Unemployment Analysis

In [1]:
```
#importing Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns

import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
#loading our dataset
unemp = pd.read_csv("Unemployment in India.csv")
unemp.head()
```

Out[2]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
0	Andhra Pradesh	31-05-2019	Monthly	3.65	11999139.0	43.24	Rural
1	Andhra Pradesh	30-06-2019	Monthly	3.05	11755881.0	42.05	Rural
2	Andhra Pradesh	31-07-2019	Monthly	3.75	12086707.0	43.50	Rural
3	Andhra Pradesh	31-08-2019	Monthly	3.32	12285693.0	43.97	Rural
4	Andhra Pradesh	30-09-2019	Monthly	5.17	12256762.0	44.68	Rural

In [3]:
```
# dataset information
unemp.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to 767
Data columns (total 7 columns):
 #   Column                                    Non-Null Count  Dtype
---  ------                                    --------------  -----
 0   Region                                    740 non-null    object
 1    Date                                     740 non-null    object
 2    Frequency                                740 non-null    object
 3    Estimated Unemployment Rate (%)          740 non-null    float64
 4    Estimated Employed                       740 non-null    float64
 5    Estimated Labour Participation Rate (%)  740 non-null    float64
 6   Area                                      740 non-null    object
dtypes: float64(3), object(4)
memory usage: 42.1+ KB
```

In [4]:
```
# print random 5 rows
unemp.sample(5)
```

Out[4]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
221	Odisha	30-09-2019	Monthly	4.31	11167715.0	40.32	Rural
462	Goa	31-12-2019	Monthly	16.22	288154.0	42.77	Urban
644	Rajasthan	31-05-2019	Monthly	13.62	5108436.0	39.44	Urban
538	Karnataka	31-10-2019	Monthly	3.87	8799249.0	39.70	Urban
398	Assam	30-04-2020	Monthly	8.37	1454956.0	38.45	Urban

In [5]:
```
# find null values
unemp.isna().sum()
```

Out[5]:
```
Region                                    28
 Date                                     28
 Frequency                                28
 Estimated Unemployment Rate (%)          28
 Estimated Employed                       28
 Estimated Labour Participation Rate (%)  28
Area                                      28
dtype: int64
```

In [6]:
```
unemp.describe()
```

Out[6]:

	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)
count	740.000000	7.400000e+02	740.000000
mean	11.787946	7.204460e+06	42.630122
std	10.721298	8.087988e+06	8.111094
min	0.000000	4.942000e+04	13.330000
25%	4.657500	1.190404e+06	38.062500
50%	8.350000	4.744178e+06	41.160000
75%	15.887500	1.127549e+07	45.505000
max	76.740000	4.577751e+07	72.570000

In [7]:
```
unemp['Area'].value_counts()
```

Out[7]:
```
Urban    381
Rural    359
Name: Area, dtype: int64
```

In [8]:
```
unemp['Region'].value_counts()
```

Out[8]:
```
Andhra Pradesh      28
Kerala              28
West Bengal         28
Uttar Pradesh       28
Tripura             28
Telangana           28
Tamil Nadu          28
Rajasthan           28
Punjab              28
Odisha              28
Madhya Pradesh      28
Maharashtra         28
Karnataka           28
Jharkhand           28
Himachal Pradesh    28
Haryana             28
Gujarat             28
Delhi               28
Chhattisgarh        28
Bihar               28
Meghalaya           27
Uttarakhand         27
Assam               26
Puducherry          26
Goa                 24
Jammu & Kashmir     21
Sikkim              17
Chandigarh          12
Name: Region, dtype: int64
```

In [10]:
```
unemp[' Date'].value_counts()
```

Out[10]:
```
 31-10-2019    55
 30-11-2019    55
 31-05-2019    54
 30-06-2019    54
 31-07-2019    54
 31-08-2019    53
 31-12-2019    53
 31-01-2020    53
 29-02-2020    53
 30-09-2019    52
 31-03-2020    52
 30-04-2020    51
 31-05-2020    51
 30-06-2020    50
Name:  Date, dtype: int64
```

In [11]:
```
# there's a typo in frequency values
unemp[' Frequency'].value_counts()
```

