MEMORANDUM

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To: Dr. Craig
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Subj: Data Analysis

Problem

In the first homework assignment, I considered looking at the survivability of small businesses, both in years prior to 2020 and now in light of Covid-19. About half of the United States' Gross Domestic Product is from small businesses. As such, any significant changes across small businesses will have just as significant a change across the entire US economy.

For more practical application, I did adjust my focus to just businesses with at least one physical store.

Hypothesis

Have modern business trends reduced the number of small business brick-and-mortar stores?

H_0: The number of brick-and-mortar stores 2020 = the number of brick-and-mortar stores 2019
H_1: The number of brick-and-mortar stores 2020 ≠ the number of brick-and-mortar stores 2019

Has covid-19 reduced the number of small business brick-and mortar stores?

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H_1: The number of brick-and-mortar stores 2019 ≠ the number of brick-and-mortar stores 2018

Testing Approach

The data I will need to analyze will be small business brick-and-mortar start-ups and closures. This will be any United States business with fewer than five hundred employees and at least one brick-and-mortar store. I can search the local chamber of commerce to find local businesses for any given area. I can also use data provided by the Small Business Administration. Rather than doing every single small business across the country, I will have to take a sample of the population. Looking at businesses in the first several districts in each state is a possible way to collect the data.

Once I have the data, I will need to aggregate it by year and then perform a 2-sample t-test to determine whether either of the two hull hypotheses can be disproven. Additionally, I can use ANOVA to look for trends across many years such as 5, 7, or 10 years. This will show me whether or not the trends I found from 2019-2020 and 2018-2019 are part of much larger trend.

Expectations

I would expect that there has been some reduction in physical stores, with how much online shopping has increased. Stores that can only serve to people that walk in are at a greater disadvantage compared to purely online stores. Not

only are they unable to reach as many customers, but there are many more costs involved in operating in a building with a location popular enough to attract people. Of course, small businesses with brick-and-mortar stores could still have a significant online presence, and it is possible that also having the physical store can be appealing to some customers. For that reason, the number of brick-and-mortar stores may not actually be declining.

Future Research

For future research, I could consider removing stores with an online presence, and seeing how that effects the hypotheses, I could look for trends in business lifespans, which types of stores in given areas tend to last longer, I could also take natural disasters into account. If I happened to randomly choose several districts that were still recovering from a tornado, an earthquake, forest fires, or a hurricane, that could affect the likelihood of the null hypothesis being disproven.