Forward Thinking on Workforce Post COVID-19

Ana Maria Garcia, Angel Okrah, Chelsea Williams, Chuanyue Shen, Sarah Moor, Sarah Poff, Urjoshi Sinha

Highlights

- The % change in unemployment between pre & post pandemic periods, defined as “shock percent” was determined for states and used as a response variable for predictive analysis
- Future unemployment was projected by fitting an exponential decay function to the decrease in unemployment since the height of the pandemic. The prediction has less than *4% error rate* when compared against actual unemployment values of Aug & Sept 2021

Background

Our research aims to study the effects of the pandemic on the workforce distribution in the United States. The work:

- Identifies the main factors influencing post & pre pandemic unemployment rate and explores the correlation between them
- Assesses and explores the recovery across industries
- Develops a model for predicting future state of unemployment based on the factors thus derived

Dataset and Pre-processing

Data-sets web-scraped using Beautiful Soup or downloaded from:

- US Bureau of Labor Statistics: Consumer Price Index, Employment, Unemployment rate, Distribution of workforce across industries in states
- United States Nation Data Website: Consumer Sentiment, Inflation, Wages per Industry

Data Preprocessing:

1. Clean data by removing missing and inconsistent fields
2. Merge data sets in an interpretable manner using Python, SQL databases.
3. Ensure data coherency and edit anomalous data such as data for states listed under redundant headers.

Models:

Linear Regression, Predictive Modelling
Tests: R-squared tests, Chi-squared tests

Results

- Consumer confidence levels were lowest in August 2021
- The number of job openings was greatest in July 2021
- The unemployment rate was greatest in April 2020
- Industry Composition is a stronger predictor of unemployment changes than Wage Rates

Highlights of state/industry predictive results

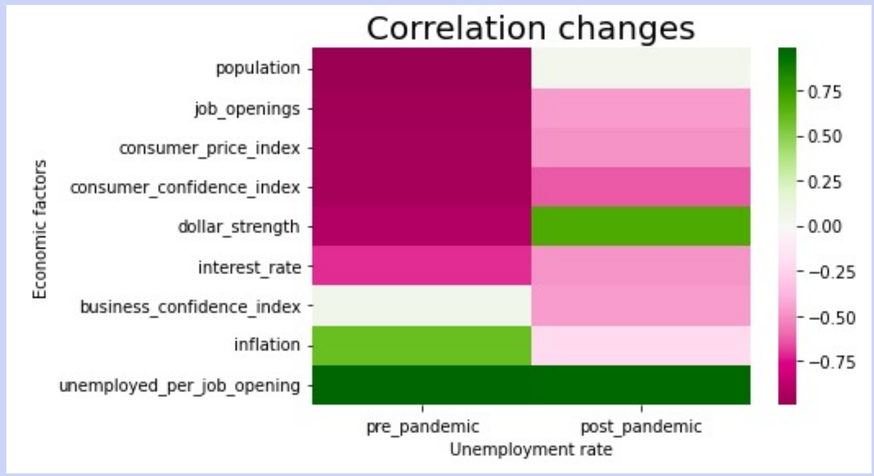
- States that grew their Arts, design, entertainment, sports, and media operations from May 2019 to 2020 tended to, on average, have a smaller change in unemployment from February to April 2020
- States with a growing percent of food preparation and serving careers tend to experience a larger shift in unemployment at the onset of the Covid-19 Pandemic.

Data Insights

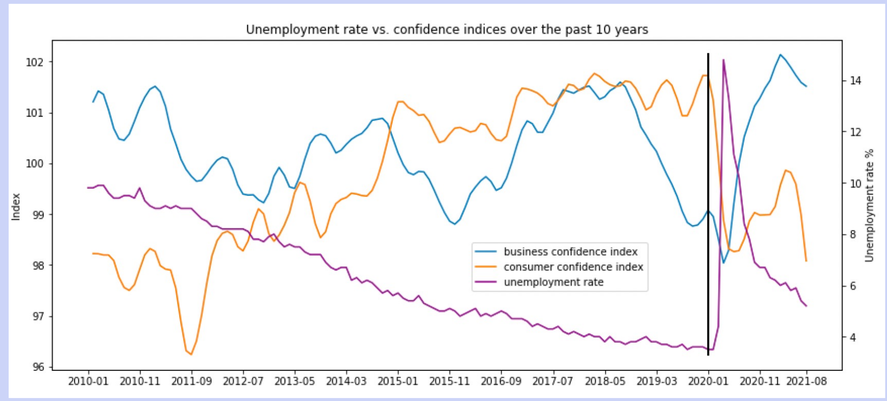
The analysis quantifies reasons behind extended or shortened recovery timelines at the national and state levels. EDA of economic attributes over unemployment across states and industries identifies interest rates and business confidence index as some of the influential factors behind unemployment

EDA

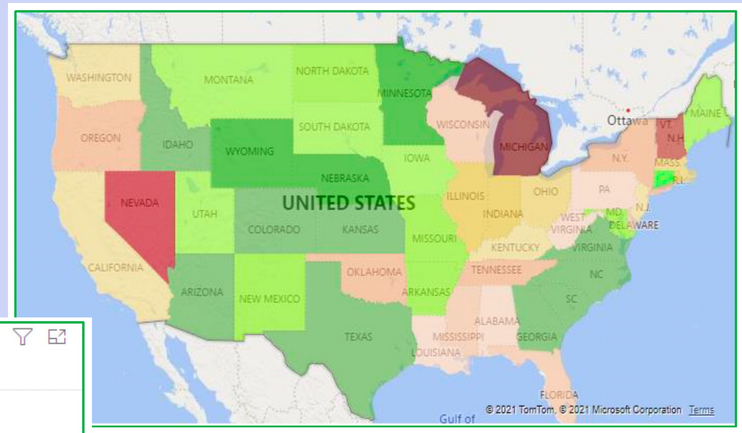
Correlation between the unemployment rate and various factors before and after Covid was identified



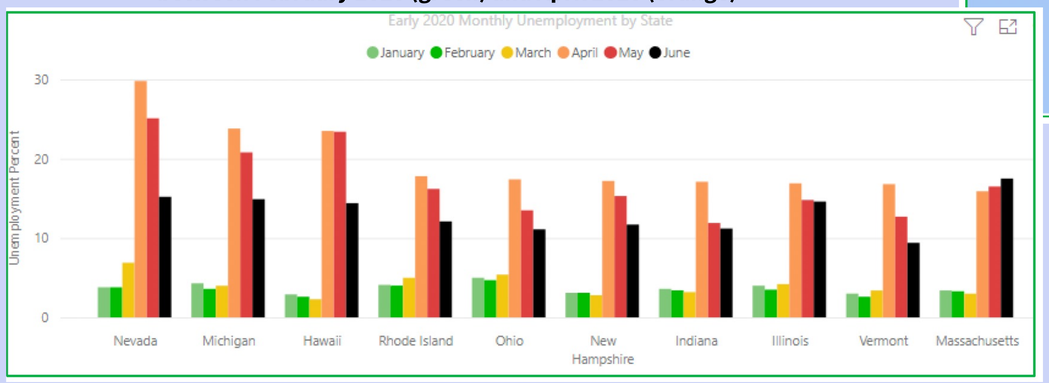
Time-series of unemployment rate vs. a series of indices before and after Covid was identified



Most shocked states tend to be on the West and near the East Coasts



10 states experienced greater than a 12% difference in unemployment between February 2020 (green) and April 2020 (orange)



Additional Takeaways

Differences in correlations and discrepancies in trends indicate that we are heading towards *stagflation* (High inflation + slow economic growth + high unemployment). Future work involve analyzing stagflation fueled recession of the 1970s for insights

Prediction for the future of the workforce