Out[11]:
```
Monthly     381
 Monthly    359
Name:  Frequency, dtype: int64
```

In [13]:
```
# checking the correlation between Estimated Employed and Estimated Unemployment Rate (%)
unemp[' Estimated Employed'].corr(unemp[' Estimated Unemployment Rate (%)'])
```

Out[13]:
```
-0.22287639952214786
```

Data Cleaning

In [14]:
```
# Dropping null values and frequency column
df2 = unemp.dropna().drop(columns=[' Frequency'])
df2
```

Out[14]:

	Region	Date	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
0	Andhra Pradesh	31-05-2019	3.65	11999139.0	43.24	Rural
1	Andhra Pradesh	30-06-2019	3.05	11755881.0	42.05	Rural
2	Andhra Pradesh	31-07-2019	3.75	12086707.0	43.50	Rural
3	Andhra Pradesh	31-08-2019	3.32	12285693.0	43.97	Rural
4	Andhra Pradesh	30-09-2019	5.17	12256762.0	44.68	Rural
...	...	...	...	...	...	...
749	West Bengal	29-02-2020	7.55	10871168.0	44.09	Urban
750	West Bengal	31-03-2020	6.67	10806105.0	43.34	Urban
751	West Bengal	30-04-2020	15.63	9299466.0	41.20	Urban
752	West Bengal	31-05-2020	15.22	9240903.0	40.67	Urban
753	West Bengal	30-06-2020	9.86	9088931.0	37.57	Urban

740 rows × 6 columns

In [22]:
```
# renaming columns name
df3 = df2.rename(columns={'Region':'region', ' Date':'date', ' Estimated Unemployment Rate (%)
                          ' Estimated Employed':'est_mil_emp', ' Estimated Labour Participatior
                          'Area':'area'}).reset_index(drop = True)
```

In [23]:
```
df3
```

Out[23]:

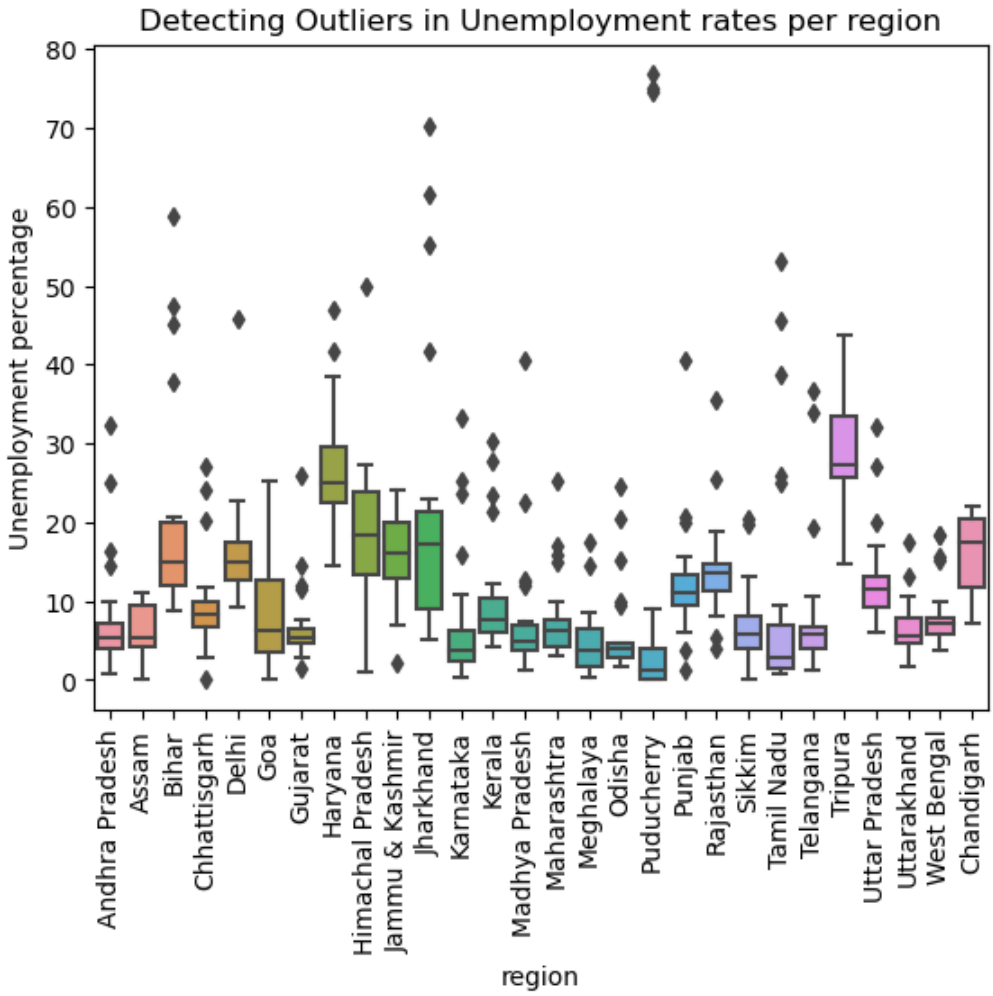
	region	date	est_unemp_perc	est_mil_emp	est_labour_perc	area
0	Andhra Pradesh	31-05-2019	3.65	11999139.0	43.24	Rural
1	Andhra Pradesh	30-06-2019	3.05	11755881.0	42.05	Rural
2	Andhra Pradesh	31-07-2019	3.75	12086707.0	43.50	Rural
3	Andhra Pradesh	31-08-2019	3.32	12285693.0	43.97	Rural
4	Andhra Pradesh	30-09-2019	5.17	12256762.0	44.68	Rural
...	...	...	...	...	...	...
735	West Bengal	29-02-2020	7.55	10871168.0	44.09	Urban
736	West Bengal	31-03-2020	6.67	10806105.0	43.34	Urban
737	West Bengal	30-04-2020	15.63	9299466.0	41.20	Urban
738	West Bengal	31-05-2020	15.22	9240903.0	40.67	Urban
739	West Bengal	30-06-2020	9.86	9088931.0	37.57	Urban

