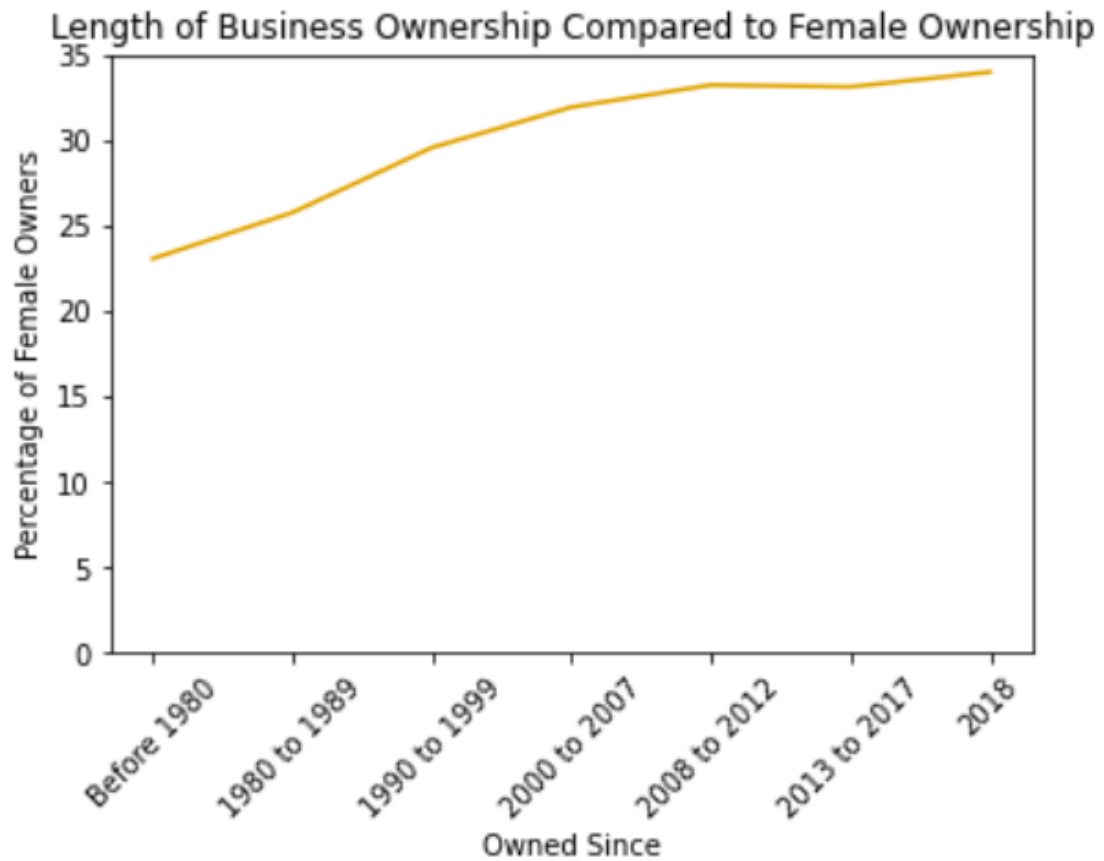


Fig4.2. Percent of Firms Owned by Females: Percentage of female business owners in the US across two decades.

