

Covid-19 and the economy

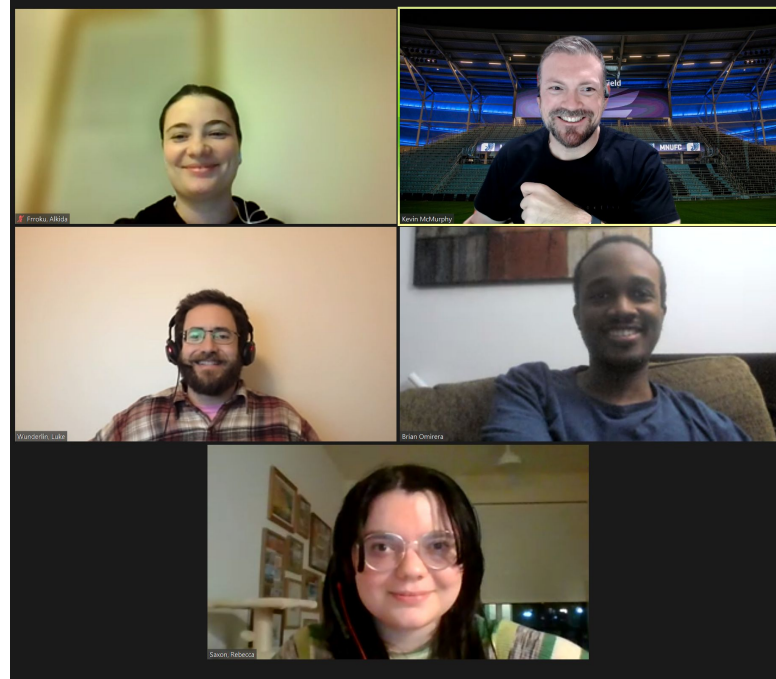
The impact of a global pandemic on life, travel and finances





Team Members

- Alkida Frroku
- Kevin McMurphy
- Brian Omirera
- Rebecca Saxon
- Luke Wunderlin





Overview

- Pandemic by the Numbers & Government Response
- Impact to Air and Travel Trends
- Changes in Consumer Spending
- Impact on manufacturing and the GDP



Questions

- Were there defining moments in time that had the biggest effect positively or negatively?
- Did government actions have an impact on the disease and did those impacts translate to changes in economic performance?
- Were there differences in spending regionally across the US?
- Were there areas within industries that helped to buoy or drag down that sector more than others?
- Which industries and areas have experienced the most change since the pandemic?
- How was air travel impacted overall and regionally by the pandemic?



Data Acquisition & Clean-Up

The data for this project did not all live in one place...

For COVID data:

- Downloaded csv files representing each month and counties from states across the US along with the date, mandate and mandate type issued
- Contained millions of lines, based on the number of events that occurred across all locations
- Summed new Covid cases and condensed time periods into quarters
- Calculated the quarter for each date using datetime format and filtered the dataframe to include specific rows to present the graphs.

For flight data:

- Downloaded csv files representing each month and csv file containing airport codes.
- Looped through each file to filter out US airports using a list derived from airport codes, and saved trimmed csv file with date as filename.
- Looped through trimmed csvs, getting length of each and filename to convert using `pd.to_datetime`.
- Plotted line graph using dataframe derived from list showing number of flights and date.

For GDP/Spend data:

- Leveraged data from the Bureau of Economic Analysis ([bea.gov](https://www.bea.gov))
- Reports came from their data within
 - Gross Domestic Product (GDP)
 - Consumer Spending
- Combination of CSV reports and API calls
- Tools within the site allowed for some initial data clean-up



