# Content

Data Visualizations:

1)This scatterplot shows how the share of counties using broadband changed over the years from 2006 to 2018. It answers the research question of how technological progress over time has impacted broadband activity and provides possible future implications for how business policies will change with the rise of technology. One challenge is that we had trouble seeing the general broadband trends with the original scatter plot, so we graphed the trends of the 10th, 25th, 50th, 75th, 90th percentiles of broadband usage. The number of counties that fall into the lower percentiles have been generally decreasing while the number of counties that fall into the higher percentiles have been increasing, which shows that broadband growth is generally positive. The exception is the sudden decrease in broadband usage in 2017 possibly due to an external reason that happened in that specific year but is not consistent across all years.
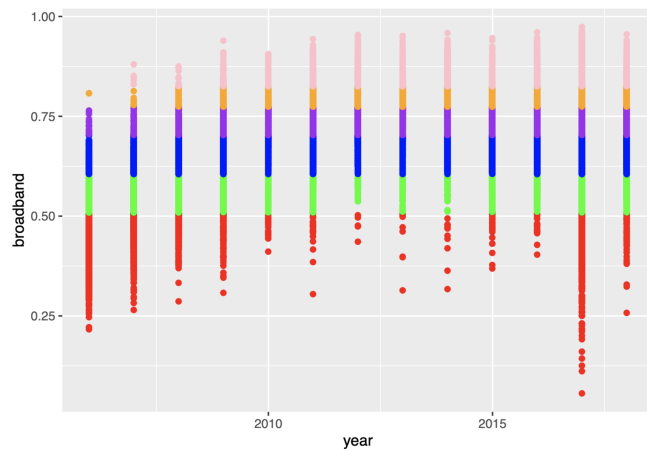
2)The histogram visualizations below describe how the distribution of broadband percentages or share of counties using broadband changes across the years. Its' main research purpose is to study whether there is increasing broadband inequality between US counties with the rise of broadband because some US counties are quicker to adopt broadband than others. The results are that the spread of distributions overall decreased from 2006 to 2016, which suggests decreasing inequality since counties' broadband usage are more similar. The exception is the bimodal distribution in 2017 that suggests larger inequality between counties with higher and lower broadband usages possibly because of an external reason that happened in that specific year. However, increasing left skewness is a concern that some US counties are not increasing their broadband usage like most US counties and thus lagging behind. Some challenges associated with producing this visualization is finding a strategy that can plot a histogram for multiple years without using excess code.