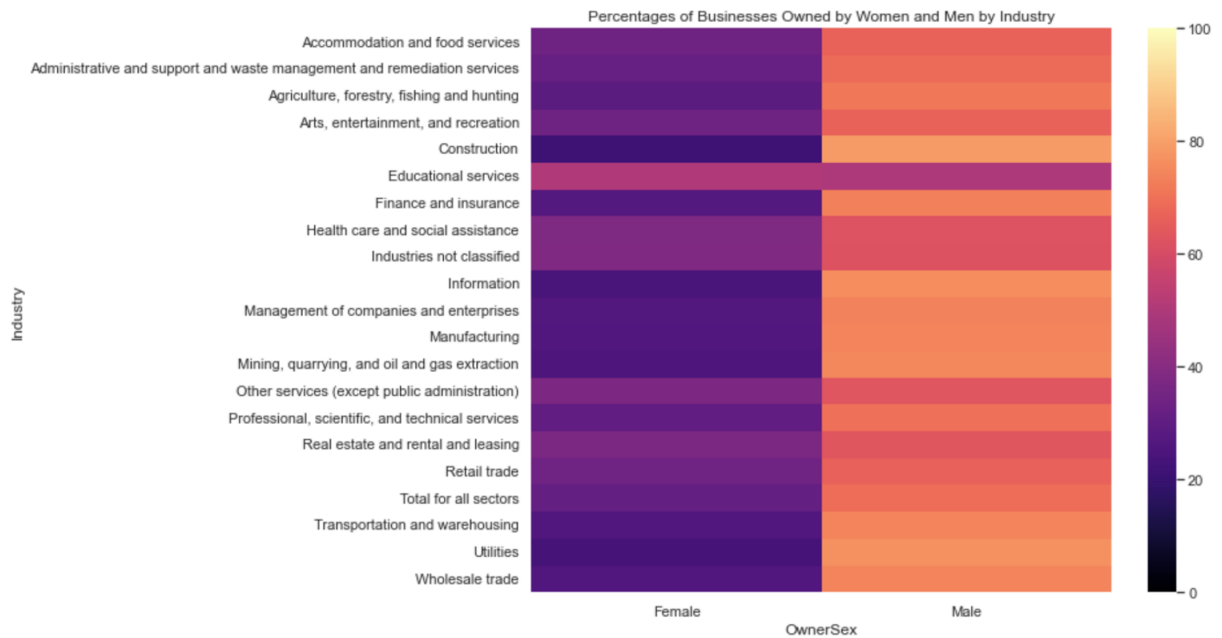


Fig4.3. Percent of Sex’s Business Ownership by Industry: Heatmap reflecting magnitude of business ownership by industry and grouped by owner’s sex.

DISCUSSION

Initial exploratory data analysis allowed for creation of hypotheses, focus of study, and potential audience. Initial investigation into the ABS 2019 Census Bureau (2021b) included research into the organization’s survey methodology, variable coverages, aggregation extent, and overlapping data tables. Following initial investigation, Group 5 determined the research is best focused on diversity in US companies. More specifically, the demographic groups and their relation to business ownership. Figures in section 1 provide background into the investigation that may be helpful in determining potential areas that discrepancies can appear. For instance, Fig.1.1 illustrates that California contributes the most to the overall value counts. When dividing the country’s business firm counts into evenly divided bins (Fig.1.2), the distribution is positively skewed with California being represented on the far right. An overall view of the industries recorded in the US (Fig.1.3) shows that the top industry, “professional, scientific, and technical services”, is no longer the case when the white race is omitted as an outlier (Fig.3.2, Fig.1.5). Finally, a first glance at males and females in ownership in Fig.1.4 shows that males own more businesses in the US than women, about 70% more. Even further, the plot shows no overlap in the error bars

suggesting that there is a significant difference in the values, and the disproportion is not likely to be caused by chance or sampling errors.

A detailed look into the ethnicity finds that there was a huge disparity between the amount of people employed at different companies owned by Hispanic ethnic groups and non-Hispanic ethnic groups as seen in Figure 2.1. The difference becomes even more prevalent when categorized by sex. Non-Hispanic male owned companies have employed more people than their Hispanic and / or female counterparts. This is in large part to the amount of revenue generated and can also be a factor of the average pay per employee at these companies. Specifically for male non-Hispanic owned companies, this group generates more revenue per employee (Fig.2.2) yet pay remains relatively similar to the other ethnic groups or gender counterparts (Fig.2.3). These factors may lead to the disparity of having more people hired at their company.

When accessing Fig.2.2 there is a trend seen in employees under Hispanic ownership faring well against the other categories. Interestingly, companies that are female led in the Hispanic ethnicity category generate the 3rd most out of every subcategory. It may be the case that Hispanic females are able to increase productivity in their employees in a way that the other 6 categories are not able to. Non-Hispanic males generating on average almost 25% more than their Hispanic male counterpart but only slightly more than their equally Hispanic / non-Hispanic male equivalent.