Pandemic by the Numbers & Government Response

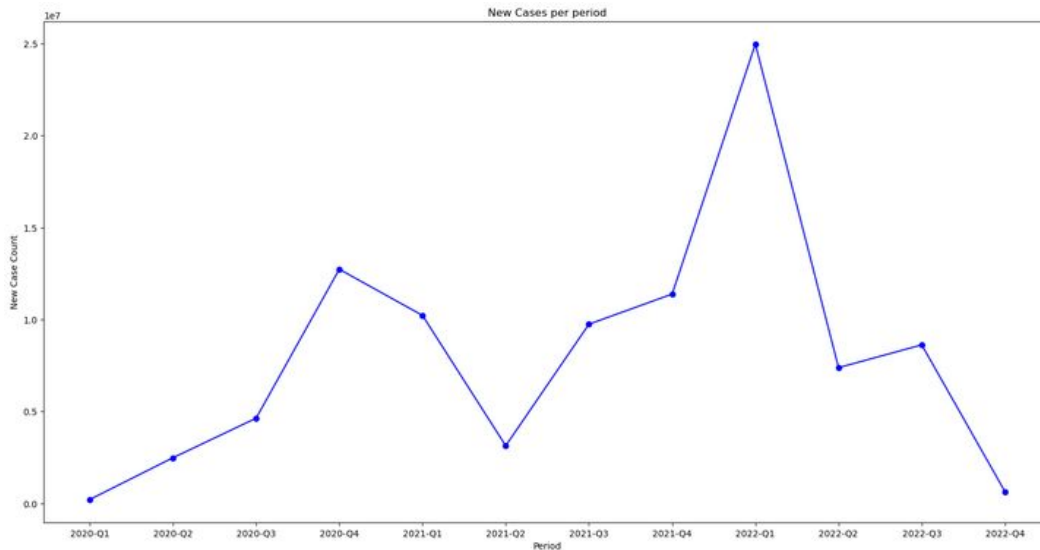




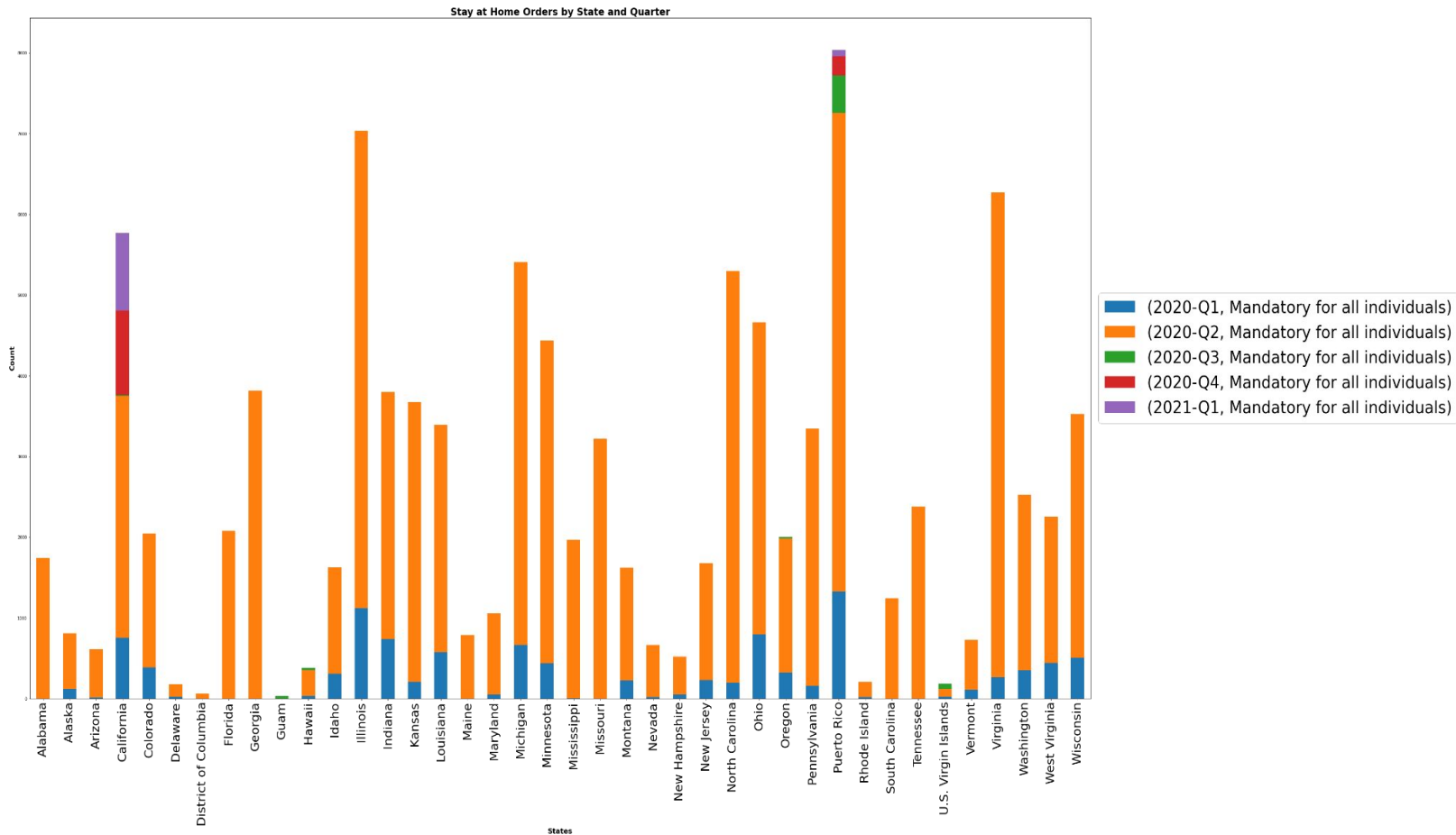
New Covid Cases per Quarter

Chose new cases to represent the spread of the virus, condensed dates into quarters