740 rows × 6 columns

In [24]:
```
# checking the duplicates
df3.duplicated().sum()
```

Out[24]: 0

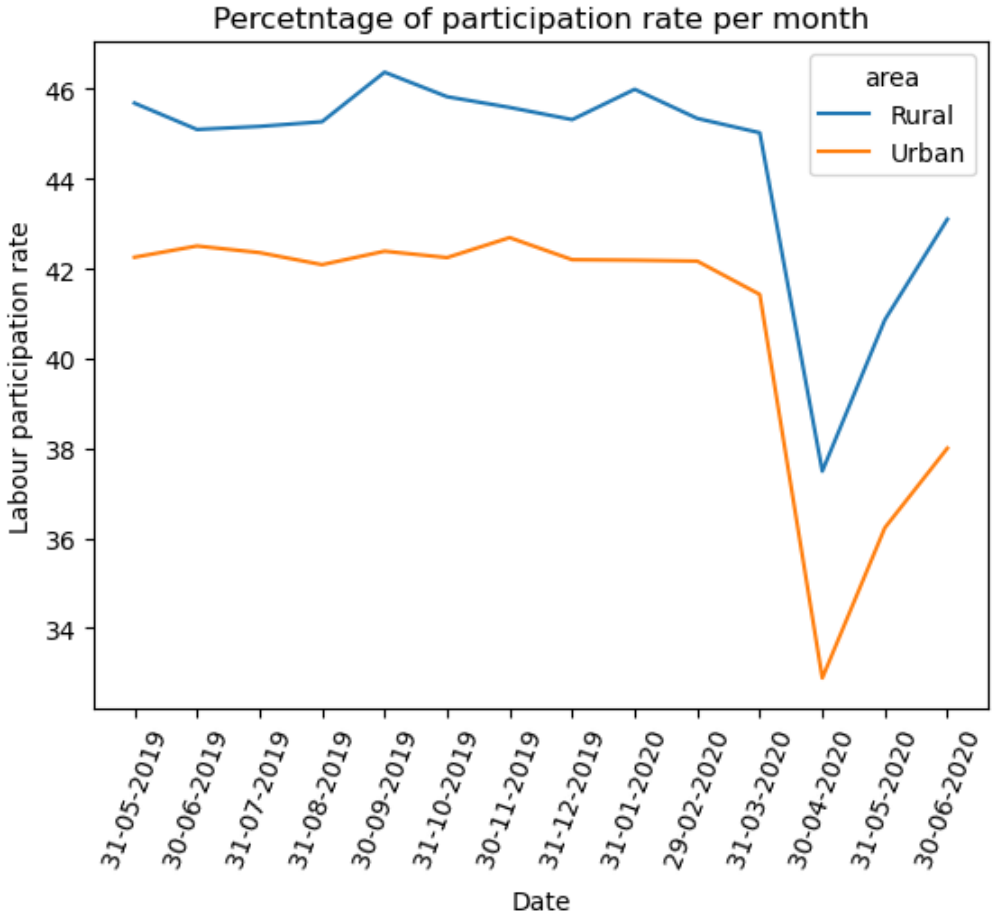
In [26]:
```
# checking the outliers
sns.boxplot(data=df3, x='region', y='est_unemp_perc')
plt.title('Detecting Outliers in Unemployment rates per region')
plt.ylabel('Unemployment percentage')
plt.xticks(rotation = 90)
plt.show()
```



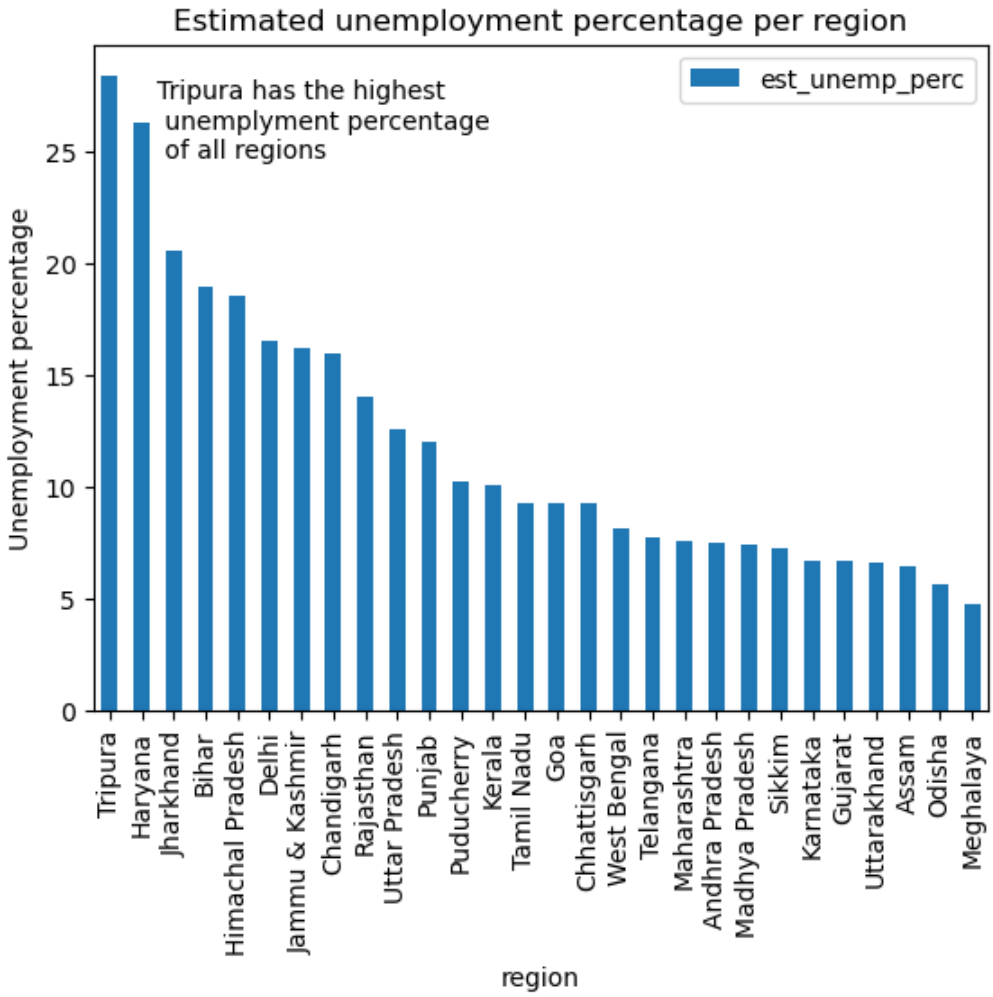
Data Visualization

In [31]:
```
# particiation rate per month
sns.lineplot(data=df3, x='date', y='est_labour_perc', hue='area', errorbar=None)
plt.title('Percetntage of participation rate per month')
plt.xlabel('Date')
plt.ylabel('Labour participation rate')
plt.xticks(rotation=70)

plt.show()
```

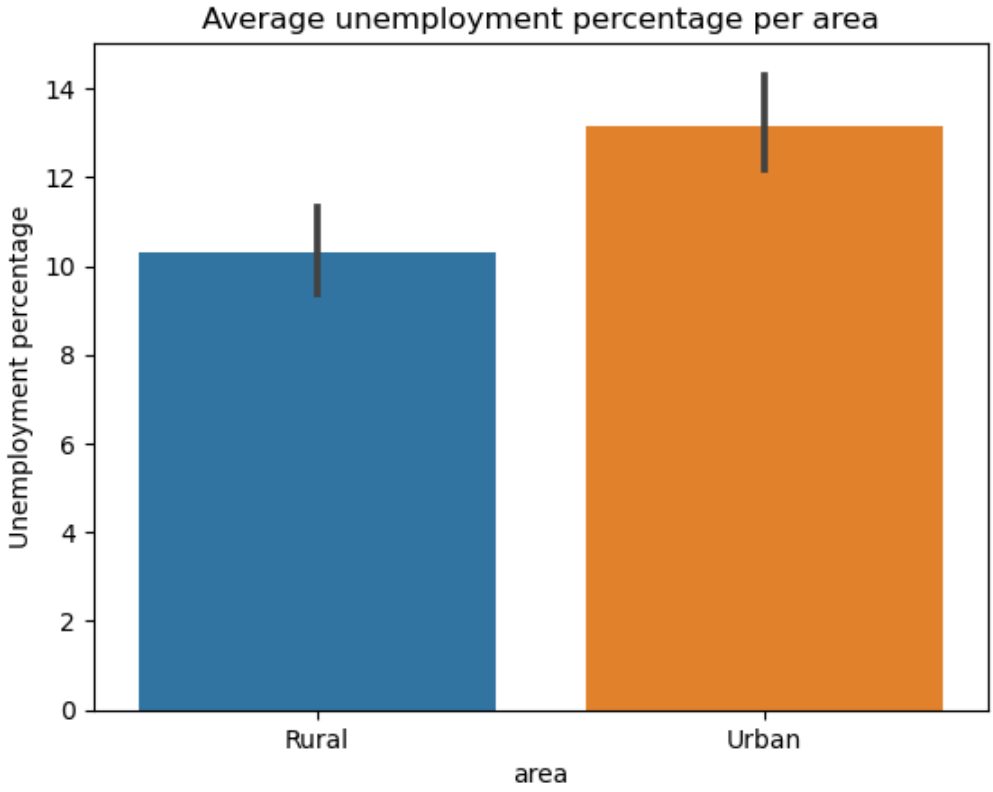


In [37]:
```
df5 = df3.groupby('region')[['est_unemp_perc']].mean().sort_values(by='est_unemp_perc', ascend
df5.plot(kind='bar')
plt.title('Estimated unemployment percentage per region')
plt.ylabel('Unemployment percentage')
plt.xticks(rotation=90)
plt.figtext(x= 0.18, y=0.75, s='Tripura has the highest\n unemplyment percentage\n of all regi
plt.show()
```



