Data Appendix

I. aggregate_job_postings_US.csv

The unit of observation for this particular dataset is each job that was posted on Indeed on a daily basis. The variables of this dataset are as follows:

A. Date
    a. The date the job was posted on Indeed.
B. Job Country
    a. The country the job is located in.
C. indeed_job_postings_index_SA
    a. The seasonally adjusted change in job postings since February 1st, 2020.
D. indeed_job_postings_index_NSA
    a. The not seasonally adjusted change in job postings since February 1st, 2020.
E. Variable
    a. This variable states whether the job is from the total postings dataset or the new postings dataset.

II. job_postings_by_sector_US.csv

The unit of observation for this dataset is the jobs that were posted on Indeed by Sector. The variables of the dataset are as follows:

A. Date
    a. The date the job was posted on Indeed.
B. Job Country
    a. The country the job is located in.
C. Indeed_job_postings_index
D. Variable
    a. This variable states whether the job is from the total postings dataset or the new postings dataset.
E. Display_name
    a. The sector that the job is offered for (e.g. Accounting)

III. Metro_job_postings_us.csv

The unit of observation for this dataset is the Indeed job postings by metropolitan area. The variables of the dataset are as follows:

A. Date
    a. The date the metro job was posted on Indeed.
B. Metro
    a. The metropolitan area where the job was posted.
C. CBSA code

a. The Core-Based Statistical Area (CBSA) of the job posting which designates metropolitan and micropolitan statistical areas.

D. indeed_job_postings_index
   a. The change in job postings since February 1st, 2020.

IV. State_job_postings_us.csv

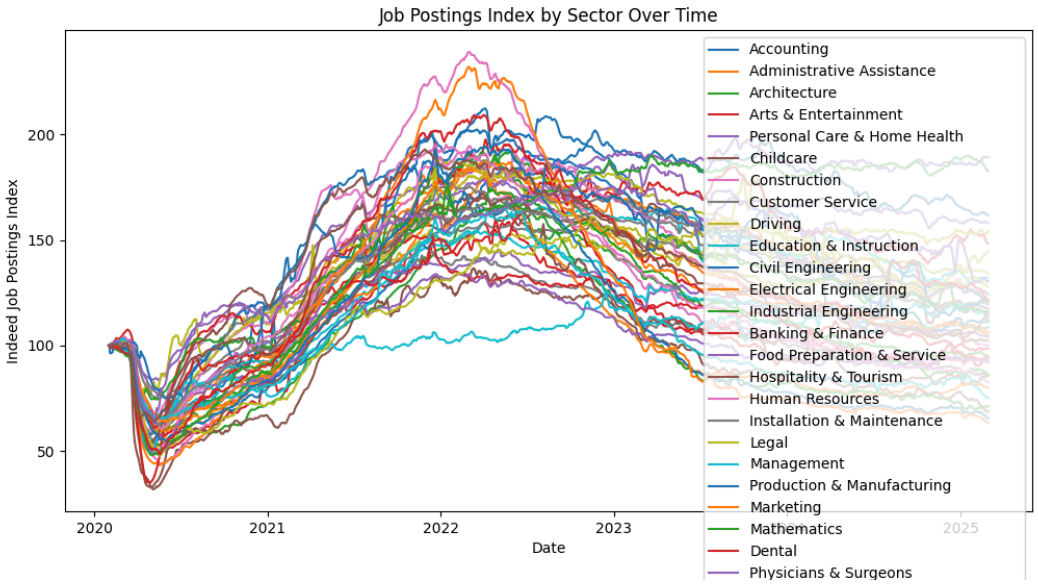
The unit of observation for this dataset is the Indeed job postings by state. The variables of the dataset are as follows:

A. Date
   a. The date the job was posted on Indeed.

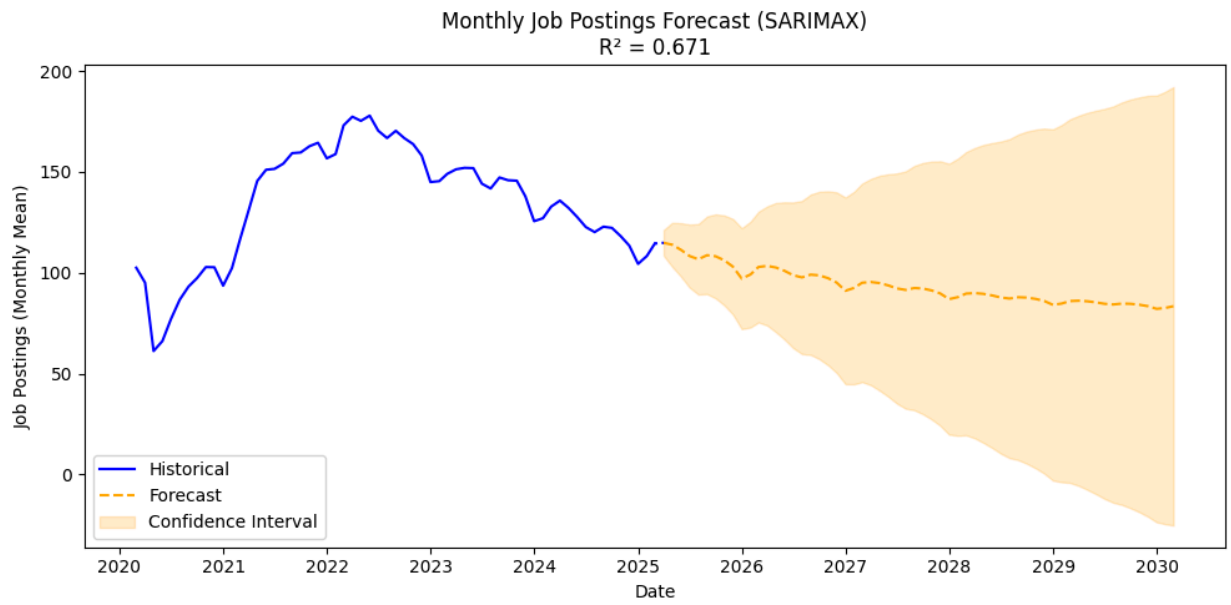
B. State
   a. The state the job was posted in.

C. indeed_job_postings_index
   a. The change in job postings since February 1st, 2020.

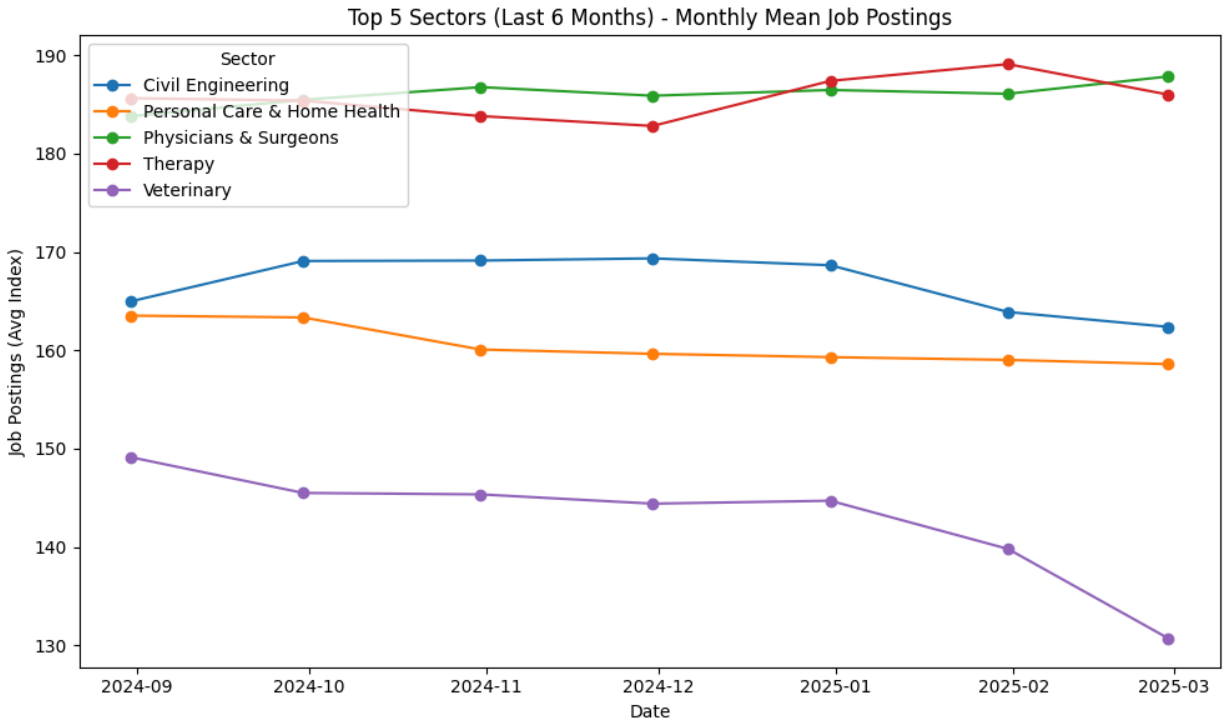
Outputs/Figures and Analysis:



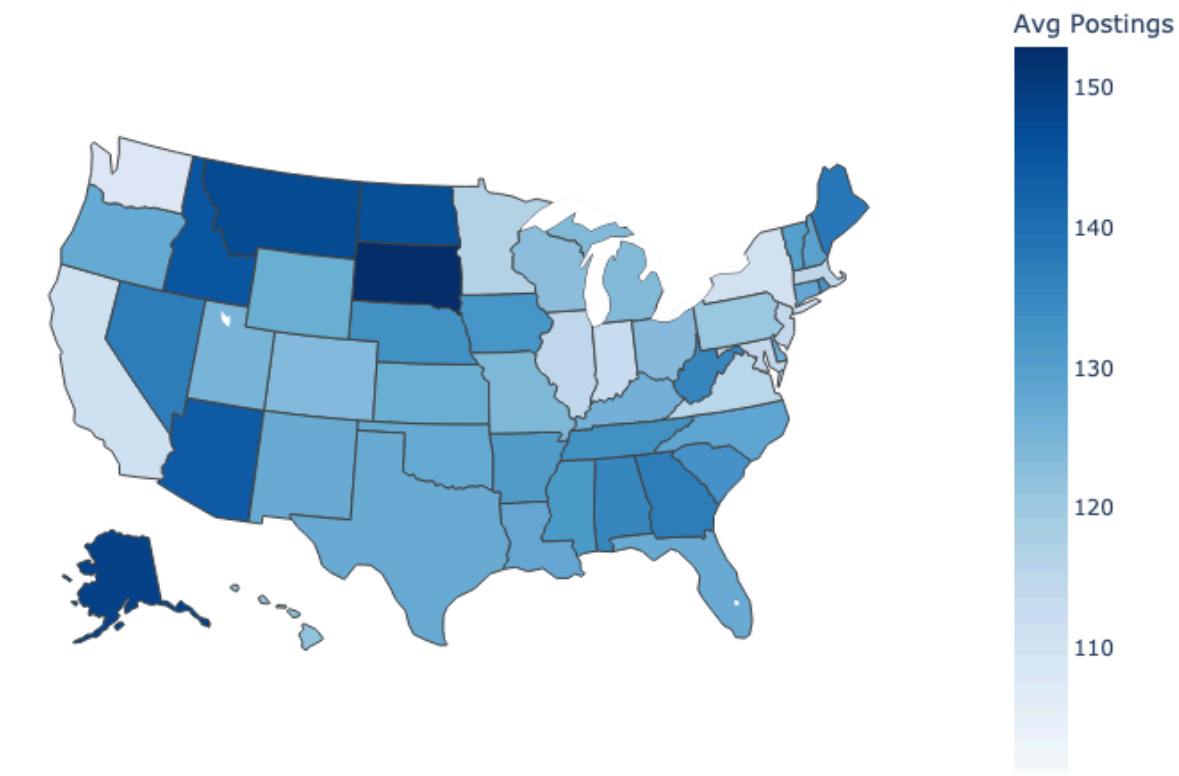
This plot above demonstrates the changes in the job posting index of each job sector over time, beginning in 2020 through the present, 2025. There is an observable dip in virtually all sectors right around the time of when COVID began, followed by a steady increase in virtually all sectors as 2020 went on. Around 2022, there is a noticeable peak in the job posting index, with virtually all sectors experiencing this, followed by another decrease. As the graph approaches 2025, most sectors seem to balance out at a steady rate.



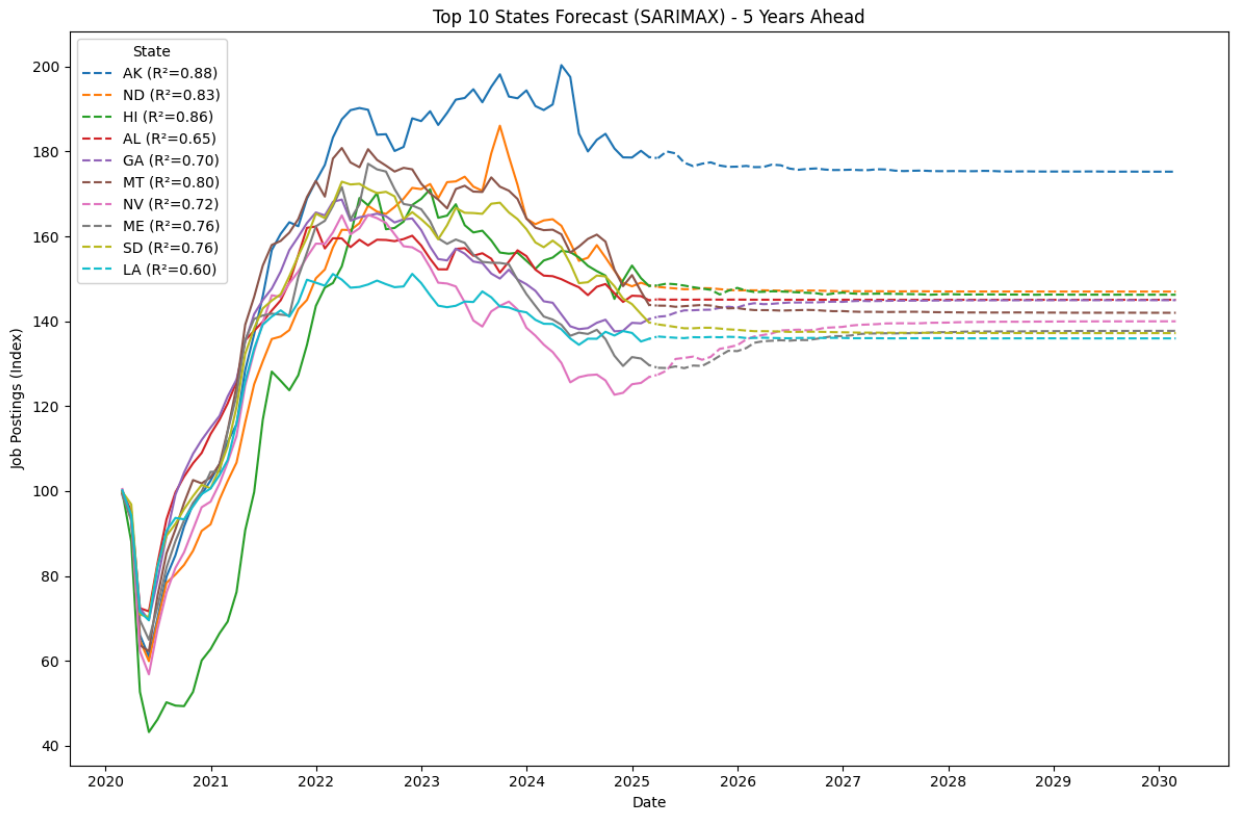
This plot above displays the SARIMAX predictive forecast created in regards to aggregate job postings indices, utilizing the monthly data from 2020 to 2025, displayed on the "Historical" line. The five-year prediction line, or "Forecast," is seen, with the shaded confidence interval around it, which widens as the years go on, which indicates that assurance in our model's predictive power for all sectors decreases over time [21]. The forecast line displays a downwards, but relatively stable trend line for the next five years in the job posting index. The r^2 value is 0.671, indicating a relatively high predictive power [20].