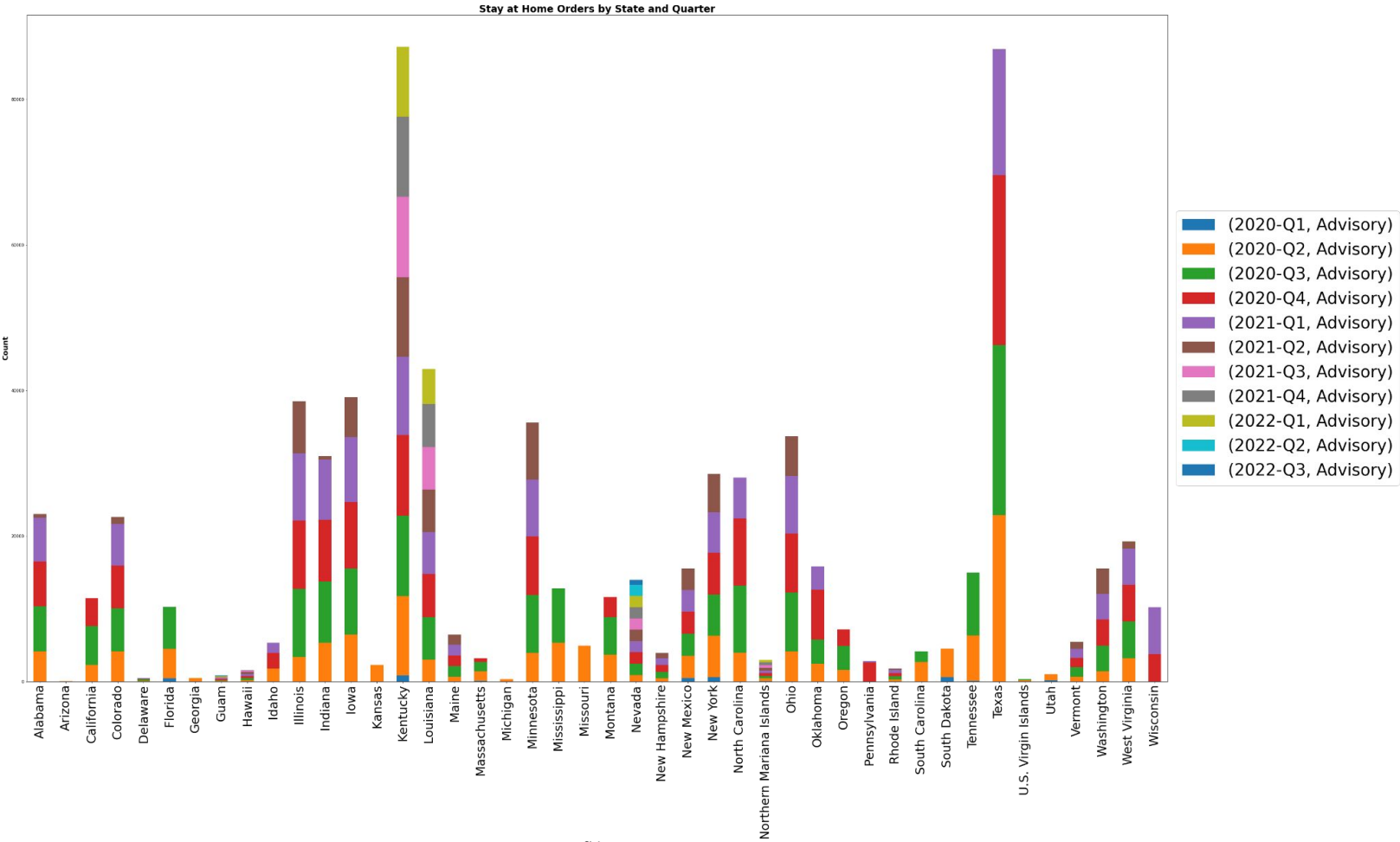
- 2020: Continuous Increase
- 2021 Q1: Vaccines Introduced (-20%)
- 2021 Q3/Q4: Holiday Travel (+200%)
- 2022 Q2: At home test kits* (-78%)



Mandatory Stay at home orders by State and Quarter



Advisories by State and Quarter





Covid Travel Trends



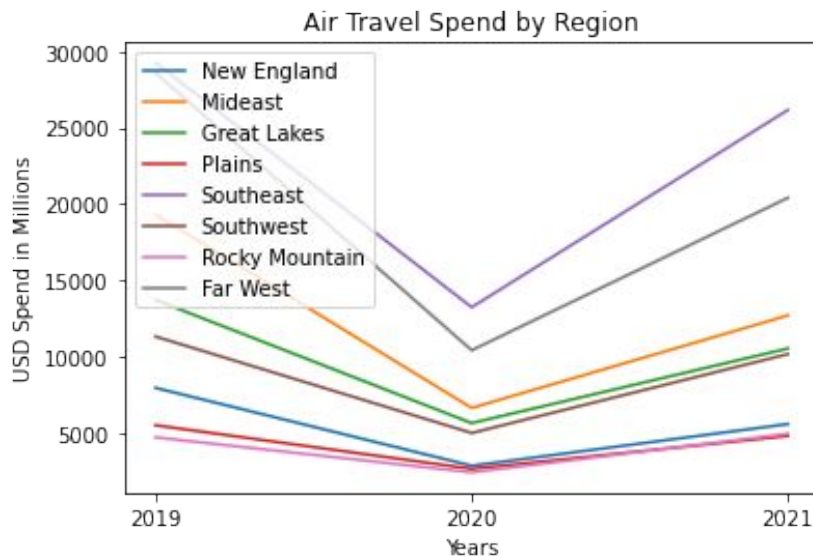


Looking at Air Travel

Regions that saw the greatest drop in spend (Far West and Southeast) include popular vacation destinations such as **Las Vegas**, **Hawaii** and **Florida**.

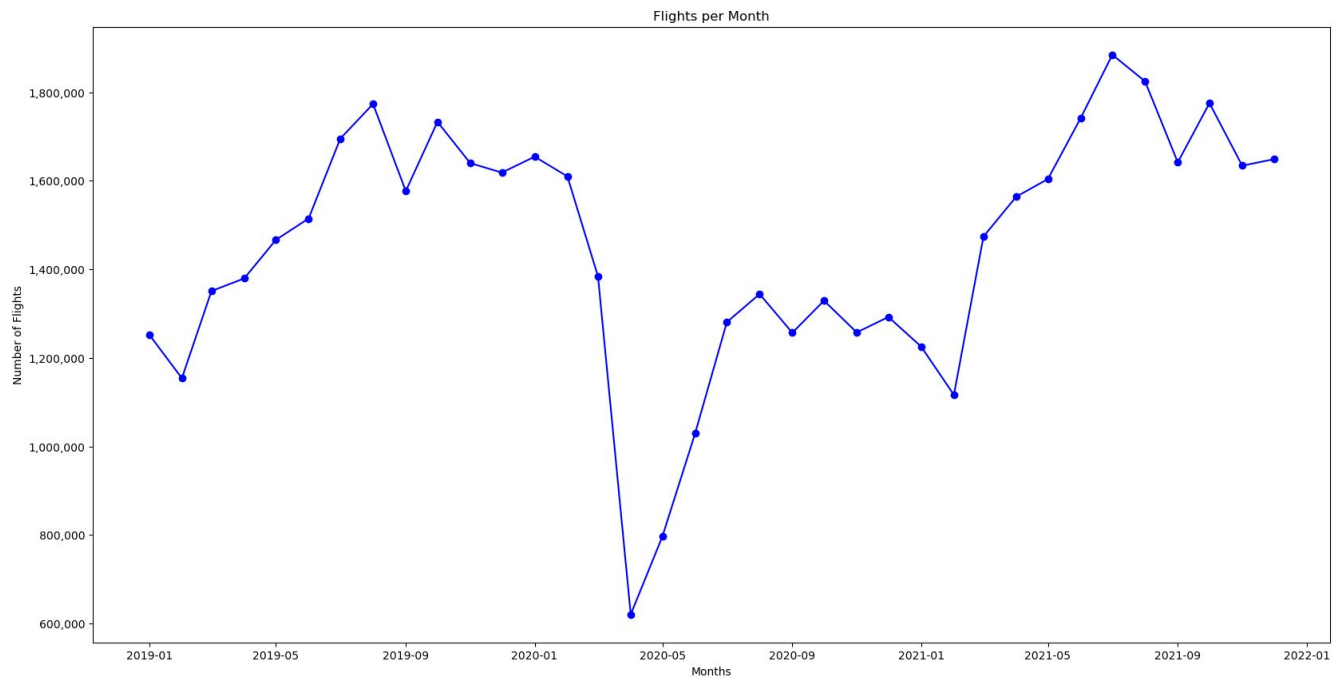
In 2020:

- Far West dipped **64%**
- Southeast dipped **55%**





Number of US Flights Per Month(2019-2021)





US spend by subcategory - Travel

Description	2019-2020	2020-2021
Air transportation	-59.4	94.9
Foreign travel by U.S. residents	-71.8	69.1
Ground transportation	-47.7	28.4
Less: Expenditures in the United States by non...	-63.1	-2.8
Water transportation	-39.3	19.3

All areas of travel suffered through the at-home restrictions during the global lockdown.