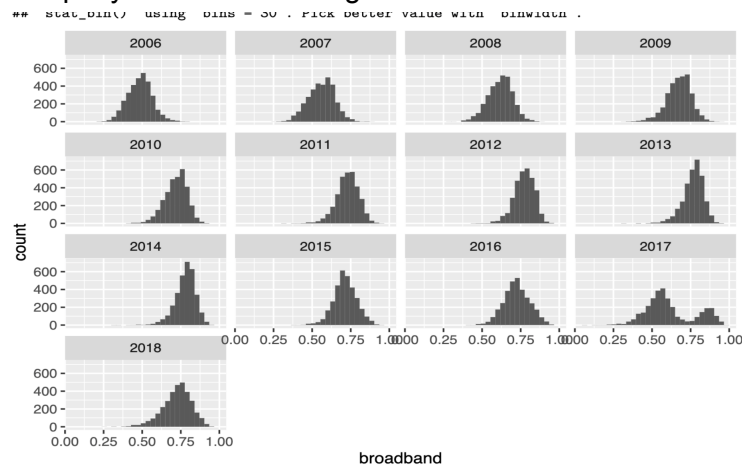
3)The visualization below shows the distribution of broadband growth rates from 2006 to 2016. Its' main research purpose is to quantify how fast broadband usage has been growing over time, whether that growth has been equal among US counties, how technological innovations can change business, and future implications about how future consumer and business activity and economic policymaking will need to change with more technological innovation in the future. The mean broadband growth is 50%, which means that technological progress has greatly influenced broadband usage in the US and that business activity will more likely change with technology in the future. Moreover, the growth distribution is normally distributed with a slight right skew, which means that broadband usage grew relatively equally among US counties with a few counties whose broadband usage grew faster. Some challenges associated with producing this visualization is finding techniques needed to pivot the table to calculate broadband growth
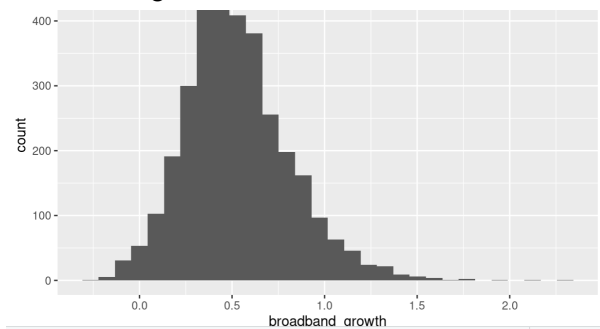
4)The main research purpose of the scatterplots below is to analyze socioeconomic factors, such as income, providers, and minority, that could influence broadband usages and create broadband policies centered around these factors. Based on the correlations below, income and number of providers are potentially useful factors to increase broadband usage whereas the minority population has no impact. However, a limitation to making broadband decisions based on just the results plotted below is oversimplified since there may be many complex factors that affect broadband usage.
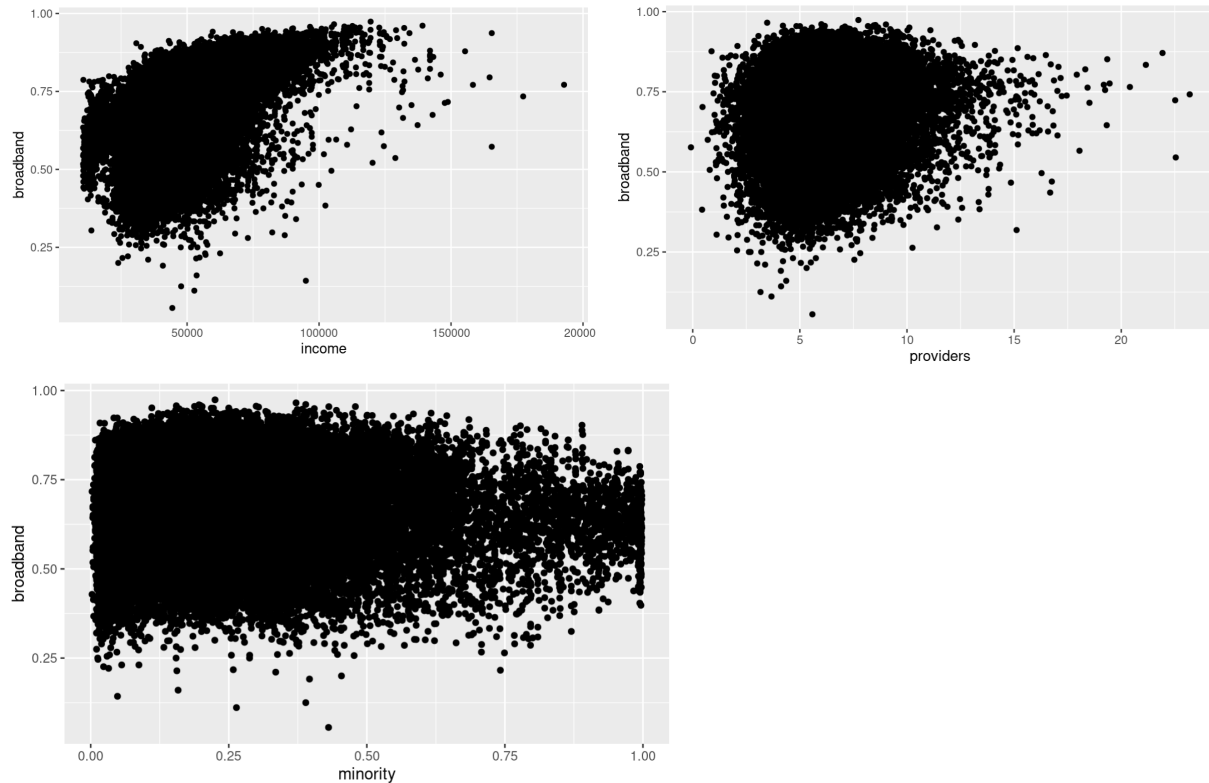
5)These scatterplots below answers our main research question of how the rise of broadband impacts consumer metrics, such as average number of trips to brick and mortar stores, average number of stores, and average number of brands in the recent time period and whether the results support the hypothesis that brick and mortar retail is going to collapse or be negatively impacted by the rise of broadband. Results show little correlation between broadband and all three measures of avg_store, avg_brand, avg_trips, which does not support the retail apocalypse hypothesis. Increasing broadband usage does not decrease nor negatively impact any of these brick and mortar retail measures, so people do not have to worry about the collapse of retail as broadband continues to progress in the future. However, a limitation to these visualizations is that they only include data from 2018 because of challenges loading in and putting together separate datasets from all the years. Still, 2018 is the most recent year included in this research and thus the best indicator of business activity in future time periods, so our visualizations are still reliable. Previous years may not be as reliable because each year is always changing.
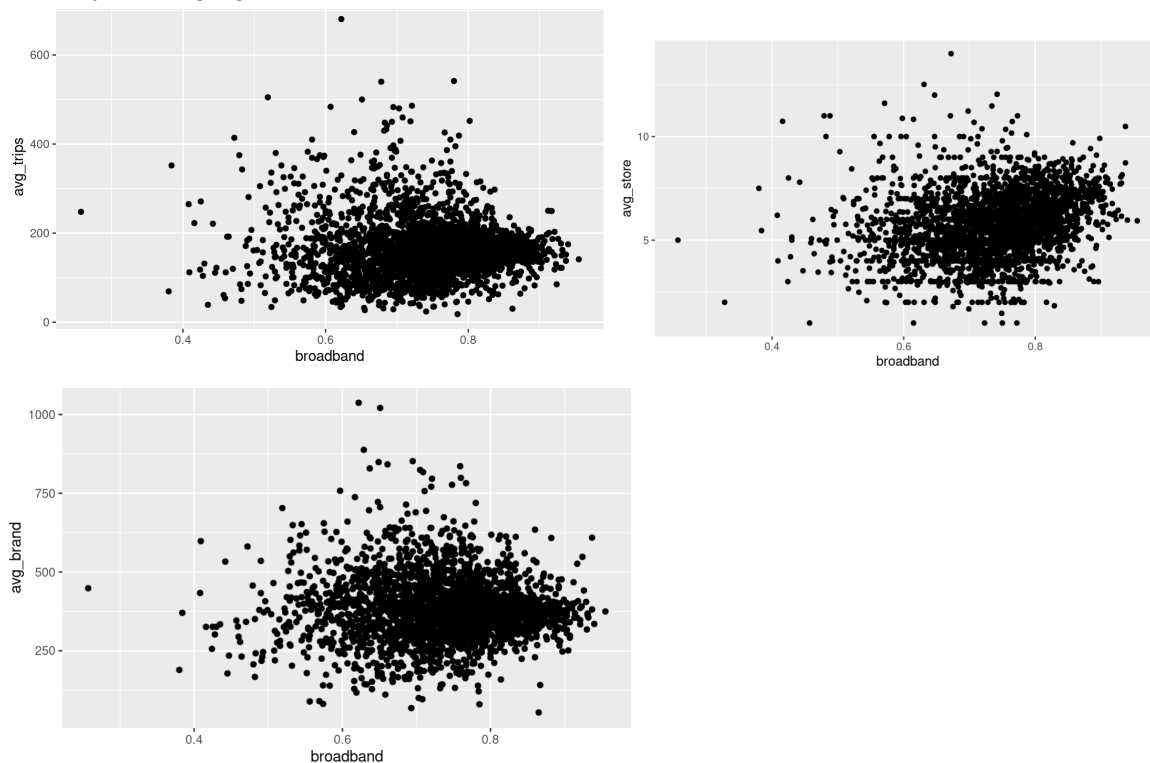
Layout
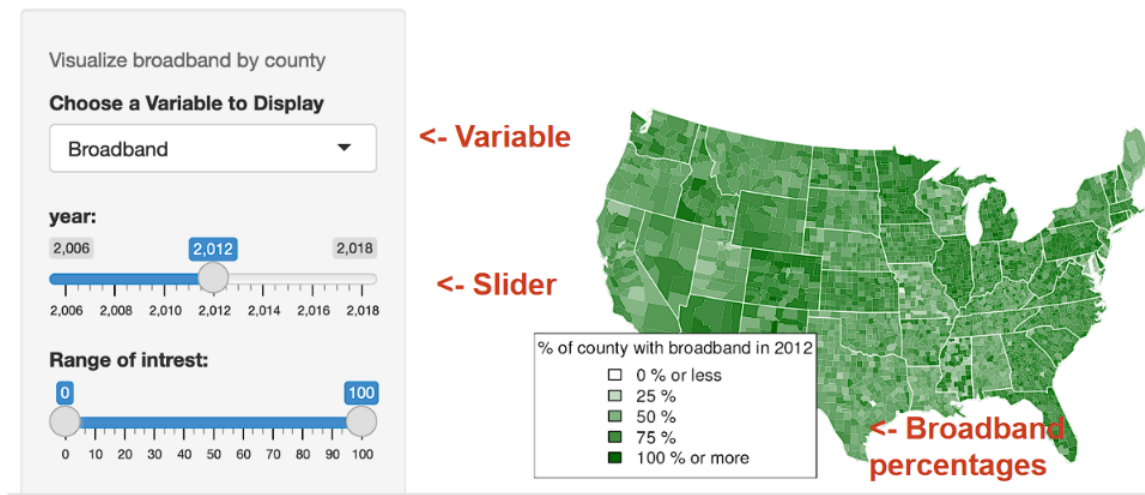
Textbox Notes: This is the order the text boxes will appear. Hit next to proceed. Title of textbox and text is shown below.

1. Welcome: This app was created as part of a Discovery Project based on a dissertation for: "Consumer Behavior and the Rise of Broadband: A Retail Apocalypse?". The app provides an interactive experience for users to visualize how the proliferation of broadband affected key metrics in consumer behavior.
2. Variable: Choose which variable to display from this dropdown menu. These are the key metrics mentioned before and include:
   Brand
   Broadband
   Chain
   Spend
   Trips

3. Slider : Adjust the slider to see progression in variables
4. Broadband Percentages: This variable shows a choropleth map of the US. When you adjust the slider you can see how the percentage of counties with broadband changes overtime.

The goal is to look something like this ([link](#)):