statistics-state

March 14, 2023

[223]:

```
%matplotlib inline
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt

# Set some Pandas options
pd.set_option('display.max_columns', 20)
pd.set_option('display.max_rows', 25)

from datetime import datetime
```

[224]:

```
segments = pd.read_csv("covid19_superdata.csv")
```

[225]:

```
#get just the dates in wisconsin
wisconsin = segments[segments.StateFIPS==55].iloc[1:,4:-1]

#get population of state
wi_pop = segments[segments.StateFIPS==55].iloc[:,-1:].sum()

wisconsin.head()
```

[225]:

```
      2020-01-22_x  2020-01-23_x  2020-01-24_x  2020-01-25_x  2020-01-26_x  \
3093             0             0             0             0             0
3094             0             0             0             0             0
3095             0             0             0             0             0
3096             0             0             0             0             0
3097             0             0             0             0             0

      2020-01-27_x  2020-01-28_x  2020-01-29_x  2020-01-30_x  2020-01-31_x  \
3093             0             0             0             0             0
3094             0             0             0             0             0
3095             0             0             0             0             0
3096             0             0             0             0             0
3097             0             0             0             0             0

      …  2023-01-27_y  2023-01-28_y  2023-01-29_y  2023-01-30_y  \
3093  …           70            70            70            70
3094  …           42            42            42            42
3095  …          153           153           153           153
3096  …           46            46            46            46
3097  …          620           620           620           620

      2023-01-31_y  2023-02-01_y  2023-02-02_y  2023-02-03_y  2023-02-04_y  \
3093            70            70            70            70            70
3094            42            42            42            42            42
3095           153           153           153           153           153
3096            46            46            46            46            46
3097           620           620           620           620           620

      2023-02-05_y
3093            70
3094            42
3095           153
3096            46
3097           620

[5 rows x 2222 columns]
```

0.1 Weekly Case Info:

[264]:

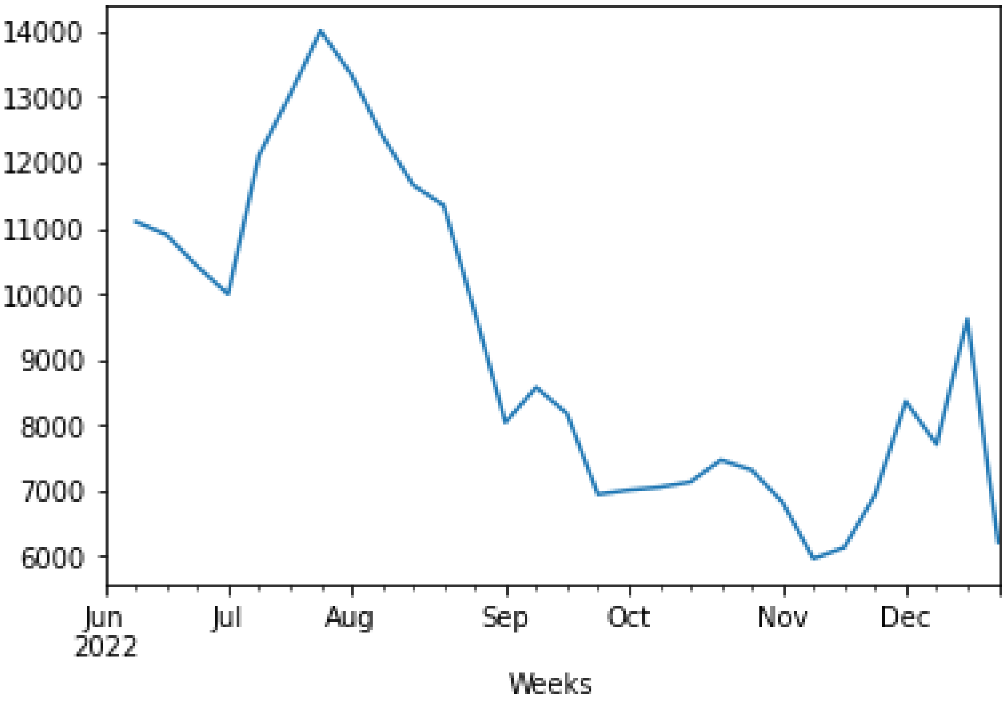
```
#remove suffixes and convert to datetime
wi_cases = wisconsin.filter(regex='_x')
wi_cases.columns = wi_cases.columns.str.rstrip('_x')
wi_cases.columns = pd.to_datetime(wi_cases.columns)
#wi_cases = wi_cases.loc[:, '2022-06-01':'2022-12-31']
wi_cases_week = wi_cases.T.reset_index()
wi_cases_week = wi_cases_week.assign(Weeks = wi_cases_week['index']).
 ↪drop(columns = 'index')
wi_cases_week['Weeks'] = wi_cases_week['Weeks'].astype('datetime64[ns]')

#get mean cases per week
wi_cases_week_mean = wi_cases_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True).astype(int)
wi_cases_week_mean = wi_cases_week_mean.loc['2022-06-01':'2022-12-31', :]
wi_cases_new_week_mean = wi_cases_week_mean.sum(axis=1).diff()
```