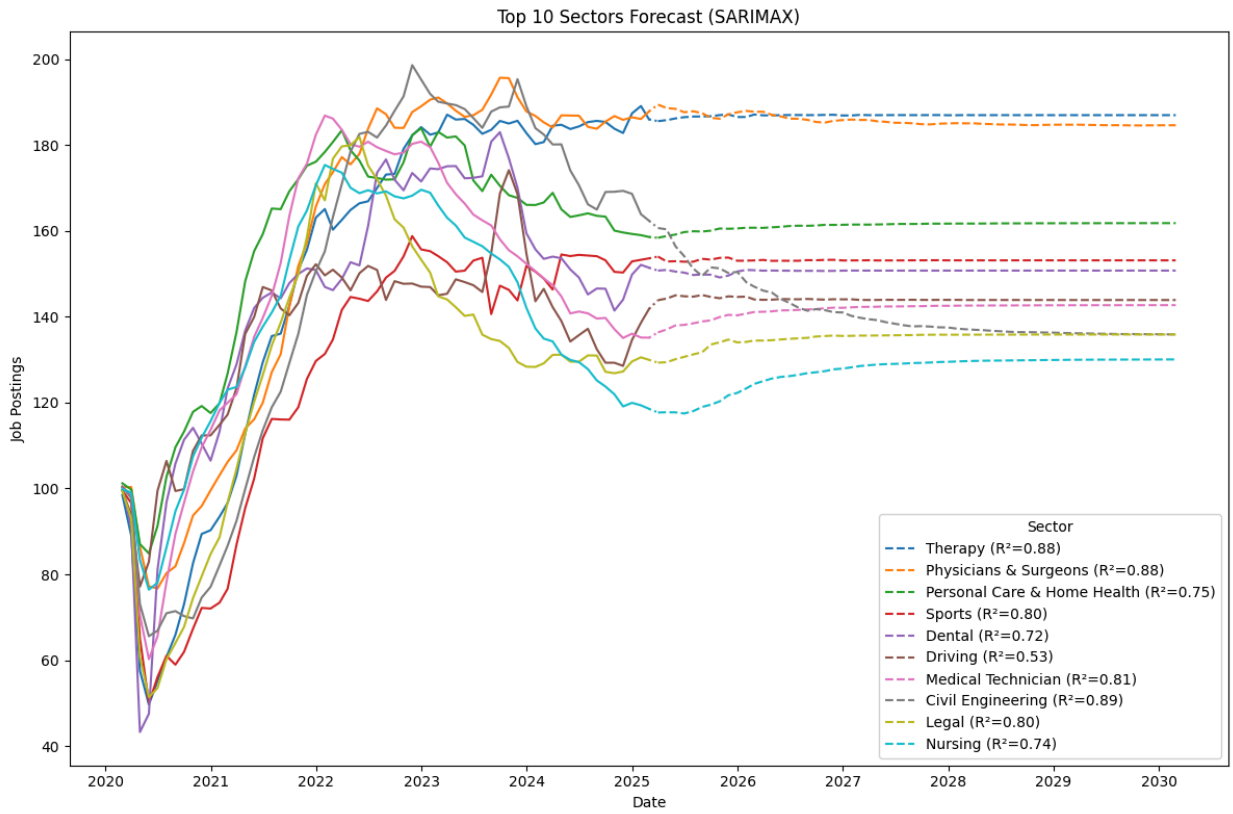
This graph above demonstrates the job posting indices for the top five job sectors with the highest number of postings in the last six months, going back to September of 2024. The top five sectors are shown to be Physicians & Surgeons, Therapy, Civil Engineering, Personal Care & Home Health, and Veterinary. Most of these sectors demonstrate steady rates of job posting indices across these six months, but there is a decrease for the Veterinary sector starting in January of 2025. With these months having the highest job posting indices for these categories, this information could be helpful for potential job searchers to apply to these sectors during this time of year.



This plot above demonstrates a map of the U.S. in relation to each state's job posting index, with darker colors indicating a higher index. Based on this plot, some of the states with the lowest job posting indices include California, Washington, Virginia, New York, and Maryland.



From the SARIMAX 5-year forecast of the top ten states with the highest number of job postings, Arkansas remains the state with the highest posting index over the next five years, and North Dakota, Alabama, and Hawaii remain relatively steady over time. Nevada has a pretty steep climb into 2027 and stabilizes, rising above the posting indices of Louisiana, South Dakota, and Maine. The r2 values for this forecast range from 0.60 to 0.88, indicating high levels of predictive power with our model [20].



This SARIMAX 5-year forecast of the top 10 sectors with the highest job posting indices indicate that the sectors of Therapy and Physicians & Surgeons are the sectors with the largest number of posts for the next five years. There is a steep decline seen for Civil Engineering, as well as growth seen for the Nursing sector. For this forecast, the r^2 value ranges from 0.53 to 0.89, indicating a relatively high level of predictive power for our model [20].