Assessment 8 Report on the 2019 Annual Business Survey  
  
Group 5:

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Introduction:

We examined some of the key metrics that the US census uses to define different businesses in the United States. We first examined the nation as a whole, and then zoomed in on three representative regions. Our group wanted to explore these three states in particular to see what key differences we could find: Washington, Louisiana, and Iowa. We choose them because we consistently found (based on prior reports as well as Internet rankings) that Washington is one of the best states to live in, Louisiana is one of the worst and Iowa is centrally located between the two and also is the quintessential Midwestern state. We will be using the Annual Business Survey conducted by the US Census to draw conclusions about the differences between each state.

Data Exploration:

*Sex and Race Profiles:*

Before jumping into how businesses perform in the states of Iowa, Louisiana, and Washington, the sex and race demographics for each state was explored. To begin the ownership of employer firms (by sex) was visualized using tree maps:

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| *Figure X: Treemap Diagram of employer firm ownership by sex in Iowa* |

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| *Figure X: Treemap Diagram of employer firm ownership by sex in Louisiana* |

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| *Figure X: Treemap Diagram of employer firm ownership by sex in Washington state* |

In the treemaps above the labeling (i.e., ‘Male’, ‘Female’, and ‘Equally...’) represents whether a business is owned by majority male or female owners or if there is an equal split between sexes. At a glance it becomes immediately obvious that regardless of state most employer firms are owned mainly by males (or they hold a majority share in a firm) and this likely aligns with national trends. An interesting thing to make note of however is that in all three states there are more employer firms that have an even (or near even) split in male and female ownership than majority female ownership. Why this may be the case is complex but one contributing factor may be that women may simply not consider entrepreneurship as a desirable career path at the same rate that men do.

Following this data the number of employees employed in majority male or female businesses was looked at:

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| *Figure X: Bar Chart of how many people are employed by mainly Male, Female, or equally owned firms (Iowa)* |

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| *Figure X: Bar Chart of how many people are employed by mainly Male, Female, or equally owned firms (Louisiana)* |

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| *Figure X: Bar Chart of how many people are employed by mainly Male, Female, or equally owned firms (Washington state)* |

From this data it is obvious that most people who are employed in the states of Iowa, Louisiana, and Washington are employed by firms whose owners are majority male. This is not very surprising as this naturally follows from the tree maps of each given state where it was found that a majority of employer firms are owned by mainly males to begin with. Therefore, one would expect to see this trend. What's interesting to note however is that in Louisiana, there are slightly more people employed by female owned firms than those that have split ownership despite there being less female owned firms than split ones. This implies that female owned firms may be larger than average in Louisiana when compared to the other states.

Lastly, race demographics were used to split the sex demographics to observe how ownership varies by sex and race:

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| *Figure X: Stacked Bar Chart of how many people are employed by mainly Male, Female, or equally owned firms. The Color represents the majority race of the owning board (or person). (Iowa)* |

In the figure above we can see that a majority of business owners are not only male but also white regardless of sex, in Iowa. This isn’t too surprising considering the racial demographics of Iowa overall being ~ 90% white. However that may still not explain the underrepresentation of people of color (particularly African Americans and Indigenous peoples) as business owners in Iowa especially when it comes to female people of color.

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| *Figure X: Stacked Bar Chart of how many people are employed by mainly Male, Female, or equally owned firms. The Color represents the majority race of the owning board (or person). (Washington state)* |

In Washington (compared to Iowa) we see that the representation of minorities is better with an exceptionally larger proportion of Asian business owners (again as compared to Iowa). The increased number of Asian business owners make at least some sense as Washington has a much larger asian population. However (just at a glance from the figure above) it seems that Asians may actually be overrepresented. In any case the majority of business owners, regardless of sex, tend to be white.

The next section of our exploration takes a look at the race of business owners in Iowa, Washington and Louisiana:

In this section, we wanted to look at who owns businesses in each state, and compare to the states’ race demographics to understand if the race of business owners is reflective of the demographics of the state itself. For this exploration, we will start with the state of Iowa. Iowa is a predominantly white state, with 90.02% of the population of Iowa being white. In terms of racial composition in the other 10 percent, African American citizens make up 3.71% of the population, and Asian citizens make up 2.41%. When looking at business owners in Iowa, these demographics are shown to be relatively similar to the racial composition of the state. Whites make up the majority of business owners in the state, followed up by Asians, then African-Americans.

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| *Figure X: Bar Chart of the race of business owners in Iowa in 2018* |

Switching over to Louisiana, we can see that there are more businesses owned by minority racial groups than in Iowa. This is reflective of the racial composition of Louisiana in general, being a much more diverse state. In Louisiana, whites make up 62.01% of the population while African Americans make up 32.2% of the population. This is not reflected in the share of business owners by race, as African Americans make up a smaller share of business owners the Asians, which make up 1.73% of the population in Louisiana. Once again, the racial composition of business owners is predominantly white. While making up 32.2% of the population, African Americans make up a very small share of business owners, this is surprising and needs possibly further examination into Louisiana to help explain this discrepancy.

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| *Figure X: Bar Chart of the race of business owners in Louisiana in 2018* |

In terms of racial composition, Washington is the most racially diverse state observed in this analysis. Despite this, the population is still predominantly white, making up 75.38% of the population. Asians make up 8.53% of the population, while African Americans make up 3.8%, followed by 1.28% Native American/American Indian. When looking at the racial composition of business owners, once again, whites make up the majority of business owners. Asians have a significant share of businesses, followed by African-Americans. In Washington, the racial composition statewide versus with business owners are reflective of each other, in this case meaning that within each race, there is a similar percentage of business owners.

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| *Figure X: Bar Chart of the race of business owners in Louisiana in 2018* |

*Firm Size and Payroll:*

For the exploration into the state's overall businesses based upon the size of the firm we started by manipulating the census table until it was in a form that would be useful for analysis. Please consult the transform step of ETL for insights into the generation of the table. EMPSZFL is a breakout group for the number of employees per employer firm. FIRMDPEMP is the number of employer firms, and EMP is the number of employees employed by the breakout groups in EMPSZFI. To study the data great care must be taken in filtering out data that may wash out the data and make conclusions hard to draw and to ensure that overlapping breakout groups are not included in the same graphics.

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| *Figure 1: cencusTable* |

US General Overview

We can see that there is a general trend between states that have a high number of firms with large employment numbers (firms with over 500 employees) and the number of high-income firms. This makes sense, as we would expect to see such firms making a larger overall amount of money if they can afford to pay that many employees. Each point on the scatterplot below represents a state, with the number of high-employing firms in the state on the x-axis and the number of high-earning firms on the y-axis.

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| *Figure X: National number of employees per firm compared to income* |

It’s unsurprising to see that the number of firms with high income is similarly proportional to the number of years the firm has been in business, as the scatterplot below shows. A firm that’s been in business longer is more likely to have assets (personnel, property, and tools) that are entrenched, and it is easier to continue running a business than it is to start it up. Each point here, as above, represents a separate state.

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| *Figure X: National firm longevity compared to income.* |

Our final plot shows firms with high income vs. firms that are owned by veterans. We can see a somewhat strong positive correlation between the two. It seems likely that veterans may have slightly higher incomes than non-veterans, and thus choose to live in more prosperous states. It’s also possible that veterans just have more backing from the Department of Veterans’ Affairs and thus can focus more on growing their business.

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| *Figure X: National veteran firm ownership compared to income.* |

Now, we can draw out some pertinent details. In particular, we’ll be looking at three states which together help showcase the trendlines of this graph: Iowa, Louisiana, and Washington.

Iowa is on the bottom left of all of our plots. This is because it has a small number of large firms, and also has a small number of high-earning firms.

Meanwhile, Louisiana has no firms that employ above 500 people, and accordingly has almost no firms that have lasted for a long period of time or make more than 1,000,000 per year.

Finally, Washington had 36,000 firms making over a million dollars, along with 700 firms with 500+ employees. However, it had no firms that had lasted for 16+ years. This puts it as an outlier in the upper left hand area of the firm longevity.

For veterans, we see there are no veteran-owned firms in either Iowa or Louisiana. However, there are 14,000 of them in Washington, which as we know has many more firms with an income of $1,000,000 or more. It’s possible that veterans simply choose to settle in this state, but it’s also possible that veterans may have more technical experience and thus are more likely to be successful entrepreneurs.

Data Analysis

We used the breakout groups for firm size and filtered out the firm sizes that were under 50 employees. We did this because the breakout groups for under 50 employees tended to wash out the nuanced differences in the higher firm sizes. We normalized this data by dividing the number of firms above 50 to make the comparisons between each state easier.

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| *Figure X: Employer firms for Iowa with breakouts greater than 50 employees* |

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| *Figure X: Employer firms for Washington with breakouts greater than 50 employees* |

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| *Figure X: Employer firms for Louisiana with breakouts greater than 50 employees* |

A couple of interesting trends become apparent between the three states. First a large gap is revealed in the study in Louisiana with a firm size of 100-249 people due to the complete lack of any data in this breakout group. This unfortunately throws some doubt onto the true trends of Louisiana's data with regards to its proportions of businesses above 50 employees. Washington seems to have a lot of large and small businesses but intermediately sized businesses (those with between 100 and 499 employees) seems to be the smallest breakouts. Iowa on the other hand has much more large companies when compared with the amount of companies that employ greater than 50 people.

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| *Figure X: The number of employer firms for the states Washington, Iowa, and Louisiana* |

Another analysis we decided to conduct will be to compare the three states with regards to their total number of Employer Firms per state. It is important to note that the American Business Survey (ABS) was a voluntary survey conducted on a sample of the business population and therefore does not actually reflect the total number of businesses in each state. It is interesting to note that there were significantly more firms that answered the survey. For our first analysis we took our initial total employer firms for each state and normalized it with the population of each state by dividing the two to see if some of these differences could be due to the differences in population.

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| *Figure X: The number of employer firms for the states Washington, Iowa, and Louisiana normalized per capita.* |

When state population is used to normalize the data we do still see that Louisiana does seem to have less businesses per capita than the other two states.

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| *Figure X: The number of employer firms for the states Washington, Iowa, and Louisiana normalized per employee* |

The next analysis we do is to try a different normalizer which is to divide the total number of firms per state by the total number of employees per state. This shows that Washington has a larger business to employee ratio than Iowa or Louisiana.

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| *Figure X: The number of employer firms for the states Washington, Iowa, and Louisiana normalized per employee* |

This figure is very useful to see one of the key differences between the states, the average pay per person. It is apparent that employees in Washington make a significantly larger yearly salary due to the average employee making more than $60,000 while employees in Iowa and Louisiana make less than $50,000 per year.

Conclusion:

We can see several large-scale national trends. There is a correlation between states with large firms and the income those firms take in, as well as long-running and established firms and large-income firms. Likewise, we can see that veterans help a firm, though this may be confounded by other variables.

Notably, however, Washington has many more companies as a whole than either Louisiana or Iowa, meaning population surely is a confounding variable in this case. Likewise, we can see that there are *more* large firms than medium-size firms of, say, 100 employees in *all* of these states. However, Washington still comes out ahead even assuming normalization, perhaps due to higher population density. Iowa has fairly low population density, and accordingly normalized comes out to a much lower number of firms than the other two states.

Works Cited:

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