[265]:

```
wi_cases_new_week_mean.plot()
```

[265]:

```
<Axes: xlabel='Weeks'>
```



[268]:

```
#get mean median and mode of the above dataframe
print("Mean: ",wi_cases_new_week_mean.mean(),"Median: ",wi_cases_new_week_mean.
 ↪median(),"Mode: ",wi_cases_new_week_mean.mode().max())
```

```
Mean:  9153.965517241379 Median:  8359.0 Mode:  14006.0
```

0.2 Weekly Death Info:

[276]:

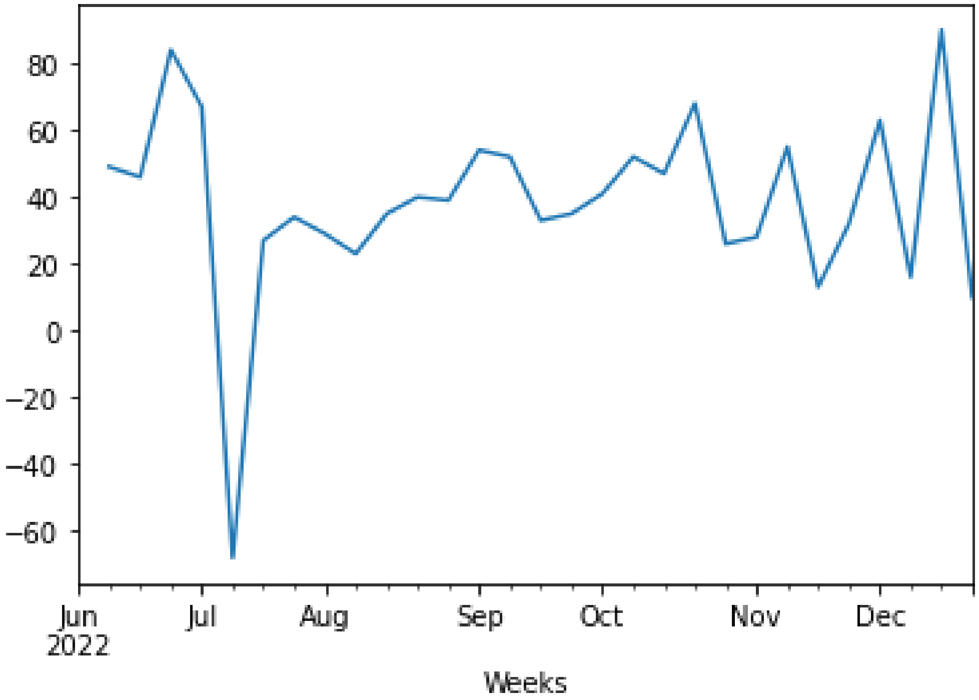
```
#remove suffixes and convert to datetime
wi_deaths = wisconsin.filter(regex='_y')
wi_deaths.columns = wi_deaths.columns.str.rstrip('_y')
wi_deaths.columns = pd.to_datetime(wi_deaths.columns)
#wi_deaths = wi_deaths.loc[:, '2022-06-01':'2022-12-31']
wi_deaths_week = wi_deaths.T.reset_index()
wi_deaths_week = wi_deaths_week.assign(Weeks = wi_deaths_week['index']).
 ↪drop(columns = 'index')
wi_deaths_week['Weeks'] = wi_deaths_week['Weeks'].astype('datetime64[ns]')

#get mean deaths per week
wi_deaths_week_mean = wi_deaths_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True).astype(int)
wi_deaths_week_mean = wi_deaths_week_mean.loc['2022-06-01':'2022-12-31', :]
wi_deaths_new_week_mean = wi_deaths_week_mean.sum(axis=1).diff()
```