This impacted modes of travel as well as the travel industry.



Consumer Spend





Consumer Spend Analysis

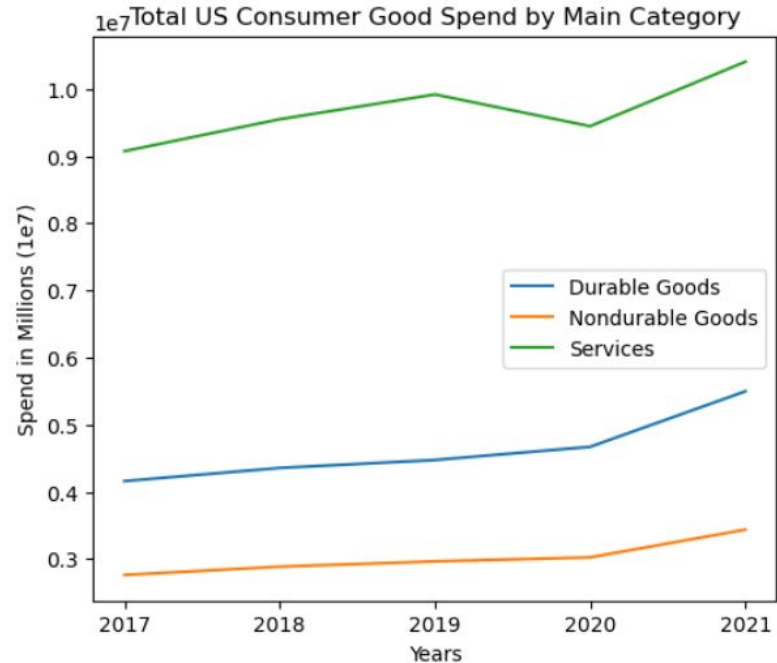
Using data provided by the Bureau of Economic Analysis (BEA), we were able to look at the annual spend by consumers in variety of different categories.

The data was provided annually and broken down by country, region and to the state level.

- US Spend by main category
- Regional spend by sub-category
- Performance of items within sub-categories

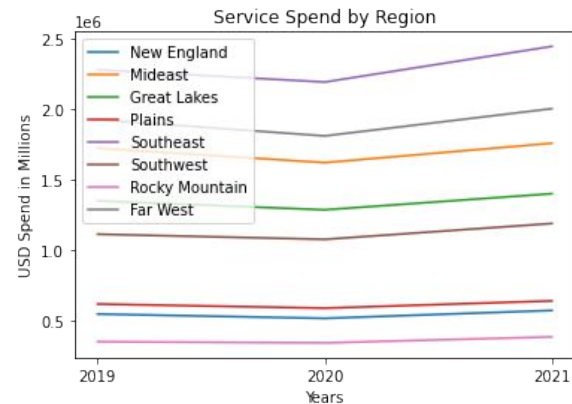
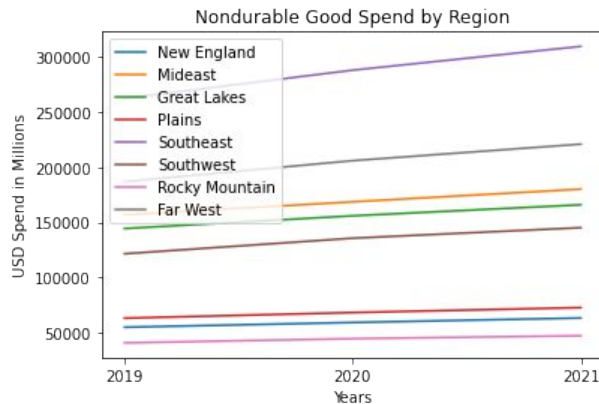
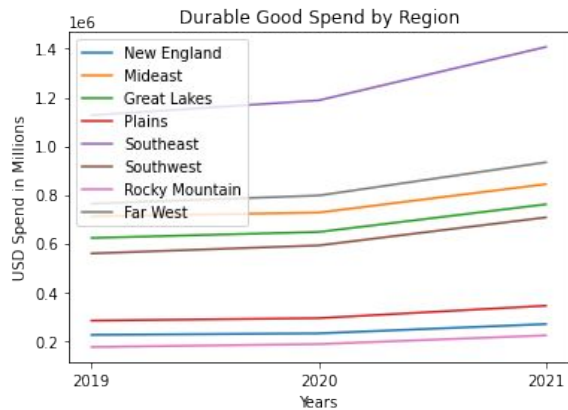
US Spend by macro category

- Looking at three major categories, all were growing YoY
- Only Services took a hit during the pandemic (dropping 5% YoY)
- Growth grew even more rapidly following the pandemic
 - Durable: 25%
 - Nondurable: 14%
 - Services: 10%





Regional spend by macro category



When looking at the macro level, even breaking down regionally, no significant outliers were detected.



US spend by subcategory - Durable Goods

Description	2019-2020	2020-2021
Furniture and furnishings	16.6	21.8
Household appliances	10.1	17.6
Net purchases of used motor vehicles	5	50.6
New motor vehicles	2.5	20
Sporting equipment, supplies, guns, and ammuni...	27.7	23
Telephone and related communication equipment	-16.9	21.3
Therapeutic appliances and equipment	-1.7	21.8
Video, audio, photographic, and information pr...	18.6	19.9

- **2020 Covid worst/best**

- Telephone and related communication equipment (-16.9%)
- Sporting equipment, supplies, guns, and ammunition (27.7%)

- **2021 Covid worst/best**

- Household appliances (17.6%)
- Net purchases of used motor vehicles (50.6%)



US spend by subcategory - Nondurable Goods

Description	2019-2020	2020-2021
Alcoholic beverages purchased for off-premises...	12.8	6.9
Clothing and footwear	-9.9	28.7
Food and nonalcoholic beverages purchased for ...	8.7	7
Men's and boys' clothing	-9.9	28.9
Personal care products	3.7	14.8
Tobacco	3.7	3.5
Women's and girls' clothing	-11.4	29.4

- **2020 Covid worst/best**
 - Womens and girls clothing (**-11.4%**)
 - Alcoholic beverages purchased for off-premises consumption (**12.8%**)
- **2021 Covid worst/best**
 - Tobacco (**3.5%**)
 - Womens and girls clothing (**29.4%**)



US spend by subcategory - Services

Description	2019-2020	2020-2021
Dental services	-16.5	14.4
Electricity and gas	0.3	7.5
Gambling	-21.2	37.3
Internet access	3.2	6.7
Membership clubs, sports centers, parks, theat...	-47.3	23.9
Outpatient services	-5	10
Physician services	-4.8	9.1
Telecommunication services	-0.6	6.6
Water supply and sanitation	0.1	5.1

- **2020 Covid worst/best**
 - Membership clubs, sports centers, parks, theaters, and museums (-47.3%)
 - Internet access (3.2%)
- **2021 Covid worst/best**
 - Water supply and sanitation (5.1%)
 - Gambling (37.3%)



GDP Analysis by State and Industry



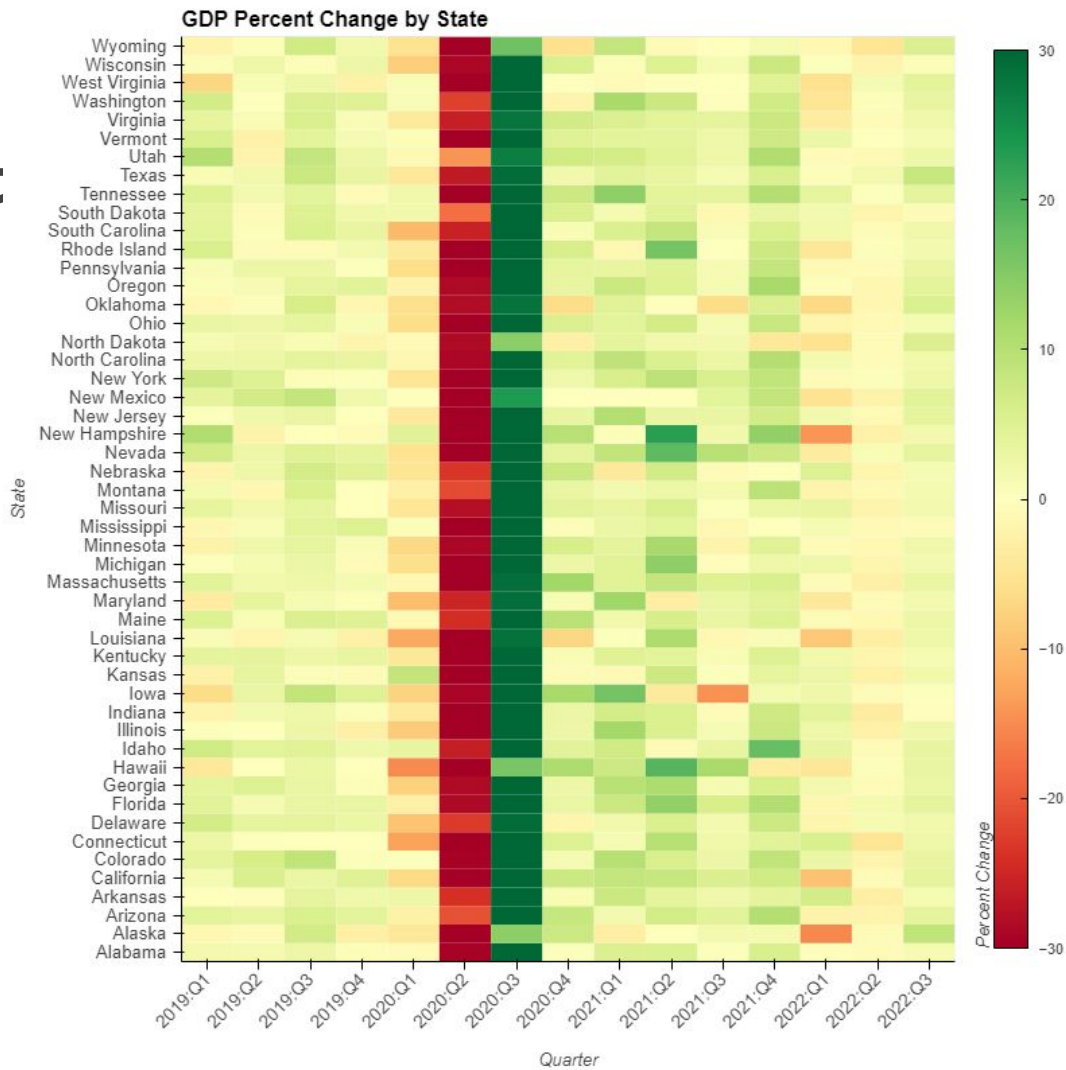
Utah -14.1%

Nevada -49.6%

Rebound 2020:Q3

Michigan 65.9%

Alaska 14.2%

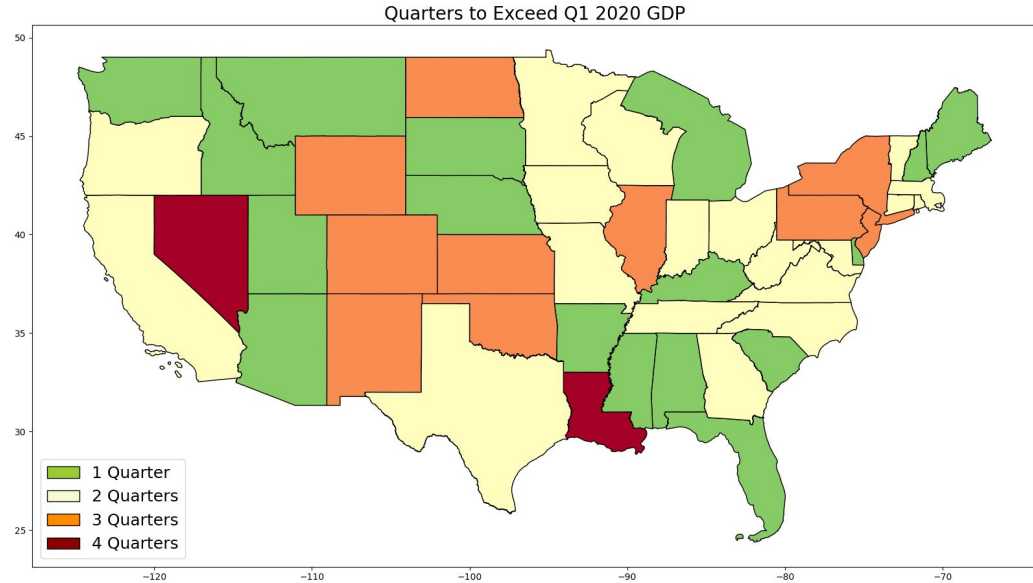
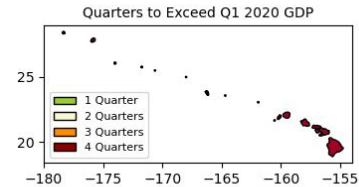


NonDefense Spend 21.2%
Air Transportation -71.1%

NonDefense Spend -8.8%
Accommodation 78.3%



GDP Recovery by State





Industry Rebounds

	Industry Sector	Quarters to Recover
36	Food and beverage stores	0
54	Finance and insurance	0
55	Federal Reserve banks, credit inte...	0
58	Funds, trusts, and other financial...	0
61	Housing	0
89	Federal	0
90	General government	0
92	Nondefense	0