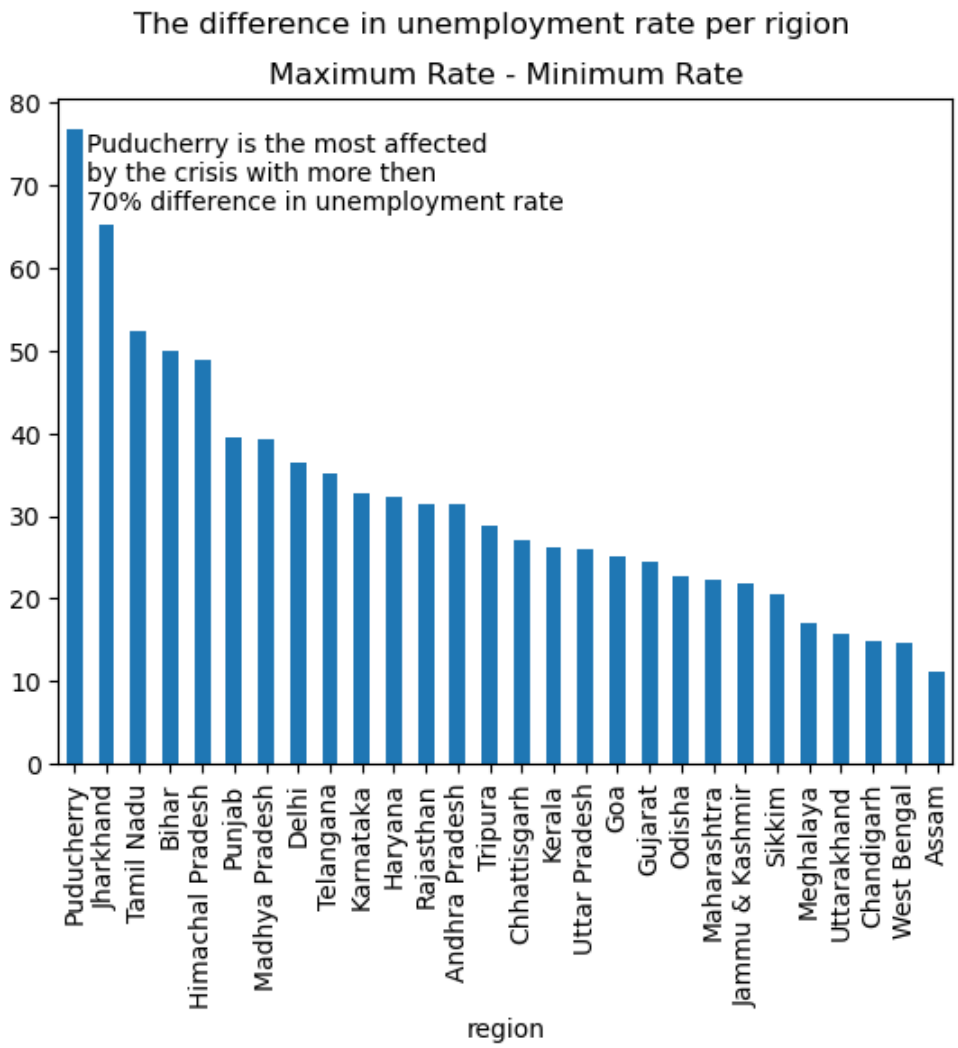
In [38]:

```
# area wise unemplyment rate
sns.barplot(data=df3, x='area', y='est_unemp_perc')
plt.title('Average unemployment percentage per area')
plt.ylabel('Unemployment percentage')
plt.show()
```



Rural area has a lower unemployment percentage than urban areas.

In [48]:
```
ax1 = df3.groupby('region')['est_unemp_perc'].agg(lambda x: max(x) - min(x)).sort_values(ascer
plt.suptitle('The difference in unemployment rate per rigion')
plt.title('Maximum Rate - Minimum Rate')
plt.figtext(x= 0.15, y= 0.75, s='Puducherry is the most affected'
                               '\nby the crisis with more then'
                               '\n70% difference in unemployment rate')
plt.show()
```



Conclusion

1. During the peak of the crisis in April 2020, the labor force participation rate reached its lowest point, indicating a significant decrease in economic activity.

2. Visualizations show that urban areas generally experienced higher unemployment rates compared to rural areas.

3. Some states, such as Meghalaya, had the fewest employees but also the lowest unemployment rates. In contrast, states like Puducherry were severely impacted by the crisis.

You can find this project on **GitHub.**