[262]:

```
wi_deaths_new_week_mean.plot()
```

[262]:

```
<Axes: xlabel='Weeks'>
```



[263]:

```
#get mean median and mode of the above dataframe
print("Mean: ",wi_deaths_new_week_mean.mean(),"Median:␣
↪",wi_deaths_new_week_mean.median(),"Mode: ",wi_deaths_new_week_mean.mode().
↪max())
```

```
Mean:  38.62068965517241 Median:  39.0 Mode:  52.0
```

0.3 Case Data Compared to Three More States:

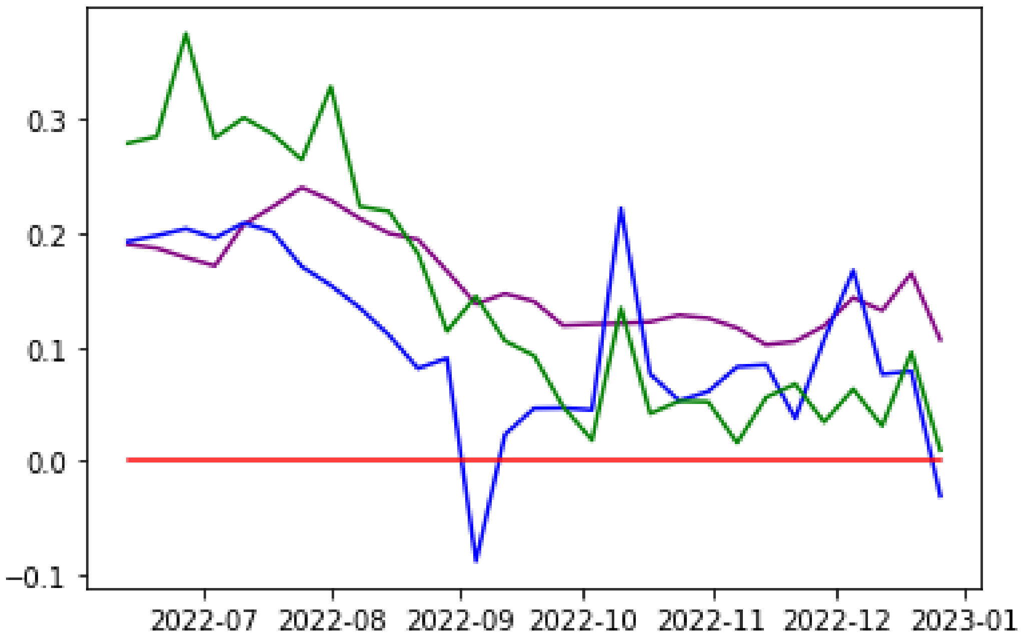
[230]:

```
#get just the dates in utah (UT)
utah = segments[segments.StateFIPS==49].iloc[1:,4:-1]

#get population of state
ut_pop = segments[segments.StateFIPS==49].iloc[:,-1:].sum()

#remove suffixes and convert to datetime
ut_cases = utah.filter(regex='_x')
ut_cases.columns = ut_cases.columns.str.rstrip('_x')
ut_cases.columns = pd.to_datetime(ut_cases.columns)
ut_cases_week = ut_cases.T.reset_index()
ut_cases_week = ut_cases_week.assign(Weeks = ut_cases_week['index']).
 ↪drop(columns = 'index')
ut_cases_week['Weeks'] = ut_cases_week['Weeks'].astype('datetime64[ns]')

#get mean cases per week
ut_cases_week_mean = ut_cases_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True)
ut_cases_week_mean = ut_cases_week_mean.loc['2022-06-01':'2022-12-31', :]
ut_cases_new_week_mean = ut_cases_week_mean.sum(axis=1).diff()


#get just the dates in nebraska (NE)
nebraska = segments[segments.StateFIPS==31].iloc[1:,4:-1]

#get population of state
ne_pop = segments[segments.StateFIPS==31].iloc[:,-1:].sum()

#remove suffixes and convert to datetime
ne_cases = nebraska.filter(regex='_x')
ne_cases.columns = ne_cases.columns.str.rstrip('_x')
ne_cases.columns = pd.to_datetime(ne_cases.columns)
ne_cases_week = ne_cases.T.reset_index()
ne_cases_week = ne_cases_week.assign(Weeks = ne_cases_week['index']).
 ↪drop(columns = 'index')
ne_cases_week['Weeks'] = ne_cases_week['Weeks'].astype('datetime64[ns]')

#get mean cases per week
ne_cases_week_mean = ne_cases_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True)
ne_cases_week_mean = ne_cases_week_mean.loc['2022-06-01':'2022-12-31', :]
ne_cases_new_week_mean = ne_cases_week_mean.sum(axis=1).diff()


#get just the dates in alaska (AK)
alaska = segments[segments.StateFIPS==2].iloc[1:,4:-1]

#get population of state
ak_pop = segments[segments.StateFIPS==2].iloc[:,-1:].sum()

#remove suffixes and convert to datetime
ak_cases = alaska.filter(regex='_x')
ak_cases.columns = ak_cases.columns.str.rstrip('_x')
ak_cases.columns = pd.to_datetime(ak_cases.columns)
ak_cases_week = ak_cases.T.reset_index()
ak_cases_week = ak_cases_week.assign(Weeks = ak_cases_week['index']).
 ↪drop(columns = 'index')
ak_cases_week['Weeks'] = ak_cases_week['Weeks'].astype('datetime64[ns]')
```

```
#get mean cases per week
ak_cases_week_mean = ak_cases_week.resample('W-Mon', label='left', closed = 'left', on='Weeks').mean(numeric_only=True)
ak_cases_week_mean = ak_cases_week_mean.loc['2022-06-01':'2022-12-31', :]
ak_cases_new_week_mean = ak_cases_week_mean.sum(axis=1).diff()
```