Figure 2.3 shows the average pay per employee for each ethnicity category. This value is calculated by taking the 'Annual Payroll' over 'Employee Count'. This calculation describes the wage difference between gender categories. Through this visualization, the equally Hispanic / non-Hispanic categories fare much better with the Non-Hispanic owned businesses; in 2 out of the 3 gender categories. It should be noted when looking at the male data, the equally Hispanic / non-Hispanic group pay their employees on average about 15% more than their Male Non-Hispanic counterpart, but the revenue generated by each employee is less in the equally Hispanic / non-Hispanic category than in the non-Hispanic category. Additionally, the gender categories in the Hispanic ethnicity pay relatively the same as opposed to other groups.

The United States is inequitably distributing its wealth by race, particularly regarding income (Fig.3.1). White populations are receiving disproportionately higher average yearly incomes, being the only racial group making an average income above 40 thousand USD per year. Asians, American Indians and Alaska Natives, and Native Hawaiian and Pacific Islanders make around 35 thousand USD annually. However, by far the most negatively affected group is Black or African American people at 30 thousand USD per year, making more than 10 thousand USD less annually than their white counterparts. In terms of income, the American economy disproportionately benefits White people. Following income trends, White people in the United States also disproportionately own more businesses than any other race, followed by Asians (Fig.3.2). Black or African American people are again underrepresented in business ownership; despite making up 13.6% of the population, this group only makes up 1.8% of business owners. Additionally, business ownership can also be examined from the perspective of ownership augmentation (Fig.3.3), defined as the proportion of business ownership over the proportion of the population; true equitable distribution of ownership is achieved when ownership augmentation is 1. White and Asian groups are the only race groups that are overrepresented in business ownership, with Asians being the most overrepresented. In comparison, the Black or African American group has an ownership augmentation rate of less than 0.2, meaning that this group owns less than a fifth of the businesses they proportionally should.

Race groups can also be examined by their representation in key industries within the United States (Fig.3.4). Universally, the White group is overrepresented in every major industry within the United States. Additionally, the White group is disproportionately given higher paying jobs within the industries, with all but two instances of average income above 60 thousand USD per year being held within the White group. Notably, while the Asian group can be overrepresented in several industries, they are not being given the highest paying jobs. This indicates that not only is the White group being overrepresented in most industries, they are promoted to higher paying positions as well. The STEM field is a strong example of this phenomena (Fig.3.5). Disproportionately, STEM is overwhelmingly made up of White people, much at the expense of every other race group except Asians. To

give equitable representation in STEM, nearly 300 thousand jobs would have to go to other minority groups.

Finally, to further address the sex disparity from Figure 1.4, Figure 4.1 indicates that women are not as likely to be the primary operators of a business if it is jointly owned. In many industries, as shown by Figure 4.2, males dominate the ownership of businesses. The only industry that is not dominated is the Educational Services field. Further supporting the findings of Figure 4.1, females are not as likely to be owners of businesses than males. However, the rate of female ownership is on the rise as shown in Figure 4.3 which illustrates a steady increase over the past 20 years. Despite the rise, female ownership does not crest over 35 percent.

CONCLUSION

When addressing the questions posed for the study, the market is skewed to the non-Hispanic, White, male portion of the country. Holistically, the United States job market is overwhelming set up to favor the White population over other racial groups. In terms of business ownership, yearly income, and industry overrepresentation, the White population has benefited most from stronger job prospects than any other racial groups, especially to the detriment of Black or African American population. Future efforts to create more equitable economic systems need to heavily favor racial minorities to start building equitable economic treatment of all races in the United States. Future research has potential to dive into socioeconomic structures in place that factor into the distribution of business ownership by gender, race, and ethnicity. The investigation generated by Group 5 provides insight into what potential steps can be made to begin the process of either further research or initial changes to be made for a more equitable United States business economy.

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