	Industry Sector	Quarters to Recover
5	Mining	4
8	Support activities for mining	10
16	Fabricated metal products	4
21	Other transportation equipment	5
29	Printing and related support activ...	7
32	Plastics and rubber products	5
40	Air transportation	5
41	Rail transportation	4
42	Water transportation	6
44	Transit and ground passenger transport...	7
45	Pipeline transportation	4
50	Motion picture and sound recording ind...	5
63	Rental and leasing services and le...	4
74	Educational services	4
78	Nursing and residential care facil...	5
80	Arts, entertainment, recreation, accommoda...	4
81	Arts, entertainment, and recreation	5
82	Performing arts, spectator sports,...	5
83	Amusements, gambling, and recreati...	4
84	Accommodation and food services	4
85	Accommodation	4
87	Other services, except government	5
96	Government enterprises	4

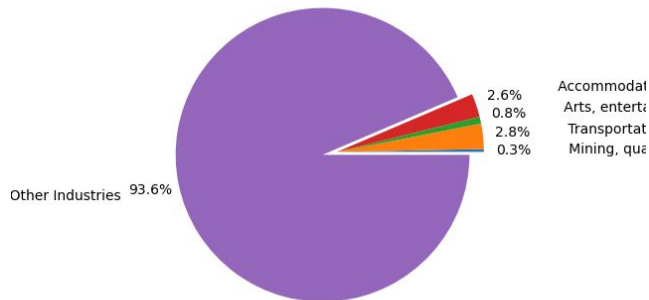


State Rebounds

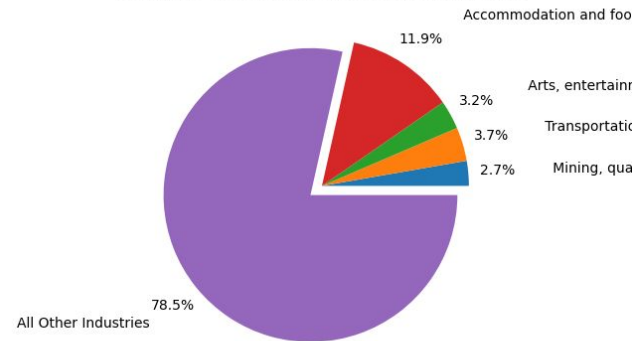
1 Quarter
Michigan 6.4%

4 Quarters
Nevada 21.5%
Hawaii 16.4%
Louisiana 10.6%

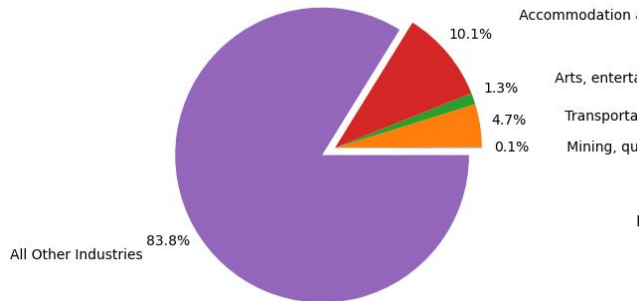
Michigan % of GDP for Slow Recovering Industries



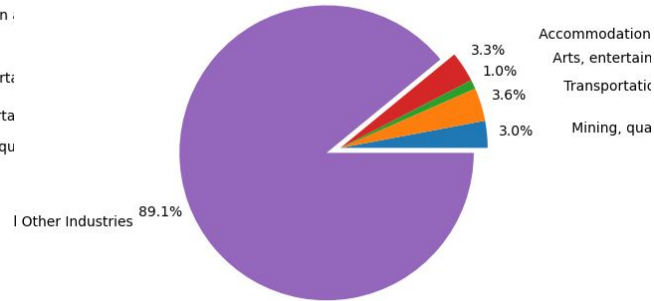
Nevada % of GDP for Slow Recovering Industries



Hawaii % of GDP for Slow Recovering Industries



Louisiana % of GDP for Slow Recovering Industries





Were there defining moments in time that had the biggest effect positively or negatively?

The defining moments in the analysis were during Q2 and Q3 of 2020. The data shows that government issued mandatory stay at home orders were widespread as was the nearly instantaneous decrease in economic performance as measured by GDP. A second defining point was Q3 of 2020 when mandatory stay at home orders were cancelled resulting in a nearly instantaneous increase in economic performance. COVID-19 infections continued to rise regardless of the orders and the economy continued to grow regardless of the prevalence of the disease into 2021.

Questions?