[272]:
```
#mean data across the three states over the population
fig1 = plt.figure()
ax1 = fig1.add_subplot()

ax1.plot((wi_cases_new_week_mean / wi_pop[0])*100, color="purple")
ax1.plot((ut_cases_new_week_mean / ut_pop[0])*100, color="blue")
ax1.plot((ne_cases_new_week_mean / ne_pop[0])*100, color="red")
ax1.plot((ak_cases_new_week_mean / ak_pop[0])*100, color="green")
```

[272]:
```
[<matplotlib.lines.Line2D at 0x7f409fee4dc0>]
```



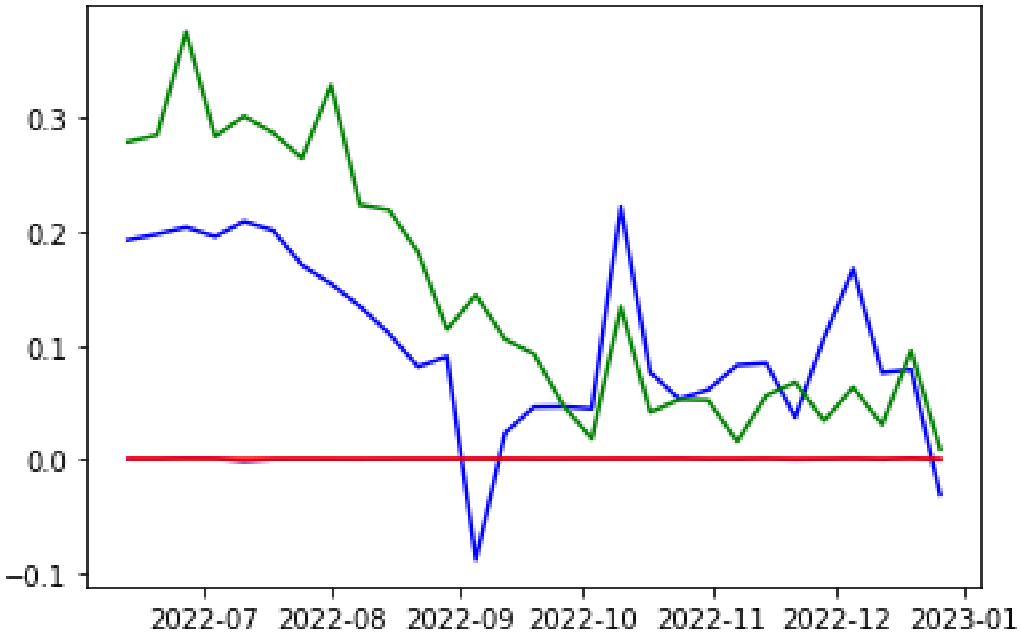
0.4 Deaths Data Compared to Three More States:

[232]:
```
#utah
#remove suffixes and convert to datetime
ut_deaths = utah.filter(regex='_x')
ut_deaths.columns = ut_deaths.columns.str.rstrip('_x')
ut_deaths.columns = pd.to_datetime(ut_deaths.columns)
```

```
ut_deaths_week = ut_deaths.T.reset_index()
ut_deaths_week = ut_deaths_week.assign(Weeks = ut_deaths_week['index']).
 ↪drop(columns = 'index')
ut_deaths_week['Weeks'] = ut_deaths_week['Weeks'].astype('datetime64[ns]')

#get mean deaths per week
ut_deaths_week_mean = ut_deaths_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True)
ut_deaths_week_mean = ut_deaths_week_mean.loc['2022-06-01':'2022-12-31', :]
ut_deaths_new_week_mean = ut_deaths_week_mean.sum(axis=1).diff()


#nebraska
#remove suffixes and convert to datetime
ne_deaths = nebraska.filter(regex='_x')
ne_deaths.columns = ne_deaths.columns.str.rstrip('_x')
ne_deaths.columns = pd.to_datetime(ne_deaths.columns)
ne_deaths_week = ne_deaths.T.reset_index()
ne_deaths_week = ne_deaths_week.assign(Weeks = ne_deaths_week['index']).
 ↪drop(columns = 'index')
ne_deaths_week['Weeks'] = ne_deaths_week['Weeks'].astype('datetime64[ns]')

#get mean deaths per week
ne_deaths_week_mean = ne_deaths_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True)
ne_deaths_week_mean = ne_deaths_week_mean.loc['2022-06-01':'2022-12-31', :]
ne_deaths_new_week_mean = ne_deaths_week_mean.sum(axis=1).diff()


#alaska
#remove suffixes and convert to datetime
ak_deaths = alaska.filter(regex='_x')
ak_deaths.columns = ak_deaths.columns.str.rstrip('_x')
ak_deaths.columns = pd.to_datetime(ak_deaths.columns)
ak_deaths_week = ak_deaths.T.reset_index()
ak_deaths_week = ak_deaths_week.assign(Weeks = ak_deaths_week['index']).
 ↪drop(columns = 'index')
ak_deaths_week['Weeks'] = ak_deaths_week['Weeks'].astype('datetime64[ns]')

#get mean deaths per week
ak_deaths_week_mean = ak_deaths_week.resample('W-Mon', label='left', closed =␣
 ↪'left', on='Weeks').mean(numeric_only=True)
ak_deaths_week_mean = ak_deaths_week_mean.loc['2022-06-01':'2022-12-31', :]
ak_deaths_new_week_mean = ak_deaths_week_mean.sum(axis=1).diff()
```

[277]:
```
#mean data across the three states
fig2 = plt.figure()
ax2 = fig2.add_subplot()

ax2.plot((wi_deaths_new_week_mean / wi_pop[0])*100, color="purple")
ax2.plot((ut_deaths_new_week_mean / ut_pop[0])*100, color="blue")
ax2.plot((ne_deaths_new_week_mean / ne_pop[0])*100, color="red")
ax2.plot((ak_deaths_new_week_mean / ak_pop[0])*100, color="green")
```

[277]:
```
[<matplotlib.lines.Line2D at 0x7f409fd4a520>]
```



1 Data Report:

The data for both cases and deaths appears to follow a similar trend when compared to both the country and other states. There are noticeable peaks around holidays in the United States, as well as fall break for most schools. It is important to note that Wisconsin does not have the same peak in October when compared to the three other states, and that outside of Utah's peaks, Wisconsin consistently has the highest cases out of the chosen states. Utah has the highest peaks out of the observed states, but the shape of the peaks does closely resemble Alaska's.

[ ]: